

**ABSTRACT**

The CC2564MODNEM is a low-cost evaluation board for TI's CC2564MODN device. The evaluation board is designed to plug-in to additional TI hardware development kits, such as MSP430 or TM4C microcontroller development platforms, to create a complete evaluation platform. This guide is designed to help users quickly get started with the CC2564MODNEM board and integrate it with multiple platforms for prototyping Bluetooth applications.

The CC2564MODN device is a complete Bluetooth BR/EDR/LE HCI solution based on TI's CC2564B dual-mode Bluetooth single-chip device, which reduces design effort and enables fast time to market. The CC2564MODN device includes TI's seventh-generation Bluetooth core and provides a product-proven solution that is Bluetooth 4.1 compliant. The CC2564MODN device provides best-in-class RF performance with a transmit power and receive sensitivity that provides range of about 2 times compared to other Bluetooth Low Energy only solutions.

Table of Contents

1 Introduction	3
2 Features	3
3 CC2564MODNEM Board Applications	4
4 Introduction to CC2564MODNEM Board	4
5 Kit Contents	5
6 Requirements	5
7 Overview	7
8 Hardware Description	9
8.1 Overview.....	9
8.2 Connectors.....	9
8.3 Board Configurations.....	12
9 Software Tools	17
9.1 TI Dual-Mode <i>Bluetooth</i> Stack.....	17
9.2 TI Dual-Mode <i>Bluetooth</i> Service Pack for CC256x.....	17
9.3 <i>Bluetooth</i> Hardware Evaluation Tool.....	17
10 Manual Information to the End User	18
10.1 RF Function.....	18
10.2 FCC or IC Certification and Statement.....	18
10.3 EU Certification and Statement.....	21
11 Revision History	22

List of Figures

Figure 4-1. CC2564MODNEM Board.....	4
Figure 6-1. MSP430 Hardware Setup Examples.....	6
Figure 6-2. TM4C Hardware Setup Examples.....	6
Figure 6-3. Other MCU Hardware Setup Examples.....	6
Figure 7-1. CC2564MODNEM Board Front Overview.....	7
Figure 7-2. CC2564MODNEM Board Back Connectors.....	8
Figure 8-1. CC2564MODNEM Block Diagram.....	9
Figure 8-2. Jumper Configuration.....	12
Figure 8-3. Jumper Configuration.....	13
Figure 8-4. Clock Input.....	13
Figure 8-5. UART Default Configuration.....	14
Figure 8-6. UART COM Connector Configuration.....	14
Figure 8-7. PCM Connector Configuration.....	15

Figure 8-8. Resistors to Change the Direction of PCM.....	16
Figure 8-9. R11 DNI to Enable Audio Features.....	16
Figure 10-1. Anatel Certification Label.....	19

Trademarks

MSP430™ are trademarks of TI.

Bluetooth® are registered trademarks of Bluetooth SIG.

All trademarks are the property of their respective owners.

1 Introduction

The CC2564MODNEM evaluation board contains the CC2564MODN device. TI intends the board for evaluation and design purposes. For a complete evaluation solution, the CC2564MODNEM board plugs directly into the following TI hardware development kits:

- MSP-EXP430F5529
- MSP-EXP430F5438
- DK-TM4C123G
- DK-TM4C129X
- Other MCU

A certified and royalty-free TI *Bluetooth* stack (TIBLUETOOTHSTACK-SDK) is available for the MSP430™ and TM4C12x MCUs. The CC2564MODNEM hardware design files (schematics, layout, and bill of materials [BOM]) are provided as a reference to aid in the implementation of the CC2564MODN device.

2 Features

- Features a CC2564MODN device (MOE package)
- Supports *Bluetooth* Specification v4.1
- Supports dual-mode – *Bluetooth* + *Bluetooth* low energy
- Offers class 1.5-transmit power (+10 dBm)
- Offers high sensitivity (–93 dBm typical)
- Offers a 32.768-kHz oscillator
- Offers a UART interface – control and data
- Offers a PCM/I2S interface – voice and audio
- Offers 4-layer PCB design
- Offers 1.8 LDO (LP2985-18)
- Offers three voltage level translators (SN74AVC4T774)
- Offers a chip antenna (LTA-5320-2G4S3-A1)
- Offers a RF connector (U.FL-R-SMT-1)
- Offers EM connectors that plug directly into the following TI hardware development kits:
 - MSP-EXP430F5529
 - MSP-EXP430F5438
 - DK-TM4C123G
 - DK-TM4C129X
 - Other MCU
- Offers COM connectors that plug directly into the TI hardware development kits
- Features Certified and royalty-free TI dual-mode *Bluetooth* stack (TIBLUETOOTHSTACK-SDK):
 - MSP430™ (CC256XMSPBTBLESW)
 - TM4C (CC256XM4BTBLESW)
 - Other MCU (CC256XSTBTBLESW)

3 CC2564MODNEM Board Applications

Example embedded wireless applications include the following:

- Cable replacement
- Printer adapters
- Personal digital assistants (PDAs)
- Printers and scanners
- Computers and peripherals
- Wireless sensors
- Industrial control applications
- Low-power medical

4 Introduction to CC2564MODNEM Board

TI intends this user's guide for use with TI's *Bluetooth* development platform, the CC2564MODNEM board. This guide will help you quickly get started with this board and integrate it with TI's evaluation platforms and software SDKs. This user's guide describes the components and configurations of this board to quickly get started with using this board for various *Bluetooth* applications. This guide provides information about the module so you can apply the board specifics to your application. Module information and capabilities, including pin descriptions, available software, and tools, enhance your out-of-box experience.

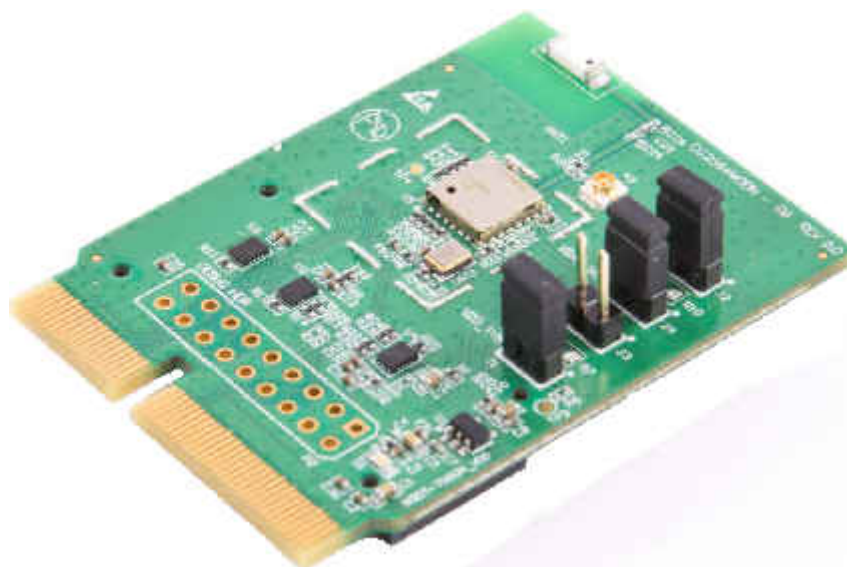


Figure 4-1. CC2564MODNEM Board

5 Kit Contents

- One CC2564MODNEM board with TI dual-mode *Bluetooth* CC2564 module
- One block jumper for MSP-EXP430F5438 board
- Four jumpers for MSP-EXP430F5529 board

6 Requirements

The following hardware and software tools are required for a complete evaluation:

Hardware

- One MSP430 experimenter board – sold separately
 - [MSP-EXP430F5529 board](#)
 - [MSP-EXP430F5438 board](#)
- One TM4C Development Kit – sold separately
 - [DK-TM4C123G Development Kit](#)
 - [DK-TM4C129X Development Kit](#)

Software

- TI dual-mode *Bluetooth* stack
 - On MSP430 MCUs: [CC256XMSPBTBLESW](#)
 - On TM4C MCUs: [CC256XM4BTBLESW](#)
- Other MCU
 - On STM32F4 MCUs: [CC256XSTBTBLESW](#)

Tools

- [TI dual-mode *Bluetooth* Service Pack for CC256x](#) (optional)
- [CC256x *Bluetooth* Hardware Evaluation Tool](#) (optional)
- IDE Versions – Platform Dependent
 - [Code Composer Studio \(CCS\)](#)
 - [IAR 7.2/7.3 for ARM](#)
 - [Keil μVision 4.70.0.0](#)

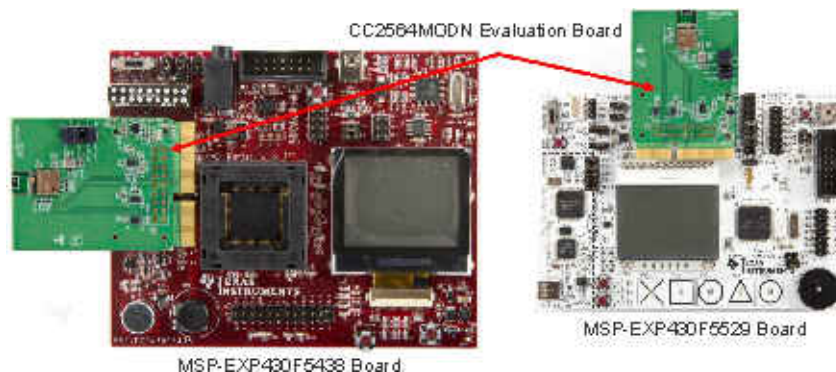


Figure 6-1. MSP430 Hardware Setup Examples



Figure 6-2. TM4C Hardware Setup Examples

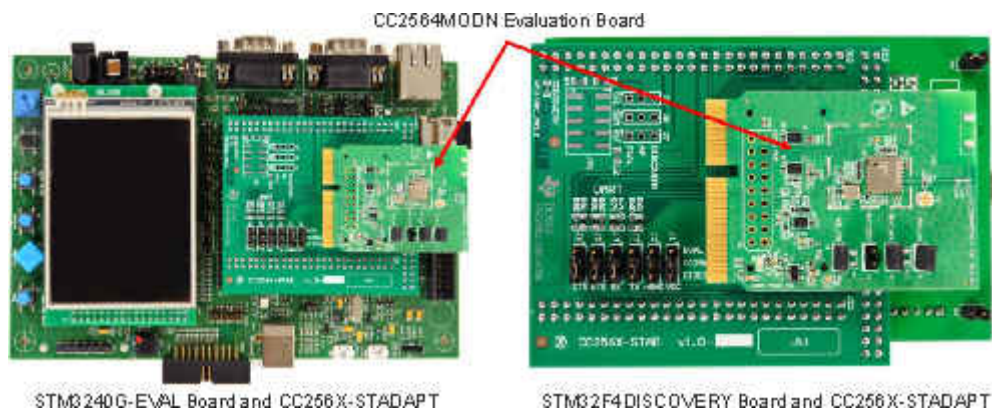


Figure 6-3. Other MCU Hardware Setup Examples

7 Overview

The CC2564MODNEM board is the development environment for the CC2564MODN module and plugs directly into TI's MSP430 and TM4C experimenter boards with EM connectors that simplify prototype wiring and field trials.

This module is based upon TI's CC2564B device and uses a host controller interface (HCI); this module is a cost-effective and flexible way to implement a *Bluetooth* network. The HCI reduces the cost of the BOM by giving designers the flexibility to choose a controller and eliminating redundant processing capacity while the *Bluetooth* stack resides and executes on the host processor of the application.

The CC2564MODNEM board has two connectors: EM and COM. The I/Os for the EM are at 3.3 V, which is the default assembly configuration. The I/Os for the COM are at 1.8 V and require hardware modification.

TI intends the CC2564MODNEM board for evaluation purposes and to work with TI's Hardware Development Kit. Refer to [Section 9](#) for further details.

To implement this reference design, schematic and layout files are available on the [CC2564MODN product page](#).

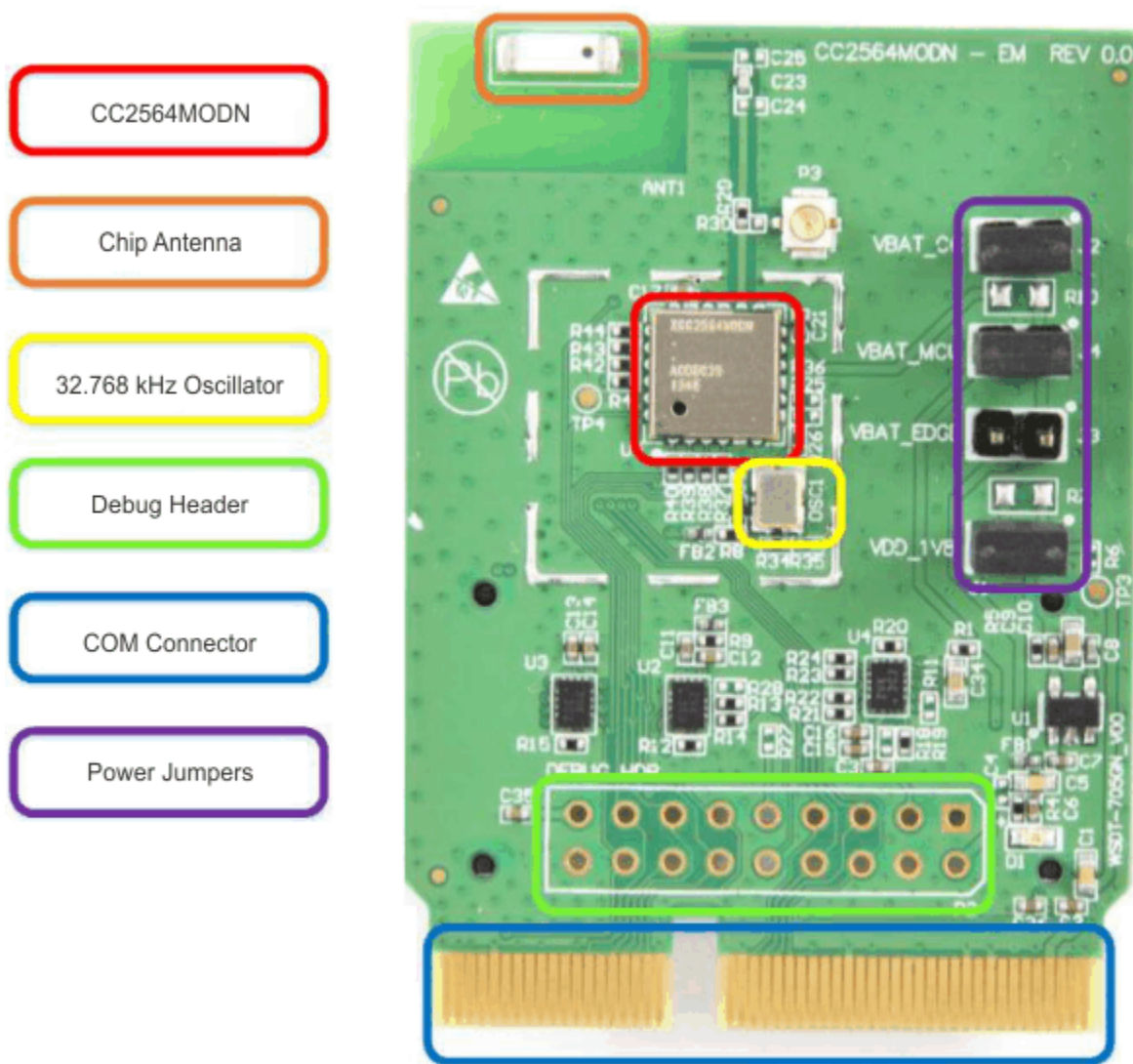


Figure 7-1. CC2564MODNEM Board Front Overview

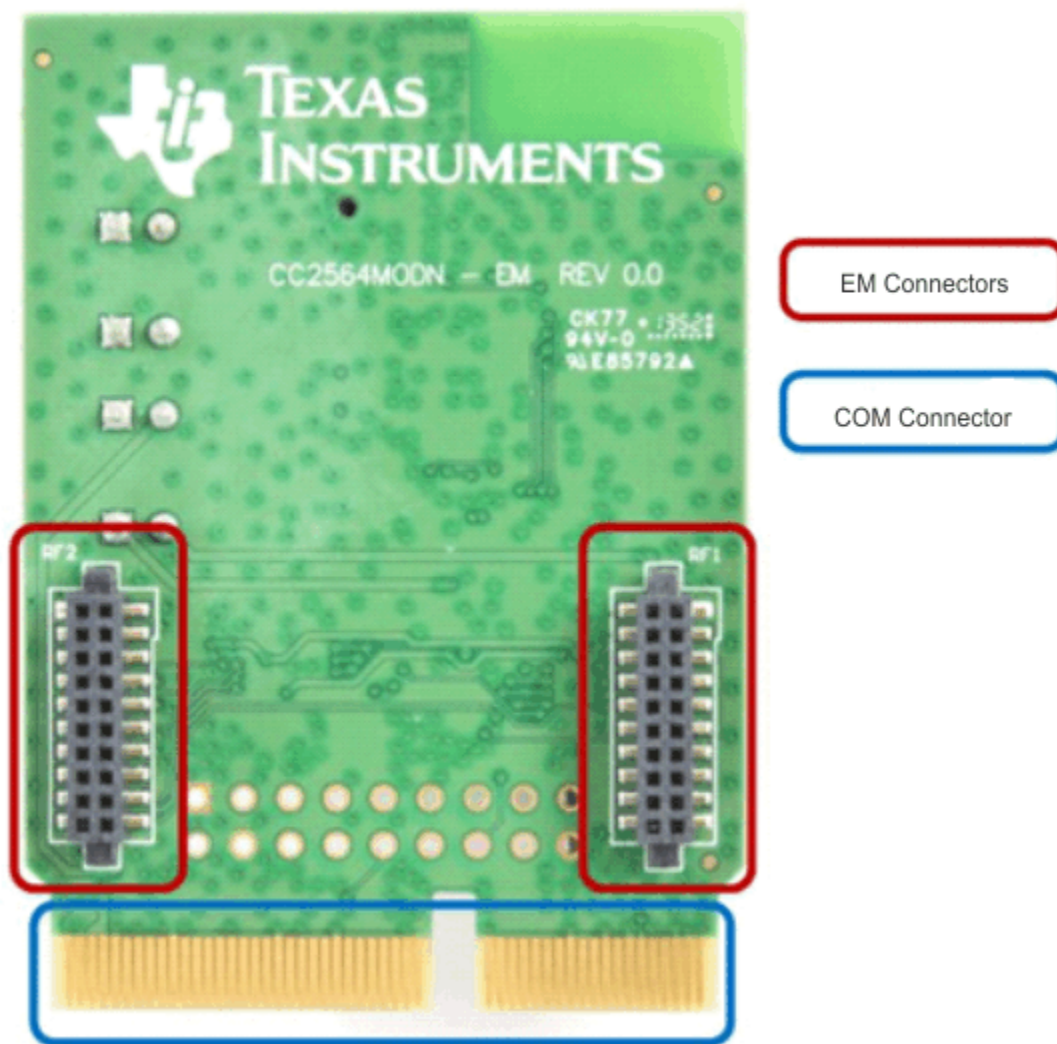


Figure 7-2. CC2564MODNEM Board Back Connectors

8 Hardware Description

8.1 Overview

Figure 8-1 is the high-level block diagram of the CC2564MODNEM board. The oscillator is the default clock with a frequency accuracy of 32.768 kHz + –250 ppm. The signals from the dual-mode *Bluetooth* CC2564 module include UART, PCM, nSHUTD, and slow clock. The CC2564MODNEM board has the following connectors:

- EM (default)
- COM

The connectors can supply power to the CC2564MODN through either VBAT_EDGE or VBAT_MCU. For the EM connector, the signals are controlled through level shifters. The hardware can be configured and modified to use the slow clock from the connectors. The third connector, the debug header, can be used for testing. The I/Os of the EM connector are at 3.3 V. The I/Os of the COM connector are at 1.8 V and require hardware modification. The I/Os for the debug header connector are at 1.8 V and require hardware modification.

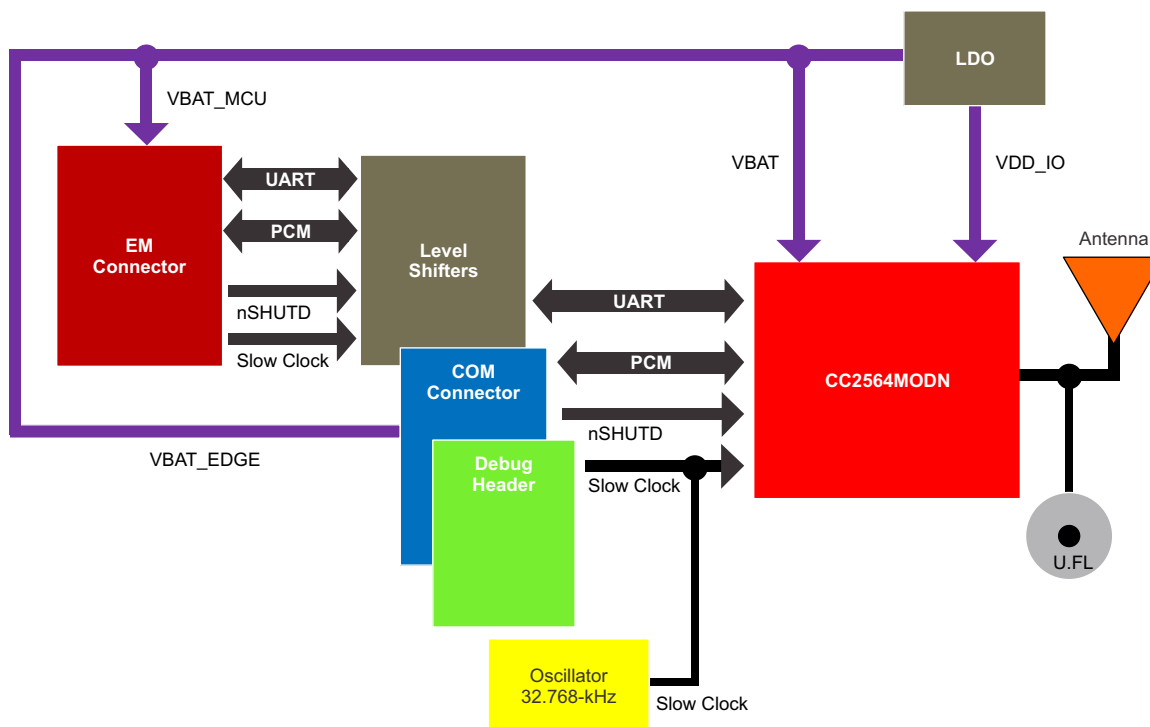


Figure 8-1. CC2564MODNEM Block Diagram

8.2 Connectors

8.2.1 The EM Connector

The EM connectors can mount a variety of TI MCU platforms such as the MSP430 (MSP-EXP430F5529 and MSP-EXP430F5438) and TM4C (DK-TM4C123G and DK-TM4C129X). The EM I/Os are at 3.3 V. The pin assignments are for the CC2564MODN side. For example, MODULE_UART_RX refers to the receiving UART RX pin on the CC2564MODN that connects to the UART TX pin on the MCU. Figure 7-2 shows the EM connector on the board. Table 8-1 shows the standard pinout.

Table 8-1. EM1 Connector Standard Pinout

Pin Number	EM Adaptor Assignment	Pin Number	EM Adaptor Assignment
1	GND	2	N/C
3	MODULE_UART_CTS	4	N/C
5	SLOW_CLK	6	N/C
7	MODULE_UART_RX	8	N/C
9	MODULE_UART_TX	10	N/C

Table 8-1. EM1 Connector Standard Pinout (continued)

Pin Number	EM Adaptor Assignment	Pin Number	EM Adaptor Assignment
11	N/C	12	N/C
13	N/C	14	N/C
15	N/C	16	N/C
17	N/C	18	N/C
19	GND	20	N/C

Table 8-2. EM2 Connector Standard Pinout

Pin Number	EM Adaptor Assignment	Pin Number	EM Adaptor Assignment
1	N/C	2	GND
3	N/C	4	N/C
5	N/C	6	N/C
7	3.3V	8	MODULE_AUDIO_DATA_OUT
9	3.3V	10	MODULE_AUDIO_DATA_IN
11	MODULE_AUDIO_FSINK	12	N/C
13	N/C	14	N/C
15	N/C	16	N/C
17	MODULE_AUDIO_CLK	18	MODULE_UART_RTS
19	nSHUTD	20	N/C

8.2.2 The COM Connector

The COM connector interfaces with TI's MPU platforms such as AM335x evaluation module (TMDXEVM3358). I/Os of the COM connector are at 1.8 V. Some components must not be installed (DNI) to use the COM connector. See [Section 8.3](#) for further details. [Table 8-3](#) shows the pinout for the COM connector.

Table 8-3. COM Connector Pinout ⁽¹⁾

Pin Number	Relevant COM Connector Pin Assignment
1	SLOW_CLK_EDGE
8	1V8_IN
52	AUD_CLK_1V8
54	AUD_FSYNC_1V8
56	AUD_IN_1V8
58	AUD_OUT_1V8
66	HCI_TX_1V8
68	HCI_RX_1V8
70	HCI_CTS_1V8
72	HCI_RTS_1V8
76	TX_DEBUG_1V8
89	nSHUTDOWN_1V8
3, 9, 19, 37, 47, 63, 77, 83, 87, 95, 97	GND
2, 6, 18, 22, 42, 60, 64, 92	GND

(1) All other pins are N/C.

8.2.3 Debug Header

The debug header enables important signals in the design such as power, ground, debug, UART, and audio signals for testing and debugging. The I/Os are at 1.8 V. [Table 8-4](#) lists the physical location of the pin numbers.

Table 8-4. Debug Header Pinout

Pin Number	EM Adapter Pin Assignment	Pin Number	EM Adapter Pin Assignment
1	GND	2	VBAT
3	VIO_HOST	4	GND
5	AUD_FSYNC_1V8	6	AUD_CLK_1V8
7	AUD_OUT_1V8	8	AUD_IN_1V8
9	CLK_REQ_OUT_1V8	10	SLOW_CLK_EDGE
11	HCI_TX_1V8	12	HCI_RX_1V8
13	HCI_CTS_1V8	14	HCI_RTS_1V8
15	TX_DEBUG_1V8	16	nSHUTDOWN_1V8
17	VDD_1V8	18	GND

8.3 Board Configurations

8.3.1 Power Supplies Configuration

The CC2564MODN device requires the following power sources:

- VDD_IN: the main power supply for the module
- VDD_IO: the power source for the 1.8-V I/O ring

The HCI module includes several on-chip voltage regulators for increased noise immunity and can be connected directly to the battery.

8.3.1.1 Jumper Configuration

The CC2564MODNEM board has four jumpers that can be configured to control power on the board. The power supply can be enabled through either the COM or EM connector through the VBAT_MCU or VBAT_EDGE jumper. VBAT_EDGE and VBAT_MCU are the power supply to the entire board. VDD_1V8 is the power supply jumper to the pins going in and out of the module, while the VBAT_CC jumper is the main default power supply to the CC2564. Ensure to place jumpers to connect power to the device.

Table 8-5. Jumper Configurations

Jumper	Description
VDD_1V8 (J1)	Supplies power to CC2564 I/Os
VBAT_CC (J2)	Main power supply for CC2564
VBAT_EDGE (J3)	Enable power supply through the COM connector
VBAT_MCU (J4)	Enable power supply through EM connectors

Figure 8-2 shows the default settings for the jumpers on the CC2564MODNEM board. The configuration for the board can be found in Table 8-5.

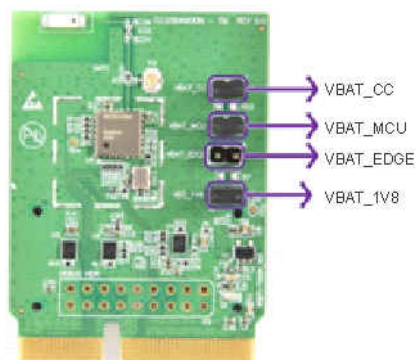


Figure 8-2. Jumper Configuration

8.3.1.2 Measuring Current Consumption

These jumpers can measure the current consumption by placing current sense resistors on R10 for VBAT_CC and R7 for VDD_1V8. Both of these resistors are 0.10 Ω , 1/4 W. The VBAT_CC jumper (J2) can measure the power consumed by the CC2564 including the RF TX and RF RX while the VDD_1V8 jumper (J1) can measure power consumed by the digital VDD_IO.

8.3.2 RF Interface

The board can be configured to route the radio frequency (RF) output from the CC2564MODN to the on-board chip antenna or the on-board U.FL connector. This configuration is done by placing the resistor in either R29 or R30 position which has negligible resistance of 0 Ω . R30 connects the RF output to the U.FL while R29 connects to the chip antenna. The U.FL connector is for testing. The [Bluetooth Hardware Evaluation Tool \(BHET\)](#) can be used to test the basic RF functionality of this board.

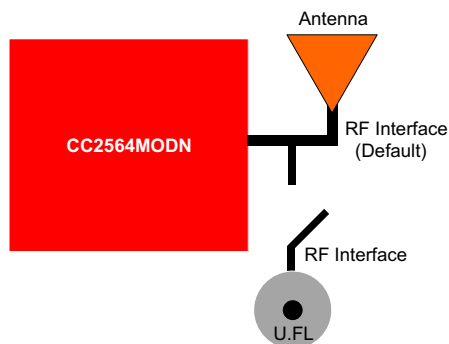


Figure 8-3. Jumper Configuration

8.3.3 Slow Clock

8.3.3.1 Clock Inputs

The slow clock can come from an internal or external source. The CC2564MODNEM lets you place the slow clock on the board (the default setting) or source it from an external source. The CC2564MODN connects to the SLOW_CLK_IN and can be a digital signal in the range of 0 V to 1.8 V. The frequency accuracy of the slow clock must be $32.768\text{ kHz} \pm 250\text{ ppm}$ for *Bluetooth* use (according to the *Bluetooth* specification).

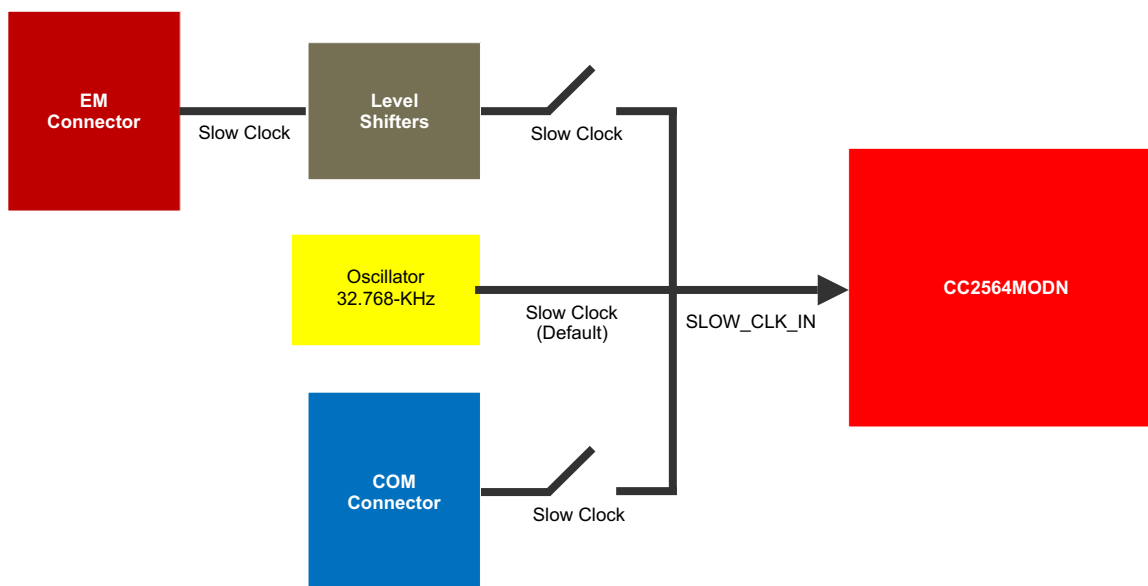


Figure 8-4. Clock Input

8.3.4 UART Configuration

The UART for the CC2564MODNEM board can be routed to the EM or COM connector. The signals are also available to the debug header to probe the signals. Figure 8-5 shows the EM connector as the default UART configuration, where the dotted line shows that the COM connector is not connected. To configure the COM connector for UART, remove or unpopulate the U3 level shifter as shown in Figure 8-6, where the level shifter is dotted to represent the unpopulated level shifter.

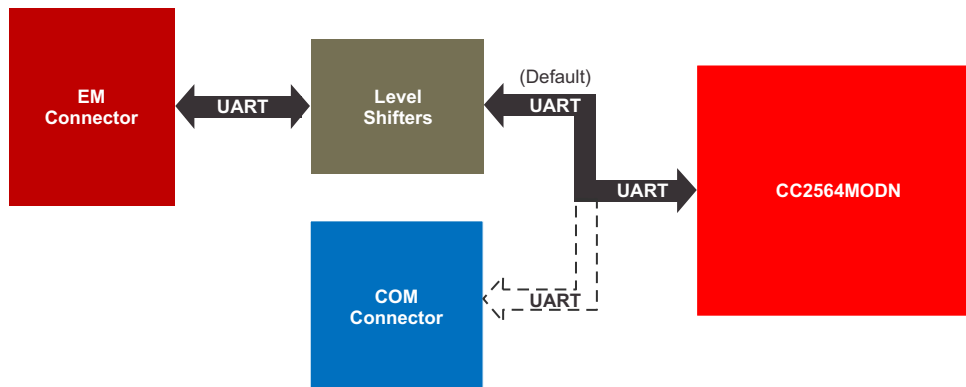


Figure 8-5. UART Default Configuration

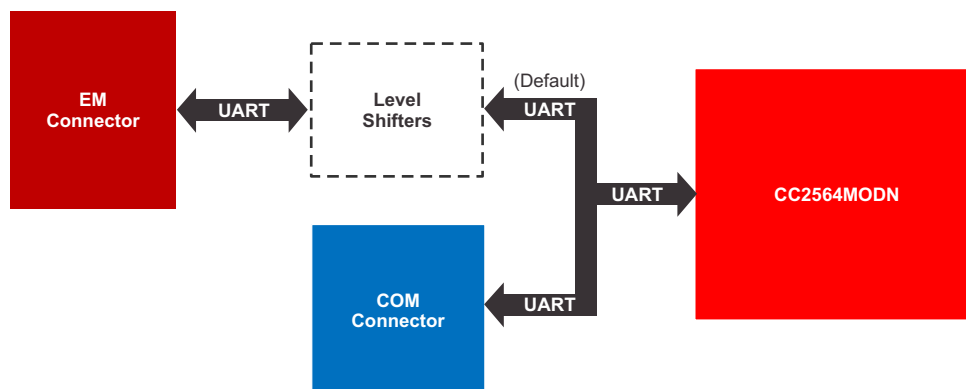


Figure 8-6. UART COM Connector Configuration

8.3.5 PCM Configuration

For voice and assisted audio features, the PCM signals from CC2564MODN (master) must be connected to an external audio host (slave). This relationship signifies that the CC2564MODN board provides the FSYNC and slow clock signals to the codec.

The PCM configuration is required for the following profiles:

- HFP
- HSP
- A3DP

Two configurations are available for the two connectors: EM and COM. [Figure 8-7](#) demonstrates the default configuration and the following sections show how to set up each connector.

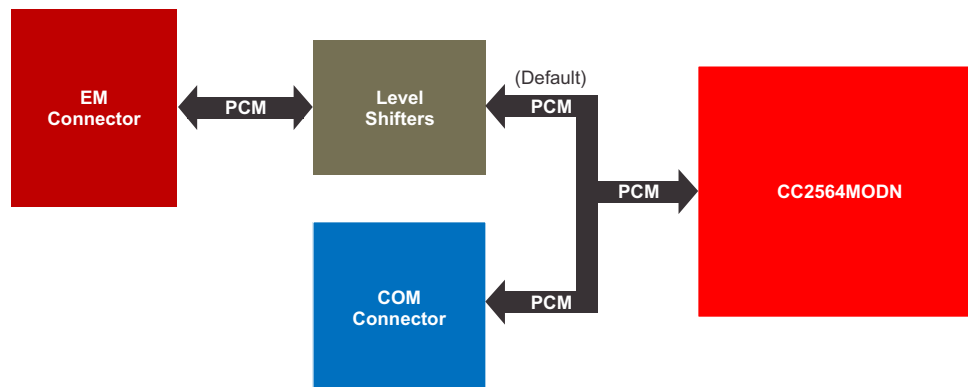


Figure 8-7. PCM Connector Configuration

8.3.5.1 EM Configuration

The EM connector allows configuration of the CC2564MODN as either the master or slave. The default configuration is a master role for the module through the EM connectors.

To change the direction of the PCM so the module is configured as the slave, do the following:

1. Connect resistor R18.
2. Remove resistor R19 on the U4 level shifter. (See [Figure 8-8](#) for the positions of the resistors.)

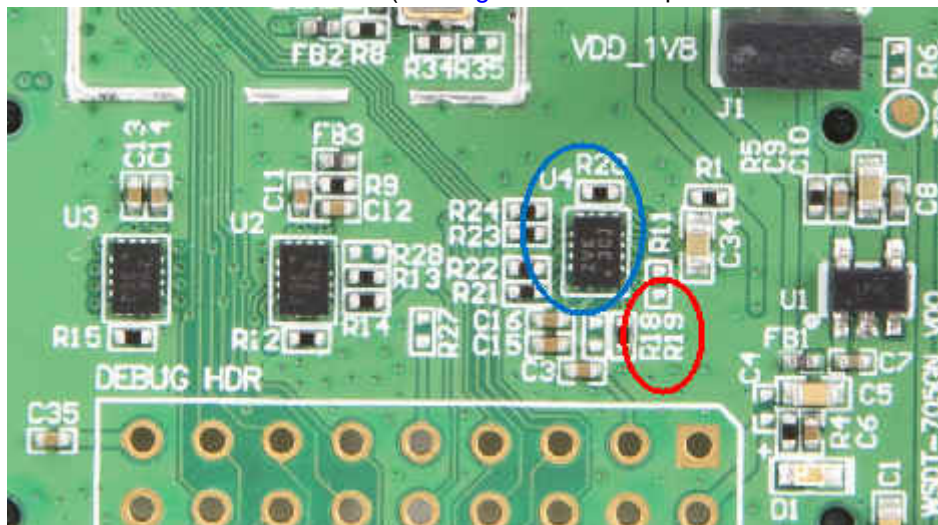


Figure 8-8. Resistors to Change the Direction of PCM

The board can also be set up to use audio features. To use audio features, the R11 resistor must be disconnected (DNI) on the U4 level shifter. (See [Figure 8-9](#) for the positions of the resistors.)

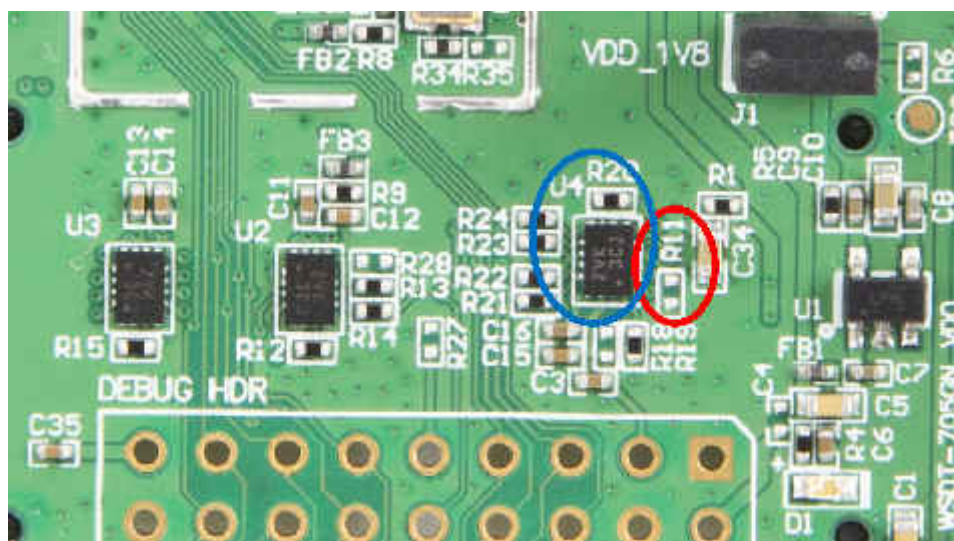


Figure 8-9. R11 DNI to Enable Audio Features

8.3.5.2 COM Configuration

To configure the COM connector, pull the resistors connected to U4 high to switch the direction on the level shifter. The signal in the COM connector can be configured to run in either direction without any changes to the board components.

9 Software Tools

9.1 TI Dual-Mode *Bluetooth* Stack

TI's dual-mode *Bluetooth* stack enables *Bluetooth* + *Bluetooth* low energy and is comprised of single-mode and dual-mode offerings implementing the *Bluetooth* 4.0 specification. The *Bluetooth* stack provides simple command line sample applications to speed development.

The stack works with the following:

- Any MSP430 MCU with flash equal to or greater to 128KB and RAM equal or greater than 8KB (CC256XMSPBTBLESW)
- Any TM4C MCU with flash equal to or greater than 128KB (CC256XM4BTBLESW)
- Other MCUs (CC256XSTBTBLESW)

For detailed documentation, see the [Bluetooth Demo APPS page](#).

9.2 TI Dual-Mode *Bluetooth* Service Pack for CC256x

The [CC256x Bluetooth Service Packs](#) (SP) are mandatory initialization scripts that contain bug fixes and platform specific configurations. The scripts must be loaded into the corresponding CC256x device after every power cycle. The CC256x SPs are delivered as a *Bluetooth* Script (BTS) file. A BTS file is a scripted binary file that contains the embedded HCI commands and HCI events.

9.3 *Bluetooth* Hardware Evaluation Tool

The [CC256x Bluetooth Hardware Evaluation Tool](#) is a program that can be downloaded as a complete package from TI. The program is an intuitive, user-friendly tool to test TI's *Bluetooth* chips including this CC256xQFNEM board. This tool tests RF performance and modifies the service packs of our *Bluetooth* chips.

10 Manual Information to the End User

The OEM integrator must be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product. The end user manual must include all required regulatory information and warnings as shown in this manual.

10.1 RF Function

The CC2564MODN is a dual-mode Bluetooth HCI module.

Note

The maximum RF power transmitted in each band is 10 dBm.

10.2 FCC or IC Certification and Statement

This device is intended for OEM integrators under the following conditions:

- The antenna must be installed such that 20 cm is maintained between the antenna and users.
- The transmitter module may not be co-located with any other transmitter or antenna.
- To comply with FCC or IC regulation limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain (including cable loss in mobile exposure conditions) must not exceed -1.69 dBi.

In the event that these conditions cannot be met (for example, certain laptop configurations or co-location with another transmitter), the FCC or IC authorization is no longer considered valid. The FCC or IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC or IC authorization.

10.2.1 FCC

The TI CC2564MODA module is certified for FCC as a single-modular transmitter. The module is a FCC-certified radio module that carries a modular grant.

Note

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with Part 15 of the FCC rules.

Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

CAUTION**FCC RF Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

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 the one the receiver is connected to.
- Consult the dealer or an experienced radio or TV technician for help.

The antenna listed in the *Antenna Specifications* section were verified in the compliance testing. Use only antennas on this list. A separate approval is required for all other operating configurations, including different antenna configurations.

10.2.2 CAN ICES-3(B) and NMB-3(B) Certification and Statement

The TI CC2564MODA module is certified for IC as a single-modular transmitter. The TI CC2564MODA module meets IC modular approval and labeling requirements. The IC follows the same testing and rules as the FCC regarding certified modules in authorized equipment.

Note

This device complies with Industry Canada license-exempt RSS standards.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

Operation is subject to the following conditions:

- The device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation.

L'exploitation est autorisée aux conditions suivantes:

- L'appareil ne doit pas produire de brouillage.
- L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAUTION

IC RF Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum of 20 cm between the radiator and your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This radio transmitter (4511-2564N) has been approved by Industry Canada to operate with the antenna types listed in the *Antenna Specifications* section with maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum indicated for that type, are strictly prohibited for use with this device.

The antenna listed in the *Antenna Specifications* section were verified in the compliance testing. Use only the antennas on this list. A separate approval is required for all other operating configurations, including different antenna configurations.

10.2.3 Anatel Certification Label

Figure 10-1 shows the full Anatel certification label for the CC2564MODN.



Figure 10-1. Anatel Certification Label

10.2.4 End Product Labeling

This module is designed to comply with the FCC statement, FCC ID: Z64-2564N. The host system using this module must display a visible label indicating the following text:

- Contains FCC ID: Z64-2564N

This module is designed to comply with the IC statement, IC: 4511-2564N. The host system using this module must display a visible label indicating the following text:

- Contains IC: 4511-2564N

10.2.5 Device Classifications

Since host devices vary widely with design features and configurations, module integrators shall follow the guidelines below regarding device classification and simultaneous transmission. Module integrators will also seek guidance from their preferred regulatory test lab to determine how regulatory guidelines will impact the device compliance. Proactive management of the regulatory process will minimize unexpected schedule delays and costs due to unplanned testing activities.

The module integrator must determine the minimum distance required between their host device and the user's body. The FCC provides device classification definitions to assist in making the correct determination.

Note

These classifications are only guidelines; Strict adherence to a device classification may not satisfy the regulatory requirement, as near-body device design details may vary widely. Your preferred test lab will be able to assist in determining the appropriate device category for your host product and if a KDB or PBA must be submitted.

Note

The module you are using has been granted modular approval for mobile applications. Portable applications may require further RF exposures (SAR) evaluations. It is also likely that the host and module combination will need to undergo testing for FCC Part 15 regardless of the device classification. Your preferred test lab will be able to assist in determining the exact tests which are required on the host and module combination.

10.2.6 FCC Definitions

Portable: (§2.1093) – A portable device is defined as a transmitting device designs to be used so that the radiating structure(s) of the device is / are within 20 cm of the body of the user.

Mobile: (§2.1091) (b) – A mobile device is defined as a transmitting device design to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Per §2.1091d (d)(4) in some cases (for example, modular or desktop transmitters), the potential conditions of use of a device may not allow easy classifications of that device as either Mobile or Portable. In these cases, applicants are responsible for determining minimum distances for compliance for the intended use and installation of the device based on evaluation of either specific absorption rate (SAR), field strength, or power density, which is most appropriate.

10.2.7 Simultaneous Transmission Evaluation

This module has not been evaluated or approved for simultaneous transmission as it is impossible to determine the exact multi-transmission scenario that a host manufacturer may choose. Any simultaneous transmission condition established through module integration into a host product must be evaluated per the requirements in KDB447498D01(8) and KDB616217D01,D03 (for laptop, notebook, netbook, and tablet applications).

These requirements include, but are not limited to:

- Transmitters and modules certified for mobile or portable exposure conditions can be incorporated in mobile host devices without further testing or certifications when:
 - The closest separation among all simultaneous transmitting antennas is greater than 20 cm.

- Or, the antenna separation distance and MPE compliance requirements for all simultaneous transmitting antennas have been specified in the application filing of at least one of the certified transmitters within the host device. In addition, when transmitters certified for portable use are incorporated in a mobile host device, the antennas must be greater than 5 cm from all other simultaneous transmitting antennas.
- All antennas in the final product must be at least 20 cm from the users and nearby persons.

10.3 EU Certification and Statement

10.3.1 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.

10.3.2 Simplified DoC Statement

10.3.2.1 CC2564MODN Module

Hereby, Texas Instruments declares that the radio equipment type CC2564MODN is in compliance with Directive 2014/53/EU.

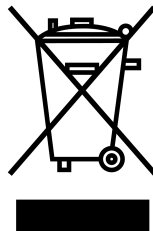
The full text of the EU declaration of conformity is available [here](#).

10.3.2.2 CC2564MODNEM

Hereby, Texas Instruments declares that the radio equipment type CC2564MODNEM is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available [here](#).

10.3.3 Waste Electrical and Electronic Equipment (WEEE)



Waste Electrical and Electronic Equipment (WEEE)

This symbol means that according to local laws and regulations your product or battery shall be disposed of separately from household waste. When this product reaches the 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.

10.3.4 OEM and Host Manufacturer Responsibilities

OEM and Host manufacturers are ultimately responsible for compliance of the host and module. The final product must be reassessed against all the essential requirements of the RED before it can be placed on the EU market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the RED. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.

10.3.5 Antenna Specifications

In all cases, assessment of the final product must be met against the essential requirements of the RE Directive Article 3.1(a) and (b), safety and EMC respectively. As well as any relevant Article 3.3 requirements.

- The LTA-5320-2G4S3-A1 (-1.31 dBi) was verified in the conformity testing, and for compliance the antenna shall not be modified. A separate approval is required for all other operating configurations, including different antenna configurations.
- If any other simultaneous transmission radio is installed in the host platform together with this module, or above restrictions cannot be kept, a separate RF exposure assessment and CE equipment certification is required.

11 Revision History

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

Changes from August 20, 2014 to August 31, 2021 (from Revision * (Aug 2014) to Revision A (Aug 2021))

	Page
• Updated formatting and organization to match current TI standards.....	0
• Added Section 10 through Section 10.3.5	18

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](#) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2022, Texas Instruments Incorporated