



YQ_B2216

Bluetooth Module

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About the Manual

This specification provides a basic introduction to the YQ_B2216 module, including its electrical specifications, RF performance, pin dimensions, and reference schematic design. Readers can refer to this document for a detailed understanding of the module's overall functional parameters and applications. If you have any questions, please log in to <http://www.thinkfiter.com/> to contact our company or customer service.

Revision History

Version	Date	Revision History	Reviser	Auditor
V1.0	2025.12.17	OV		

Table of Contents

About the Manual.....	2
Revision History	2
1. Product Overview	3
1.1 Features	3
1.2 Application Areas	5
2. Electrical Specifications	5
3. Pin Description	8
4. Design Reference	10
4.1 Module Dimensions	10
4.2 PCB Encapsulation.....	11
4.3 Cautions.....	11
5. Furnace Parameter	12
6. OEM Guidance.....	14

1. Product Overview

1.1 Features

YQ_B2216 is a small-sized, low-cost Bluetooth Low Energy (BLE) standardized transparent transmission module developed by ThinkFIT. The module supports BLE (up

to Bluetooth 5.2) and features a built-in 512kB FLASH memory, which supports dynamic stack and protocol profile configurations. The product functionality can be configured through software, providing ultimate flexibility. Additionally, it supports hardware OTA upgrades and multiple boot switching, allowing for convenient product feature releases and upgrades.

The module features include:

- ▶ High Performance 32-bit MCU RSIC @48M , 256KB Flash, 24KB SRAM
- ▶ Bluetooth 5.2 Standard, RF Data link up to 2Mbps
- ▶ Transmission Power: Maximum -3.28dBm
- ▶ -99dBm@BLE 1Mbps; -96dBm@ BLE 2Mbps mode
- ▶ Support UART Interface
- ▶ Support APP Parameter Configure
- ▶ Snap off hole Pin + 4 PIN Terminal interface: Easy for Welding
- ▶ Compact Encapsulation: 21.59x15.75mm Board Thickness 1.0mm
- ▶ Working Temperature: -40°C~+85°C

The YQ_B2216 module only requires the connection of four wires (VCC, GND, TX, RX) to achieve data transparent transmission functionality. It can also be applied to various small-sized accessories or fitness products through the use of Snap off holes. ThinkFIT has strong research and development capabilities, enabling seamless interconnection, data transmission, and various other applications for users' Bluetooth

devices. Our company can customize Bluetooth modules that meet the customer's usage specifications based on the YQ_B2216 standard version module and provide corresponding software and hardware support according to customer requirements. For more details, please contact our company at <http://www.thinkfiter.com/> or reach out to customer service.

1.2 Application Areas

- ▶ Smart Jump Robes\ Ab Rollers etc.
- ▶ Fitness Equipment like Treadmills\Exercise Bikes etc.
- ▶ Smart Home Products
- ▶ Industrial Control Equipment

2. Electrical Specifications

■ Rated Parameter

Item	Symbol	Min	Typical	Max	Unit
Input Voltage	VCC1	3.1	3.3	12.5	V

(4pin terminal)					
Input Voltage (Snap off Hole)	VCC2	2.8	3.0	3.6	V
Serial Voltage	TX/RX		3.0	3.3	V
Storage Temperature	T-STR	-65	25	150	°C
Welding Temperature	T-SLD			260	°C

Cautions:

The data listed about is only for reference purpose. Some of the data listed above may be updated based on new testing carried out.

The showed voltage listed above is subject to the GND in the module. Voltage that surpass the “Maximum Rated Value” will cause permanent damage to the device

Working Current

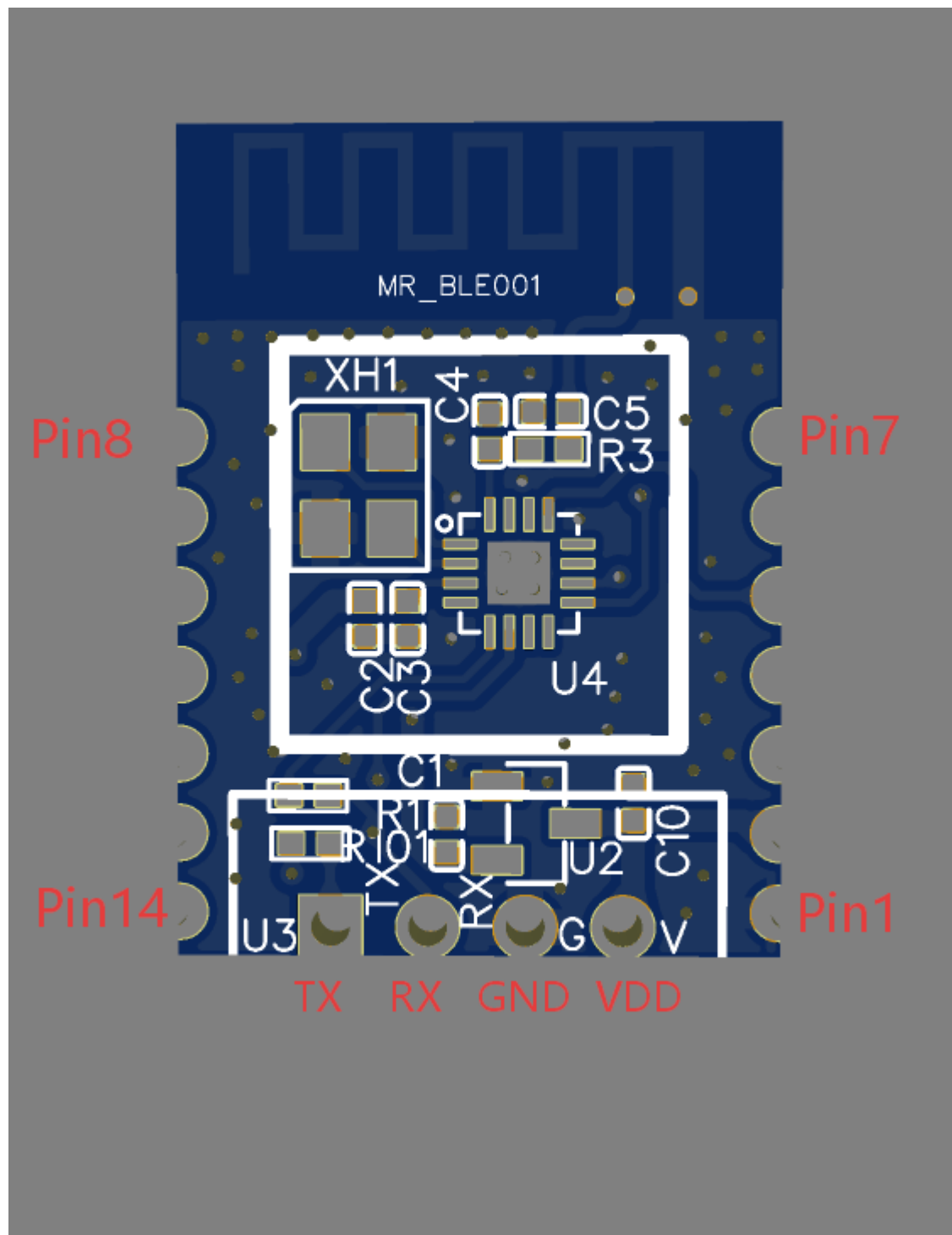
Item	Symbol	Min	Typical	Max	Unit
RX Current	Irx		5.3		mA
TX Current	Itx		4.8		mA

Note: Power consumption test conditions: Whole Module Working @0dBm With DCDC enable

RF Parameter

Item	Symbol	Min	Typical	Max	Unit
Frequency Range	Freq.	2402	-	2480	MHz
Data Rate	BLE 1Mbps BLE 2Mbps				

3. Pin Description

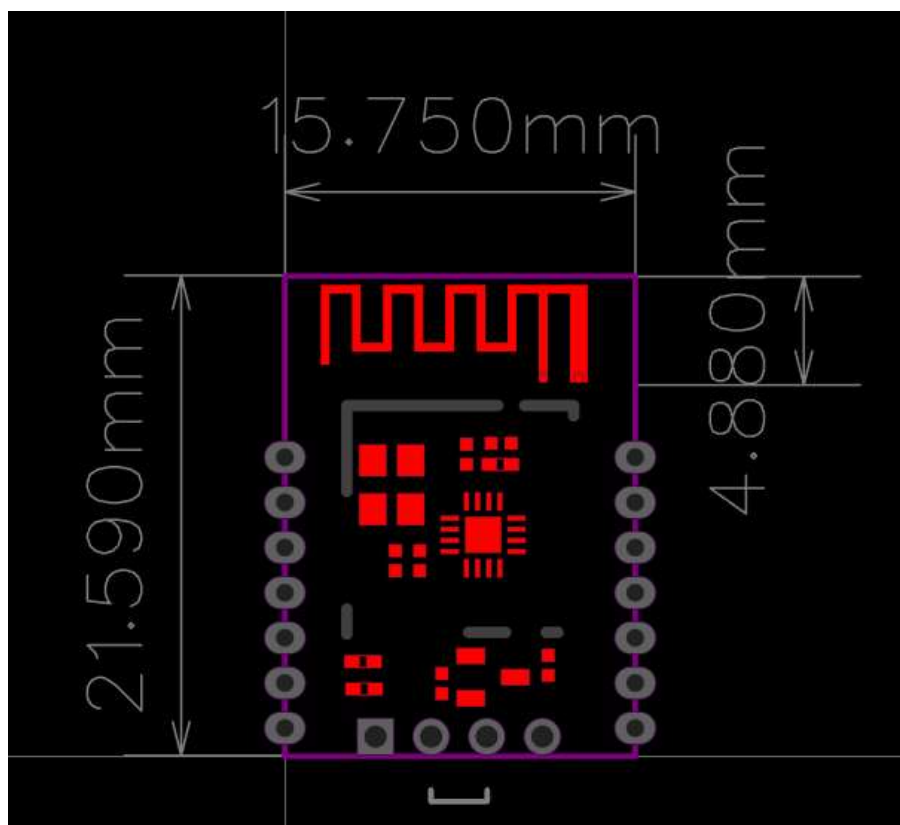


Port Description

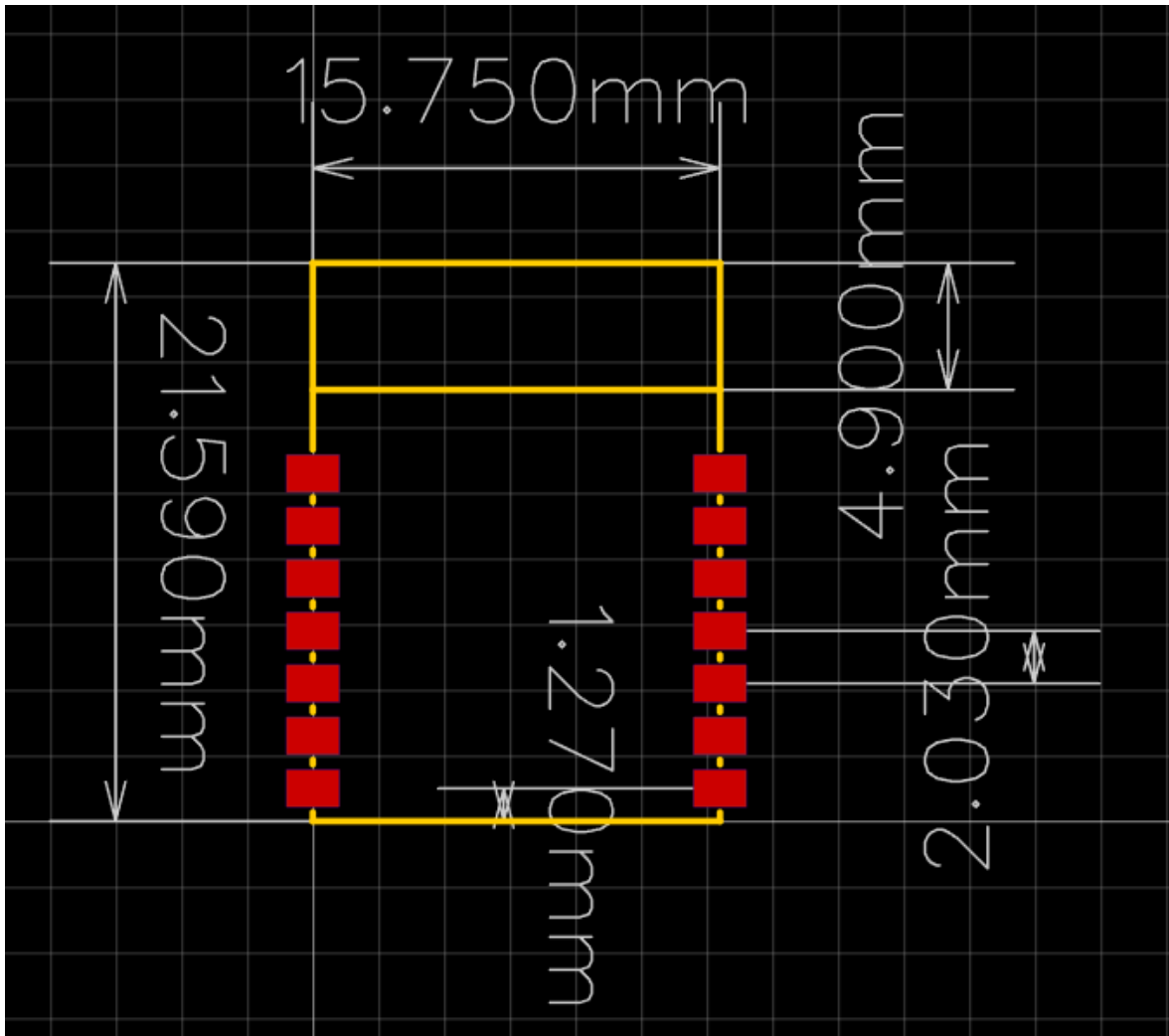
Pin #	Name	Type	Description
1	GND	PWR	Ground terminal
2	VCC	PWR	3.0V power
3	NC	/	
4	NC	/	
5	IO20	I/O	GPIO20/FUN1~7:QSPI_D0/UART0_RX/SPIM1_SCK I2C0_SCL/Reserved/PWM_6_P
6	TX	I/O	GPIO5/FUN1~7:QSPI_D3/UARTI_TX/SPIM1_NCS SPIS0_SCK/UART0_TX/Reserved/PWM_5_P
7	RX	I/O	GPIO4/FUN1~7:QSPI_NCS/UARTI_RX/SPIM1_SCK SPIS0_NCS/UART0_RX/Reserved/PWM_4_P
8	NC	/	
9	TCK	I/O	GPIO0/FUN1~7:SWDCLK(default)/I2C0_SCL SPIM0_NCS/UART0_CTS SPIS0_NCS/Reserved/PWM_0_P
10	TMS	I/O	GPIO1/FUN1 7:SWDTMS (default)/I2C0_SDA SPIM0_SCK/UART0_RTS SPIS0_SCK/Reserved/PWM_1_P
11	NC	/	
12	NC	/	
13	NC	/	
14	NC	/	

4. Design Reference

4.1 Module Dimensions



4.2 PCB Encapsulation



4.3 Cautions

The blue-tooth working frequency should be 2.4GHZ and It is suggested to use the device in a environment where interference factor can be minimized.

Cautions

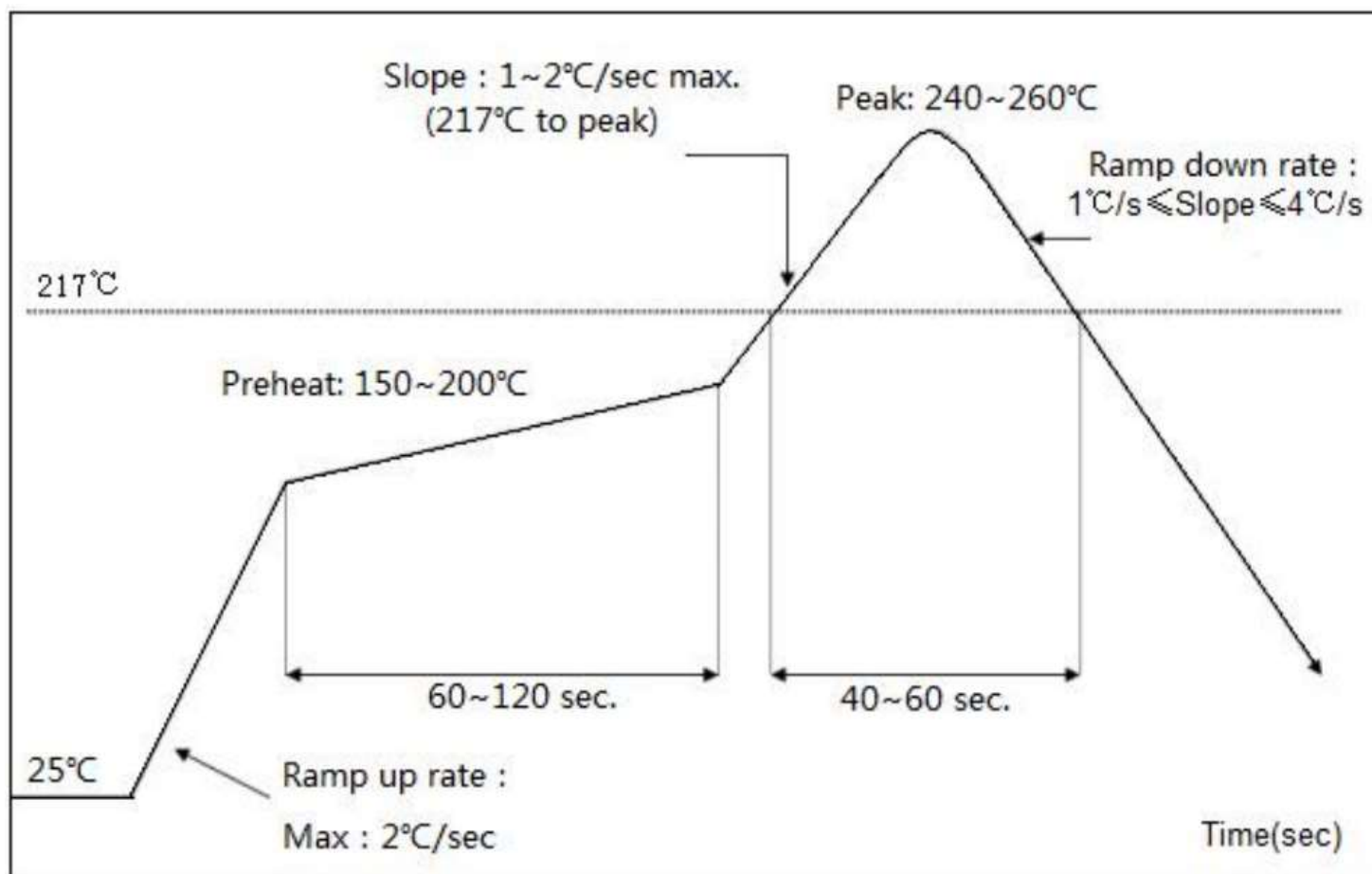
- ▶ Avoid using metal materials in the shell of the knob.
- ▶ Avoid placing metal screws and other parts too close to the radio frequency part.

►To maximize RF performance, users should follow the following recommendations for PCB layout:

- 1) (Antenna Clearance Area:) The user's main board, located directly below the antenna area of the module, should not have any copper foil (including power, ground, and signal layers).
- 2) Module placement: Ideally, the module should be placed in one corner of the user's main board, with the PCB antenna positioned at the far end of the board. This placement helps minimize the antenna clearance area to the lowest possible extent.

5.Furnace Parameter

■Refer to the following parameter



Temperature range	Time	Key parameters
Preheat zone(<150°C)	60-120S	Ramp up rate: ≤2S
Uniform temperature zone(150-200°C)	60-120S	Ramp up rate: <1S
Recirculation zone(>217°C)	40-60S	Peak: 240-260°C
Cooling zone	Ramp down rate: 1°C/s ≤ Slope ≤ 4°C/s	

6. OEM Guidance

1. Applicable FCC rules

This module has been tested and found to comply with part 15.247 requirements for Modular Approval.

2. The specific operational use conditions

This module can be used in IoT devices. The input voltage to the module is nominally 3.3V DC. The operational ambient temperature of the module is -40 to +85 degree C. Only the embedded PCB antenna is allowed. Any other external antenna is prohibited.

3. Limited module procedures

N/A

4. Trace antenna design

N/A

5. RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This transmitter must not be located or operating in conjunction with any other antenna or transmitter.

6. Antenna

Antenna type : PCB Antenna; Antenna Max. Peak Gain 1.56dBi

7. Label and compliance information

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: 2BGXU-YQ-B2216"

The FCC ID can be used only when all FCC ID compliance requirements are met.

8. Information on test modes and additional testing requirements

- a)The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).
- b)The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.
- c)If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference have been corrected .

9. Additional testing, Part 15 Subpart B disclaimer

The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part15 digital device.

The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369. For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation. When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publiclyavailable drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory devices or drivers are not available. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity

on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled.

Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 for further general testing details.

FCC Statement

Any 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 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.

FCC 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 minimum distance 20cm between the radiator & your body. This transmitter must not be located or operating in conjunction with any other antenna or transmitter.

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.