



WLT8258

BLE module

User manual

V1.1



About Datasheet

The specification of WLT8258 module provides an introduction of the basic functions of WLT8258 module, including the electrical specification, RF performance, pin size, and design of reference schematic diagram, etc. Readers can refer to this document to have a detailed understanding of the overall functional parameters of the module application, please log in <http://www.wi-linktech.com/> or contact our company or customer service.

To obtain the module samples and development board, please login to Alibaba international site <https://www.alibaba.com/> search WLT8258 for purchase. Or contact our customer service at <http://www.wi-linktech.com/>.

Revision History

Version information management

| The version number | time | Update record | editors |
|--------------------|-----------|--|---------|
| V1.0 | 2019.2.15 | The initial release | |
| V1.1 | 2019.3.12 | Overview, specification, pin specification, reference design | |
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1. Summary

1.1 Functions

WLT8258 is a small, low-cost Bluetooth BLE standard pass-through module designed by Wi-linktech.

Module supports BLE and BLE Mesh. Built-in 512kB FLASH supports dynamic stack and protocol Profile configuration. Product functionality can be configured by software, providing ultimate flexibility. It also supports hardware OTA upgrade and multi-boot switch, allowing convenient product function launch and upgrade.

The features of this module are as follows:

- Built-in high performance 32-bit MCU, 512KB Flash, 64KB SRAM
- Transmission power: maximum +7.22dBm
- Receiving sensitivity
 - -96 DBM @ BLE 1 MBPS
 - -99.5 DBM @ IEEE802.15.4 250 KBPS
- Support UART interface
- Support AT instruction
- Support APP parameter configuration
- Onboard high performance PCB antenna, and support external antenna
- Stamp hole pin, easy and reliable welding
- Super small package: 11.2x16mm
- Operating temperature: -40°C~+85°C



WLT8258 module only needs to connect VCC, GND, TX and RX to complete data transmission function. It also supports the use of the AT instruction to modify the default name and other related parameters (see the WLT8258 user manual for details).

After the module configuration is completed, pass-through function can be tested with relevant mobile phone software. Android users can download Wi-linktech's official test software "Wi-linktech test software" by searching baidu's mobile assistant. Apple users recommend using the mobile store's light blue, as shown in figure 1:



Figure 1

Wi-linktech has been engaged in the Bluetooth field for many years, with strong research and development strength, which can easily realize the interconnection of users' Bluetooth devices, data transmission and other applications. Based on the standard version of WLT8258, our company can customize and design Bluetooth modules that meet the requirements of customers, and provide corresponding software and hardware support. For details, please contact our company at <http://www.wi-linktech.com/> or customer service.



1.2 Application fields

Personal equipment:

Wearable, mouse and keyboard, remote control toys;

Retail logistics:

Electronic shelf label, cold chain transport;

Smart home:

Lighting, sensor, intelligent lock, remote control, lawn mower, voice control, intelligent printer, lift table and chair;

Industrial control:

Security monitoring, special printers, medical equipment;



2. Electrical specifications

■ Maximum rated parameter

| Item | Symbol | Min | Max | Unit |
|--------------------------|--------|-------|-----------|------|
| The power supply voltage | VDD | 0.3 | 3.6 | V |
| Pin input voltage | Vin | 0.3 | VDD + 0.3 | V |
| Pin output voltage | Vout | 0 | VDD | V |
| Storage temperature | Tstr | - 65. | 150 | °C |
| Welding temperature | Tsld | - | 260 | °C |

Note:

- 1) The listed electrical characteristics are target specifications for reference only. Some data may be updated based on actual test results.
- 2) The voltage value shown is based on GND in the module. Any voltage exceeding the maximum rating may cause permanent damage to the equipment.

■ Recommended operating conditions

| Item | Symbol | Min | Typ. | Max | Unit |
|--|--------|------|------|-----|------|
| The power supply voltage | VDD | 1.8 | 3.3 | 3.6 | V |
| Power supply voltage rise time (from 1.6v to 2.8v) | The TR | - | - | 10 | ms |
| Operating temperature range | Topr | - 40 | - | 85 | °C |

■ Working current (VDD= 3.3v, T=25°C)

| Item | Sym. | Min | Typ. | Max | Unit | Condition |
|----------------|------|-----|------|-----|------|---|
| RX current | IRx | - | 5.3 | - | mA | Whole Module Working |
| TX current | ITx | - | 4.8 | - | mA | Whole Module Working @0dbm With DCDC enable |
| Sleep patterns | | - | 1.2 | - | uA | |

■ Pin input/output characteristics (VDD= 3.3v, T=25°C)

| Item | Sym. | Min | Typ. | Max | Unit | Condition |
|-------------------|------|---------|------|---------|------|-----------|
| Input high level | VIH | 0.7 VDD | - | VDD | V | |
| Input low level | VIL | VSS | - | 0.3 VDD | V | |
| Output high level | VOH | 0.9 VDD | - | VDD | V | |
| Output low level | VOL | VSS | - | 0.1 VDD | V | |



■ RF performance parameter

| Item | Sym. | Min | Typ. | Max | Unit | Condition |
|-----------------|--|------|------|------|------|--------------------------------------|
| Frequency range | Freq. | 2380 | - | 2500 | MHz | 1MHz programmable frequency interval |
| Data rate | BLE/2.4G of Proprietary 1Mbps, $\pm 250\text{kHz}$ deviation | | | | | |

3. The Bluetooth specification

■ BLE 1Mbps RF_Rx performance ($\pm 250\text{kHz}$ deviation)

| Item | Sym. | Min | Typ. | Max | Unit | Condition |
|---|---------------------|-------|-------|------|------|---------------------------------|
| The sensitivity | 1 MBPS | - | -96. | - | dBm | |
| Frequency offset error | - | -250. | - | +300 | KHz | |
| Same frequency suppression | - | - | -11 | - | dB | Received signal strength -67dBm |
| Image reject | - | - | 37 | - | dB | Received signal strength -67dBm |
| Intra-band blocking rejection (modulation interference) | ± 1 MHz offset | - | 1/3 | - | dB | Received signal strength -67dBm |
| | ± 2 MHz offset | - | 37/39 | - | dB | |
| | ≥ 3 MHz offset | - | 42 | - | dB | |

■ BLE 1Mbps RF_Tx performance

| Item | Sym. | Min. | Typ. | Max. | Unit | Condition |
|---------------------------------|------|-------|------|-------|------|-----------|
| Maximum output | - | - | | 7.22 | dBm | |
| Minimum output | - | - | | 6.58 | dBm | |
| Programmable power output range | - | 6-7.5 | | | dBm | |
| 6dB modulation bandwidth | - | - | - | 0.727 | MHz | |



4. Pin description

4.1 Pin assignment

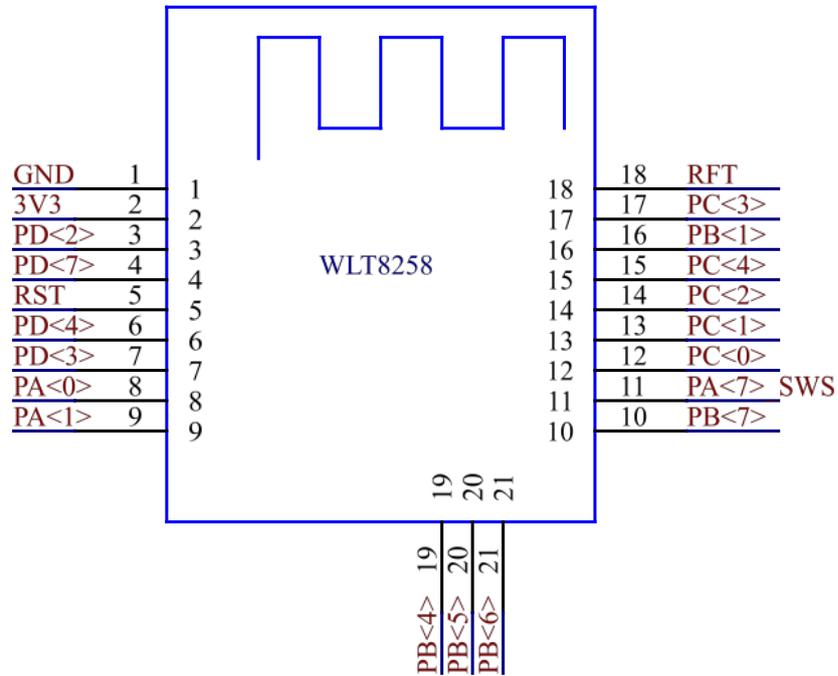


Figure 4-1 module pin diagram

Note: figure 4-1 pin functions can be redefined by pin reuse



4.2 Pin definition

| PIN # | Pin name | type | describe |
|-------|----------|-------------|---|
| 1 | GND | The POWER | Ground |
| 2 | 3 v3 | The POWER | 3.3 V Power Supply |
| 3 | PD < 2 > | Digital I/O | SPI_CN/I2S_LR/PWM3 / PD < 2 > |
| 4 | PD < 7 > | Digital I/O | SPI_CK I2S_BCK / 7816 _TRX/PD < 7 > |
| 5 | RST | The RESET | Power on reset, active low |
| 6 | PD < 4 > | Digital I/O | SWM/I2S_SDO/PWM2_N/PD < 4 > |
| 7 | PD < 3 > | Digital I/O | PWM1_N I2S_SDI / 7816 _TRX/PD < 3 > |
| 8 | PA < 0 > | Digital I/O | DMIC_DI/PWM0_N/UART_RX/PA < 0 > |
| 9 | PA < 1 > | Digital I/O | DMIC_CLK / 7816 _CLK/ I2S_CLK/PA < 1 > |
| 10 | PB < 7 > | Digital I/O | SDM_N1 / SPI_DO/UART_RX/lc_comp_ain < 7 > / sar_aio < 7 > / PB < 7 > |
| 11 | PA < 7 > | Digital I/O | SWS/UART_RTS/PA < 7 > |
| 12 | PC < 0 > | Digital I/O | I2C_SDA PWM4_N/UART_RTS PGA_P0 / PC < 0 > |
| 13 | PC < 1 > | Digital I/O | I2C_SCK PWM1_N/PWM0 PGA_NO / PC < 1 > |
| 14 | PC < 2 > | Digital I/O | PWM0/7816 _TRX/I2C_SDA/XC32K_O/PGA_P1 / PC < 2 > |
| 15 | PC < 4 > | Digital I/O | PWM2 / UART_CTS/PWM0_N/sar_aio 8 > < 4 > / by/PC |
| 16 | PB < 1 > | Digital I/O | PWM4 / UART_TX/ATSEL2 / lc_comp_ain < 1 > / sar_aio < 1 > / PB < 1 > |
| 17 | PC < 3 > | Digital I/O | PWM1 / UART_RX/I2C_SCK/XC32K_I PGA_N1 / PC < 3 > |
| 18 | RFT | ANALOG | External RF antenna outlet |
| 19 | PB < 4 > | Digital I/O | SDM_P0 PWM4 / lc_comp_ain < 4 > / sar_aio < 4 > / < 4 > in PB |
| 20 | PB < 5 > | Digital I/O | SDM_N0 PWM5 / lc_comp_ain < 5 > / sar_aio < 5 > / PB < 5 > |
| 21 | PB < 6 > | Digital I/O | SDM_P1 / SPI_DI/UART_RTS/lc_comp_ain < 6 > / sar_aio < 6 > / PB < 6 > |

Note: All digital IOs can be used as GPIOs with configurable pull-up/pull-down resistors.



■ SPI

- PD < 7 > : SPI_CK
- PB < 6 > : SPI_DI
- PB < 7 > : SPI_DO
- PD < 2 > : SPI_CS

■ I2C

- PC < 0 > : I2C_SDA
- PC < 1 > : I2C_SCK
- PC < 2 > : I2C_SDA
- PC < 3 > : I2C_SCK

I2C can also be multiplexed by SPI interface, that is, I2C_SDA/I2C_SCK can be multiplexed by SPI_DI /SPI_CK respectively.

■ UART interface

- PA < 0 > : UART_RX
- PB < 1 > : UART_TX
- PB < 7 > : UART_RX
- PC < 3 > : UART_RX

■ UART hardware flow control interface

- PA < 7 > : UART_RTS
- PB < 6 > : UART_RTS
- PC < 0 > : UART_RTS
- PC < 4 > : UART_CTS

■ Single-wire debugging interface

- PA < 7 > : SWS
- PD < 4 > : SWM

4.3 UART interface

The module supports UART (universal asynchronous transceiver) and realizes full duplex transmission and reception through TX and RX interfaces. Support hardware flow control RTS and CTS.

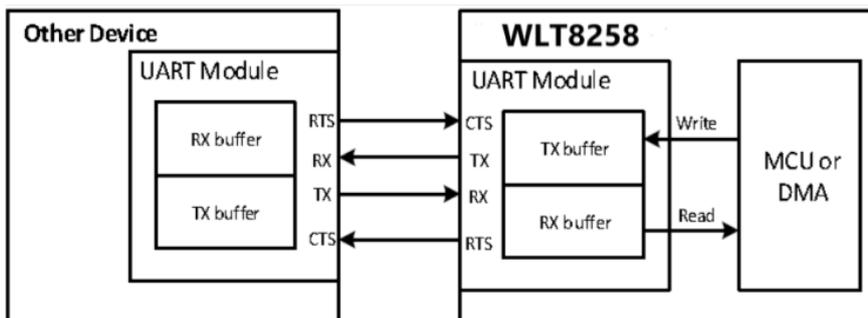


Figure 4-2 UART communication



- As shown in figure 4-2, the sent data is written to the TX buffer, and the UART module uses the TX pin to extract the data from the TX buffer transferred to other devices, the data received by the RX pin is first sent to the RX buffer and then through the MCU or DMA Read.
- If the UART's RX buffer is full, the UART module sends a signal (configurable high or low) through the RTS pin to inform other devices that they should stop sending data. Similarly, UART receives CTS foot signal, then UART should stop sending data when another device's RX buffer is nearly full.

5. Reference design

5.1 Module dimension

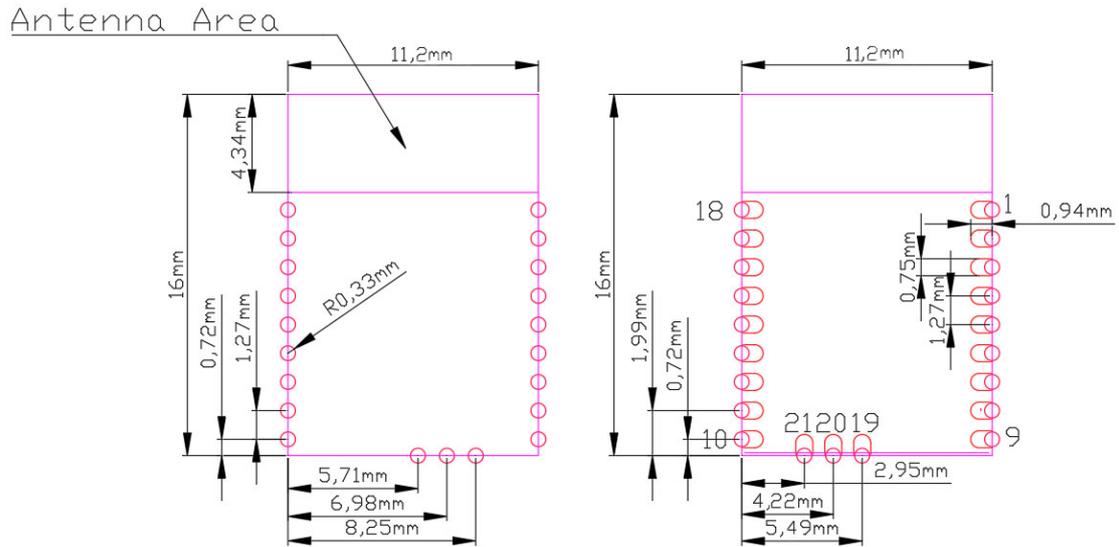


Figure 5-2 Top View (Seen from Top) Bottom View (Seen from Bottom)

Table 5-1 module design size

| | | |
|---|------------|--------------------|
| Module dimension | Length (X) | 11.20±0.15 mm |
| | Width (Y) | 16.00±0.15 mm |
| Antenna position size | Length (X) | 11.20 mm |
| | Width (Y) | 4.34 mm |
| The thickness of the PCB | Height (H) | 0.80±0.05 mm |
| Total module thickness (PCB thickness + highest component height) | Height (H) | 2.00 mm of typical |

Note: Wi-linktech reserves the right to select components from different suppliers to achieve module functions.

All mechanical and electrical specifications and module certifications are maintained. The design shall be carried out within the mechanical physical dimensions shown in FIG. 5-2. All dimensions are in millimeters (mm).

5.2 Matters needing attention

Bluetooth working at 2.4GHz frequency, should try to avoid the impact of various factors on wireless transceiver, pay attention to the following points:

- Avoid using metal in the product shell that surrounds the module. If the shell is metal, consider using an external antenna.
- Metal screws inside the product should be away from the RF part of the module.



- To maximize RF performance, the user motherboard layout should follow the following recommendations:
 - 1) Antenna clearance area: the user mainboard located directly below the module antenna area shall not have any copper foil wiring (including power supply, ground and signal layer).
 - 2) Module position: the module should ideally be placed in the corner of the user's main board, and the PCB antenna is located at the far end of the main board. This position minimizes the clearance area of the antenna.
(Refer to the definition of antenna clearance area below)

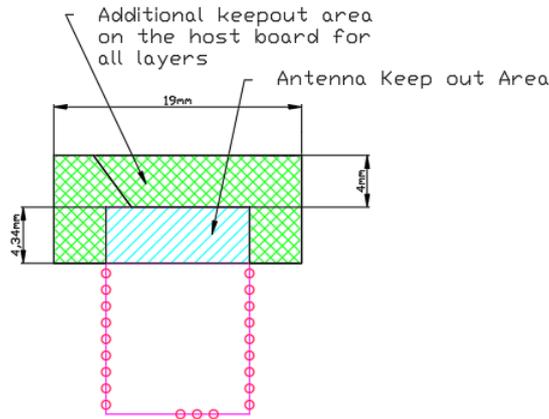


Figure 5-3 Antenna Keep out

5.3 Object diagram of module



Figure 5-4 WLT8258 module

6. Reflux parameter recommendation

Backflow parameters can be set as follows:

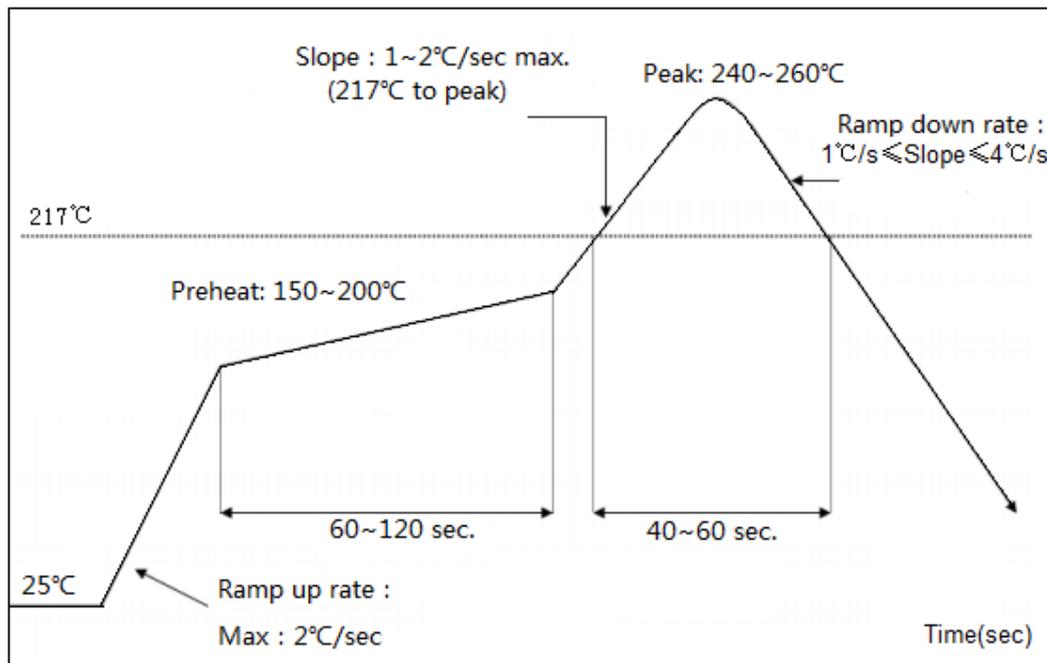


Figure 6-1 reflux recommendation curve

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

Table 6-1 recommended reflux parameters



7. Software applications

WLT8258 is a data transfer module that supports transparent transfer mode and command transfer mode.

AT+ instruction set means that users input commands through serial ports to configure parameters. For details of specific commands, please refer to the application documents of relevant WLT8258 module software.

WLT8258 supports customer customization, please contact our company for details.

8. Regulatory Module Integration Instructions

List of applicable FCC rules

This device complies with part 15.247 of the FCC Rules.

Summarize the specific operational use conditions

This module can be applied in remote control toys, sports and fitness sensors , health sensors, mobile accessories as well as smart home. The input voltage to the module should be nominally 1.8-3.6 V DC , typical value 3.3V DC and the ambient temperature of the module should not exceed 85°C.

Limited module procedures

Not applicable

Trace antenna designs

Not applicable



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. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by 2.1093.

Antennas

This module using PCB antennas with maximum gain is 3 dBi .

Label and compliance information

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as: "Contains Transmitter Module FCC ID: 2A006-WLT8258 " , Any similar wording that expresses the same meaning may be used.

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 has been corrected

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 Part 15 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.



Frequency spectrum to be investigated

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.

Operating the host product

When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publicly-available 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 and ANSI C63.26 for further general testing details.

The product under test is placed into a normal 'paired' mode with another BLE device, as per the normal intended use of the product (for example, transferring data).

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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.