EW-BLED-22 BLE

Standard Module

V1.0

202008181

About this manual

《 EW-Bled -22 Module Specification 》provides an introduction to the basic functions of the EW-BLED-22 module, including the electrical specifications, RADIO frequency performance, pin size, and reference schematic design of the module.Readers can refer to this document for a detailed understanding of the overall functional parameters of the module.

Change of History

Rev. information

Rev.	Date	Change of history	Editor
V1.0	2020.08.18	Initial release	Jon

Table content

1. Profile

1.1 Features

The EW-Bled -22 is a small, low-cost Bluetooth standardized module developed by Jiangsu Tech-leading information technology Co.,Ltd.

The features of this module are as follows.

- Support UART, SPI, I2C, I2S, ADC, PWM and other interfaces
- Support FTMS protocol, can be customized according to customer communication protocol
- Support true random number generator
- Support master and slave multiple connections, up to 16 connections
- On-board high performance PCB antenna
- Stamp hole pin, easy and reliable to weld
- Ultra-small package：11.2x16mm
- Ultra wide supply voltage：3.3V
- Working temperature：-20℃ ~ +85℃

EW-BLED-22 module only needs to connect with four lines of VCC,GND,TX and RX to complete the data transmission and communication , which can also be followed customers' need to customizespecific communication protocols and customized functions under specific applicationenvironments.After the module is configured, you can use the relevant software to test communication data function.Users can conduct Bluetooth connection and communication test through the commonly used mobile Bluetooth communication test tools

Tech-leading company has been engaged in the field of Bluetooth for many years, and has strong research and development force. It can easily realize the interconnection, data transmission and other various applications of users' Bluetooth devices.Our company can customize and design the Bluetooth module according to customers' requirements and provide corresponding software and hardware support based on the EW-Bled -22 standard version module.

1.2 Application scope

Fitness equipment: Treadmill, Fitness bike, Elliptical machine, etc；

2. Electronic data

Absolute Maximum Ratings

Rating		Min	Max	Unit
Supply Voltage	VCC	1.8	4.3	V
I/O Voltage	ALDO_OUT	2.1	3.5	V
Storage Temperature	Tstr	-20	85	°C

Note：
The electrical characteristics listed are target specifications for reference only.
Some of the data may be updated based on actual test results。
The voltage values shown are based on GND in the module.Any voltage exceeding the "maximum rating" may be applied to the device and cause permanent damage.

Item	Symbol	Min	Typ.	Max	Unit
Supply Voltage	VCC	1.8	3.3	4.3	V
I/O Voltage	ALDO_OUT	2.1	2.9	3.5	V
Operating Temperature	Topr	-20	-	85	°C

（Recommended Operating Conditions）

Operation Mode	Average	Maximum	Unit
TX peek current(0 dB)		9	mA
RX peek current		12.8	mA
Deep sleep current(include 48K retention RAM)	12		μA
Power off	5		μA

（Power Consumption）

Audio CODEC

Digital to Analogue Converter(Mono)					
PARAMETER	**CONDITIONS**	**MIN**	**TYP**	**MAX**	**UNIT**
Resolution	-	-	-	20	Bits
Sampling frequency	The synchronized clock	8		48	kHz
SNR (Signal to Noise Ratio)	Fin=1kHz B/W=20Hz—20KHz A-Weighted THD_N<0.01% Fs(8K,16K,32K,44.1K,48K)		92		dB
Digital Gain	Digital Gain	-48		32	dB
Analogue Gain	Analog Gain Resolution =	0		-30	dB
Output voltage	VDDA=2.9V		1500		mV
Stopband attenuation		65			dB
Analog to Digital Converter(Mono)					
PARAMETER	**CONDITIONS**	**MIN**	**TYP**	**MAX**	**UNIT**
Resolution	-	-	-	16	Bits
Sampling frequency	The synchronized clock	8		48	kHz
Signal to Noise Ratio	A-weighted		79		dBFS
	W/O weighting		79		dBFS
Digital Gain	Digital Gain	-48		32	dB
Analogue Gain	Analog Gain Resolution =	0		30	dB

3. Pins definition

3.1 Pins layout

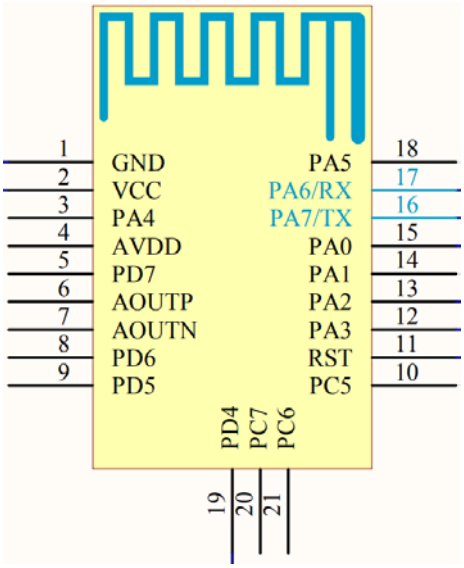

Figure 3-1 Module pins diagram

Note：Figure 3-1 Pin functionality can be redefined by pin reuse

3.2 Pins definition

PIN #	Pin name	Type	Description
1	GND	GND	Module GND
2	VCC	POWER	1.8V-4.3V power supply，typical value 3.3V
3	PA4	I/O	SCL0/I2SCLK/PWM4/SSPCLK/URXD0/URXD1/CLKOUT/PD
4	LDO_OUT	Analog Output	Analog linear regulator output
5	PD7	I/O	SDA1/I2SDIN/PWM1/SSPDIN/UTXD0/UTXD1/ ANTCTL1/PDMDAT/PWM0/ADC3
6	AOUTP	Analog Output	Speaker output positive
7	AOUTN	Analog Output	Speaker output negative
8	PD6	I/O	SCL1/I2SDOUT/PWM0/SSPDOUT/URXD0/URXD1/CLKOUT /PDMCLK/PWM1/ADC2PDMCLK/PWM1/ADC2
9	PD5	I/O	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/ANTCTL0 /PDMDAT/PWM4/ADC1
10	PC5	I/O	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/ SWV/PDM
11	RST	Analog Input	Reset
12	PA3	I/O	SDA1/I2SDIN/PWM3/SSPDIN/UTXD0/UTXD1/ANTCTL1 /PDMDAT/PWM2
13	PA2	I/O	SCL1/I2SDOUT/PWM2/SSPDOUT/URXD0/URXD1 /ANTCTL0
14	PA1	I/O	SDA0/I2SFRM/PWM1/SSPCSN/UTXD0/UTXD1/ANTCTL0 /PDMDAT/PWM0
15	PA0	I/O	SCL0/I2SCLK/PWM0/SSPCLK/URXD0/URXD1/CLKOUT/PD MCLK/PWM1
16	PA7	I/O	SDA1/I2SDIN/PWM1/SSPDIN/UTXD0/UTXD1/ANTCTL0 /PDMDAT/PWM0
17	PA6	I/O	SCL1/I2SDOUT/PWM0/SSPDOUT/URXD0/URXD1/ CLKOUT/PDMCLK/PWM1
18	PA5	I/O	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/ ANTCTL1/PDMDAT/PWM4
19	PD4	I/O	SCL0/I2SCLK/PWM4/SSPCLK/URXD0/URXD1/ANTCTL0 /PDMCLK/PWM5/ADC0
20	PD7	I/O	SDA1/I2SDIN/PWM1/SSPDIN/UTXD0/UTXD1/ANTCTL1 /PDMDAT/PWM0/ADC3
21	PC6	I/O	SCL1/I2SDOUT/PWM4/SSPDOUT/URXD0/URXD1/SWTCK /PDMCLK/PWM5

4. Schematic

4.1 Reference schematic

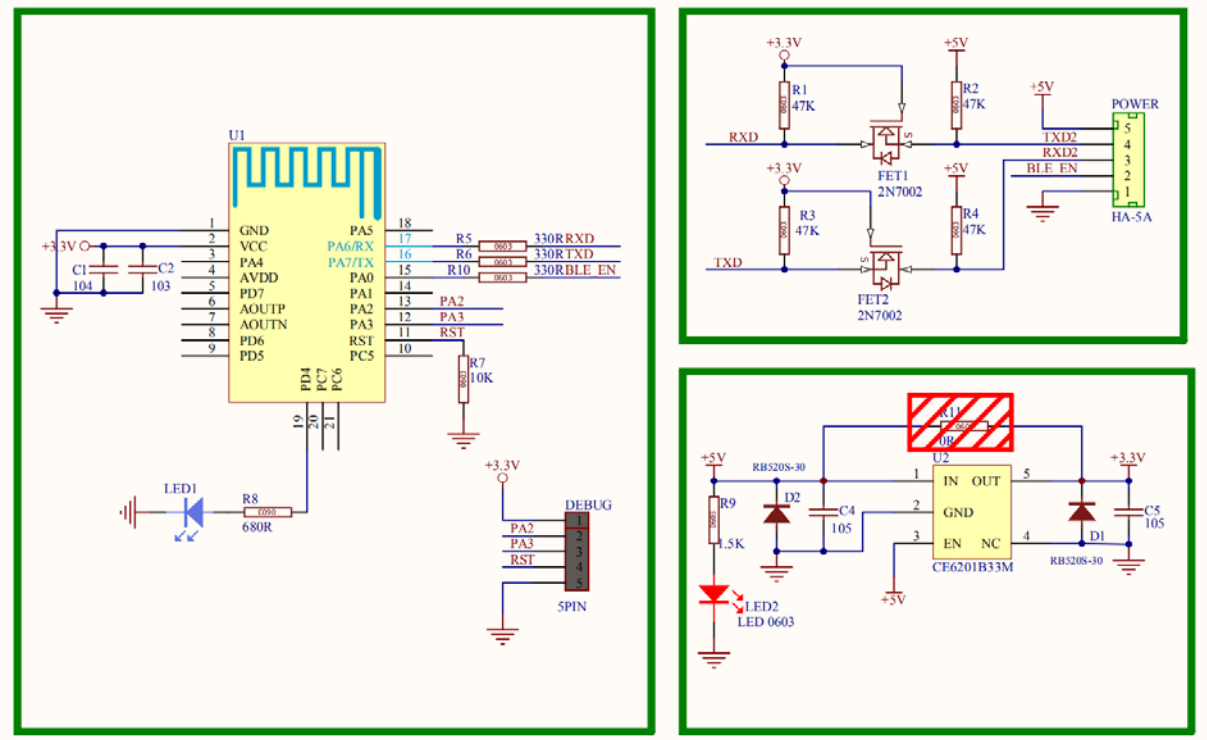

Figure 4- 1 Reference schematic

Note：PA6,PA7 for communication business serial port, PA2,PA3 for firmware programming and debugging serial port

4.2 Module size

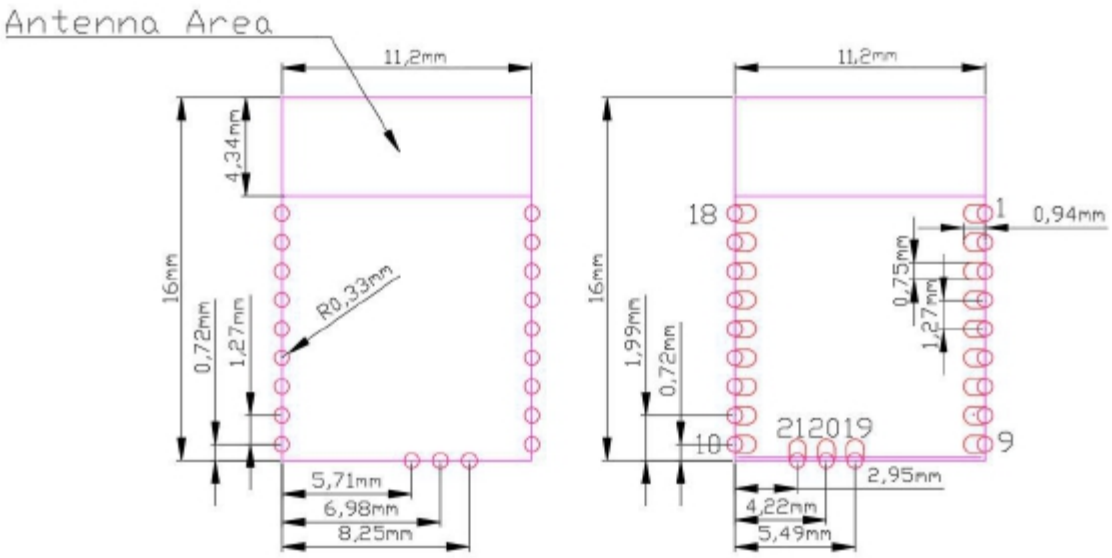

Figure4-1 Top View (Seen from Top) Bottom View (Seen from Bottom)

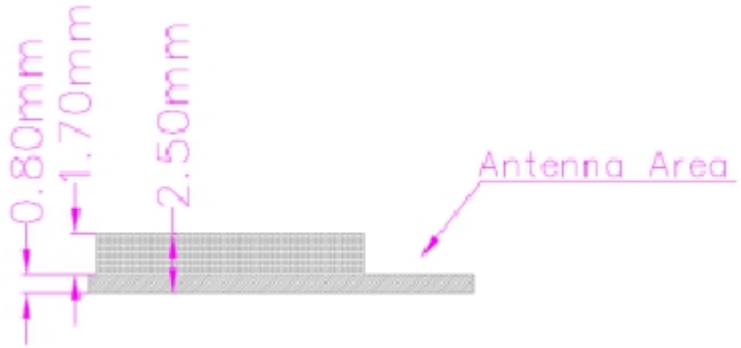

Figure 4-2 module thickness

Note： Tech-leading company reserves the right to select components from different suppliers to realize the function of modules.All mechanical, electrical specifications and modulecertifications are maintained.All dimensions are in mm (mm).

Figure 4- 3: Module design size

Module overall size	Length (X)	11.20 ± 0.15 mm
	Width (Y)	16.00± 0.15 mm
Antenna location size	Length (X)	11.20 mm
	Width (Y)	4.34 mm
PCB thickness	Height (H)	0.80 ± 0.05 mm
Module thickness（PCB thickness+Maximum component height）	Height (H)	2.50 mm typical

4.3 Attention

Bluetooth works at the frequency of 2.4ghz, so influences of various factors on wireless transceiver should be avoided as far as possible. The following points should be noted：

- Avoid using metal as part of the product housing surrounding the module. If the housing is metal, consider using an external antenna。
- The metal screws inside the product should be kept away from the RF part of the module。
- To maximize RF performance, the user host board layout should follow the following recommendations：

1) Antenna clearance area: the user's host board located directly below the module antenna area shall not have any copper foil wiring （Including power supply, GND and signal layer)。

2) Module location: Ideally, the module should be placed in a corner of the user's host board, with the PCB antenna located far away from the host board edge, this position minimizes the antenna clearance area.

（Refer to the following figure for the definition of antenna clearance area）

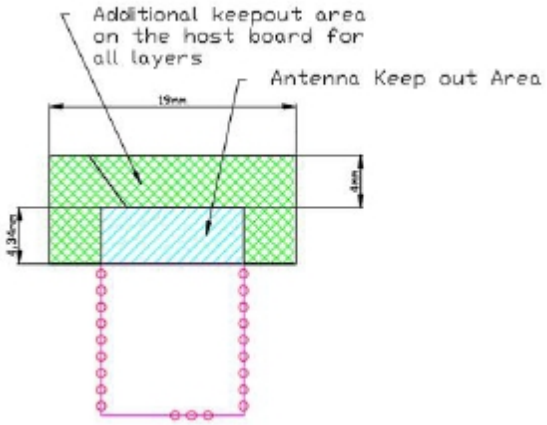

Figure 4- 4 Antenna Keep out

4.4 reference**PCB** package

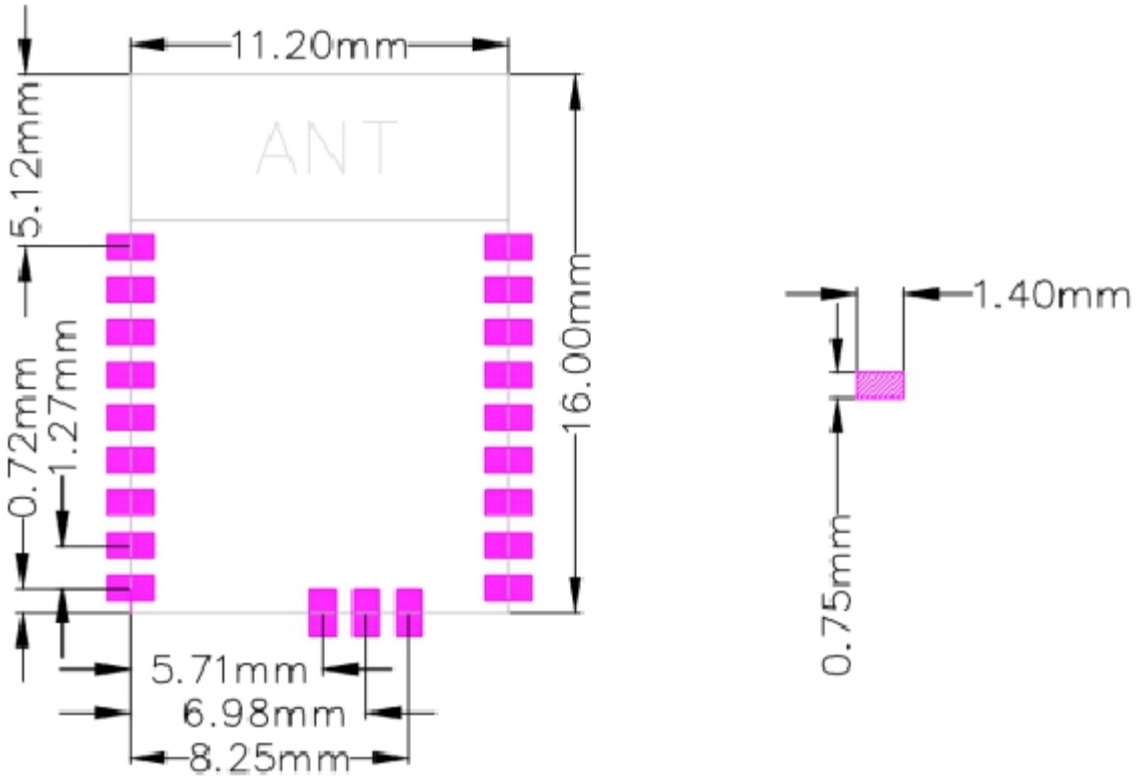

Figure 4- 5: Reference package size

5. Reflow parameter

Reflow parameter can reference below data：

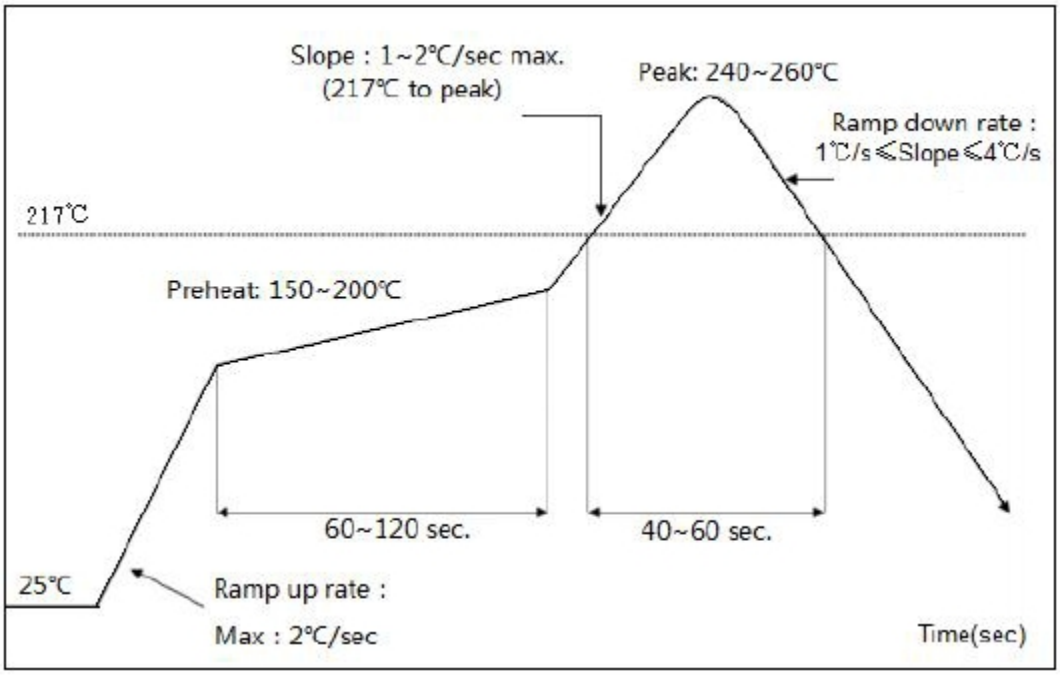

Figure 5-1 Reflow curve

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

Figure 5-1 Reflow recommendation data

FCC warning：

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.

OEM Guidance

1. Applicable FCC rules

This module is granted by Single Modular Approval. It complies to the requirements of FCC part 15C, section 15.247 rules.

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 -20 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

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment can operated with minimum distance 5mm between the radiator and your body.

6. Antenna

Antenna type: PCB antenna; Antenna Gain: 0 dBi

7. Label and compliance information

An exterior label on OEM's end product can use wording such as the following: "Contains Transmitter Module FCC ID: 2AXDJ-EWBLED22" or "Contains FCC ID: 2AXDJ-EWBLED22"

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 Sub part 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. 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 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 50 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 set into a link/association with a partnering device, as per the normal intended use of the product. To ease testing, the product under test is set to transmit at a high duty cycle, such as by sending a file or streaming some media content.