EL.RT8733BU-WFT

Dual-band WiFi4 11n + BT5.2 Module Spec

（USB2.0, BW40M, 2 antenna type, Shielded ）

Software：

客　　户 Customer	客户承认 Approve（请盖印章）	日 期 Date

拟制 Design	审核 Check	批准 Approve	版本 Version	日期 Date
			V1.0	2024.08.09

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更改记录：

Reversion History：

版本 Version	日期 Date	更改内容 Modification
1.0	2024.08.09	First release

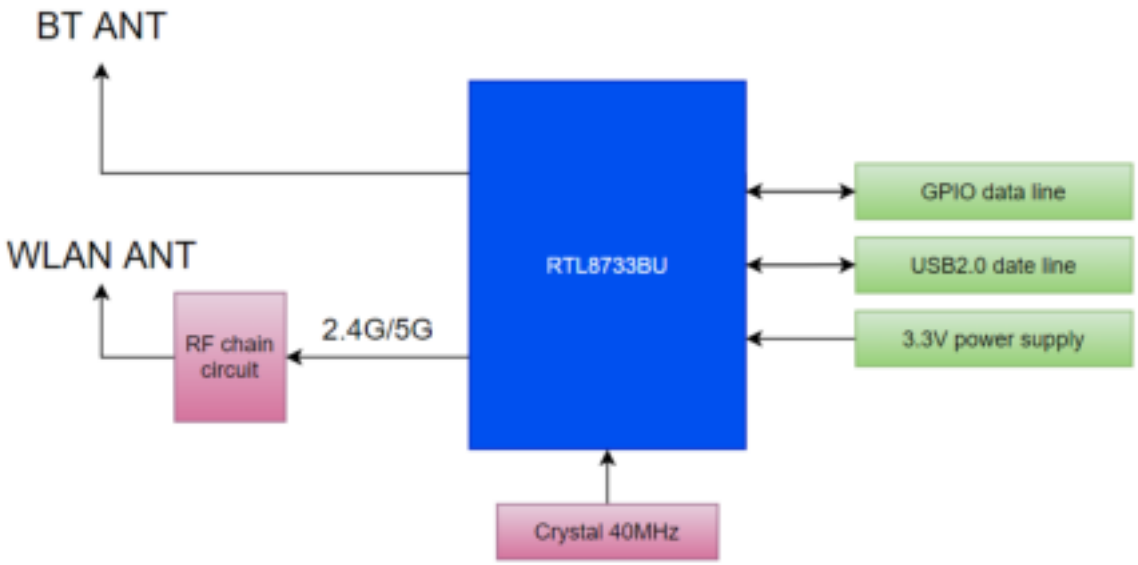
1. Overview

The EL.RT8733BU-WFT is a highly integrated 802.11a/b/g/n 1T1R WLAN and Bluetooth 5.2 combo chip. It combines a WLAN MAC, a 1T1R capable WLAN baseband,BT Protocol Stack(LMLL,and LE), BT Baseband, modem,and WLAN/BT RF in a combo chip.The F9733BU provides a complete solution for a high throughput performance integrated wireless LAN,and Bluetooth

2.Features

- IEEE 802.11b/g/n compatible WLAN802.11a/b/g/n 1T1R WLAN and Bluetooth single chip
- Complies with USB 2.0 for WLAN
- Complete 802.11n solution for 2.4GHz band
- Maximum data rate 54Mbps in 802.11g; and 150Mbps in 802.11n
- Security support for WPA/WPA2. Open, shared key, and pair-wise key authentication services
- Compatible with Bluetooth v2.1+EDR and v5.2 Systems
- Supports Bluetooth 4.0 Low Energy(BLE)
- PCM interface for audio data transmission via Bluetooth controller
- Supports multiple Low Energy states

3.Block Diagram



4.General Specification

Model	EL.RT8733BU-WFT
Product Name	WLAN 11a/b/g/n 1T1R + BT5.2 module
Major Chipset	RTL8733BU-CG
Standard	802.11a/b/g/n
Modulation Method	BPSK/ QPSK/ 16-QAM/64-QAM
Frequency Band	2.4GHz/5GHz
WiFi/BT Interface	Wifi：USB2.0　　BT：USB2.0
Operating Temperature	-20° C ~ 65° C
Storage Temperature	-40° C ~ 85°C
Humidity	5% to 90% maximum
Dimension	30.0x25.0x6.0 (LxWxH) ±0.2mm

5.RF Specification

5.1wifi Specification

A.2.4GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11b/g/n WiFi compliant	
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK	
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps	PER @ -95 dBm, typical
	- 2Mbps	PER @ -93 dBm, typical
	- 5.5Mbps	PER @ -90 dBm, typical
	- 11Mbps	PER @ -87 dBm, typical
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps	PER @ -90 dBm, typical
	- 9Mbps	PER @ -89 dBm, typical
	- 12Mbps	PER @ -88 dBm, typical
	- 18Mbps	PER @ -85 dBm, typical
	- 24Mbps	PER @ -82 dBm, typical
	- 36Mbps	PER @ -79 dBm, typical
	- 48Mbps	PER @ -74 dBm, typical
	- 54Mbps	PER @ -72 dBm, typical
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -90 dBm, typical
	- MCS=1	PER @ -87 dBm, typical
	- MCS=2	PER @ -85 dBm, typical
	- MCS=3	PER @ -81 dBm, typical
	- MCS=4	PER @ -78 dBm, typical
	- MCS=5	PER @ -73 dBm, typical
	- MCS=6	PER @ -72 dBm, typical
	- MCS=7	PER @ -70 dBm, typical
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -87 dBm, typical
	- MCS=1	PER @ -84 dBm, typical
	- MCS=2	PER @ -82 dBm, typical
	- MCS=3	PER @ -79 dBm, typical
	- MCS=4	PER @ -75 dBm, typical
	- MCS=5	PER @ -71 dBm, typical
	- MCS=6	PER @ -69 dBm, typical
	- MCS=7	PER @ -68 dBm, typical

Maximum Input Level	802.11b : -10 dBm
	802.11g/n : -20 dBm

B.5GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11a/n WiFi compliant
Frequency Range	5.0 GHz ISM Band
Number of Channels	5.0GHz：Please see the table
Modulation	802.11a : OFDM /64-QAM,16-QAM, QPSK, BPSK 802.11n : OFDM /64-QAM,16-QAM, QPSK, BPSK
Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -89 dBm, typical
	- 9Mbps PER @ -88 dBm, typical
	- 12Mbps PER @ -87 dBm, typical
	- 18Mbps PER @ -84 dBm, typical
	- 24Mbps PER @ -81 dBm, typical
	- 36Mbps PER @ -78 dBm, typical
	- 48Mbps PER @ -73 dBm, typical
	- 54Mbps PER @ -72 dBm, typical
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm, typical
	- MCS=1 PER @ -86 dBm, typical
	- MCS=2 PER @ -84 dBm, typical
	- MCS=3 PER @ -81 dBm, typical
	- MCS=4 PER @ -77 dBm, typical
	- MCS=5 PER @ -72 dBm, typical
	- MCS=6 PER @ -71 dBm, typical
	- MCS=7 PER @ -68 dBm, typical
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -86 dBm, typical
	- MCS=1 PER @ -83 dBm, typical
	- MCS=2 PER @ -81 dBm, typical
	- MCS=3 PER @ -78 dBm, typical
	- MCS=4 PER @ -74 dBm, typical
	- MCS=5 PER @ -70 dBm, typical
	- MCS=6 PER @ -68 dBm, typical
	- MCS=7 PER @ -67 dBm, typical
Maximum Input Level	802.11a/n/ac : -20 dBm

1.1 5GHz(20MHz) Channel table

Band (GHz)	Operating Channel Numbers	Channel center frequencies(MHz)
5.15GHz~5.25GHz	36	5180
	40	5200
	44	5220
	48	5240
5.25GHz~5.35GHz	52	5260
	56	5280
	60	5300
	64	5320
5.5GHz~5.7GHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5.725GHz~5.825GHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

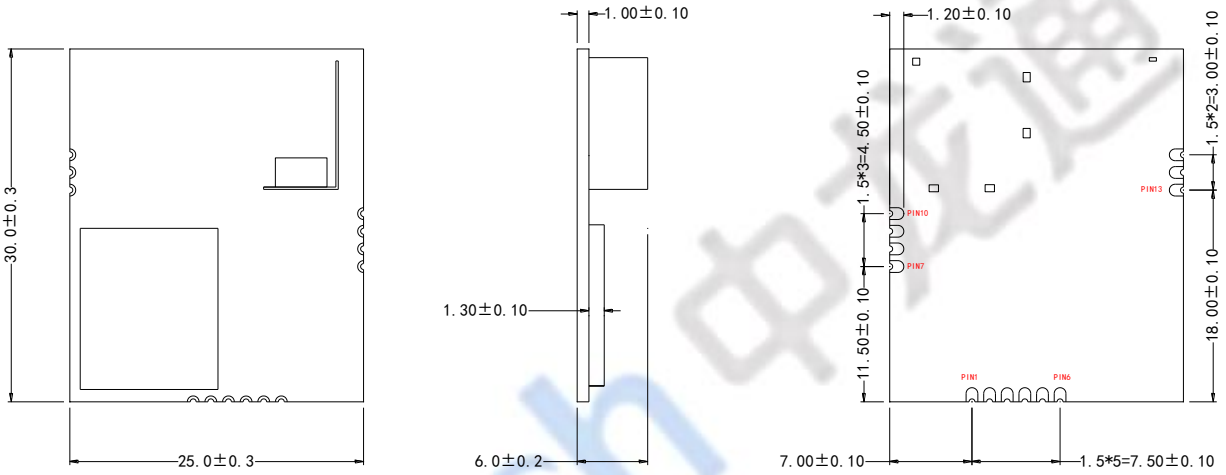
5.3 BT Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth 2.1/3.0/5.2		
Host Interface	USB		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	FHSS, GFSK, DPSK, DQPSK		
RF Specification			
	Min.	**Typical.**	**Max.**
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-86 dBm	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-86 dBm	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-80 dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

6.Electrical Characteristics

symbol	Parameter	Minimum	Typical	Maximum	Units
VCC	3.3V supply voltage	3.0	3.3	3.6	V
VCC	3.3V rating current	--	--	1000	mA
VOH	output high Voltage	2.97	--	3.3	V
VOL	output low Voltage	0	--	0.33	V

7.Pin Description & Module size (unit: mm)

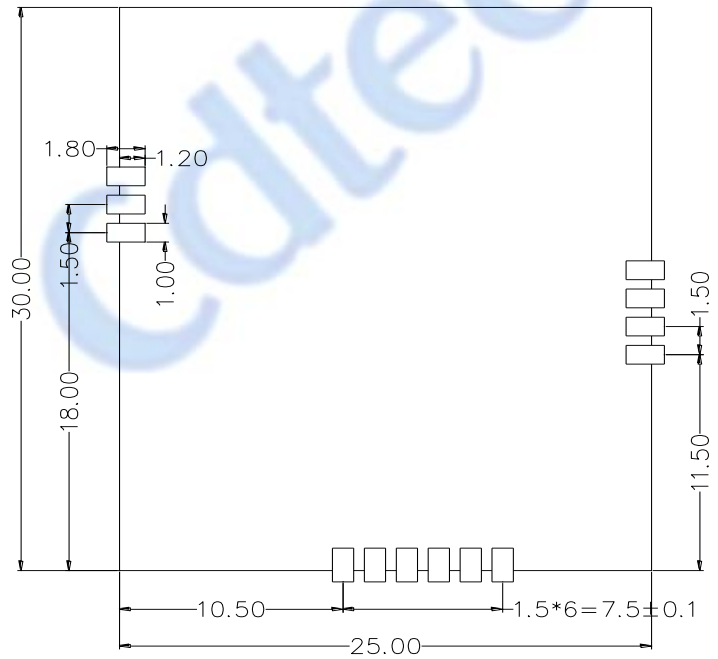


Main View　　Side View　　Back View

NO.	Symbol	Description
1	GND	Ground connections
2	DP	USB positive differential data lines
3	DM	USB negative differential data lines
4	VCC	Power supply 3.3V
5	CHIP_EN	This PIN can externally shut down module(active low, internal pull high)
6	WLAN_WAKE_HOST	GPIO12 (WiFi to wake up host, output signal control by software)
7	GND	Ground connections
8	NC	
9	BT_WAKE_HOST	GPIO14 (BT to wake up host, output signal control by software)
10	GND	Ground connections
11	GND	Ground connections
12	BT_RF	Bluetooth RF output
13	GND	Ground connections

8. Footprint Dimensions

(Unit: mm)

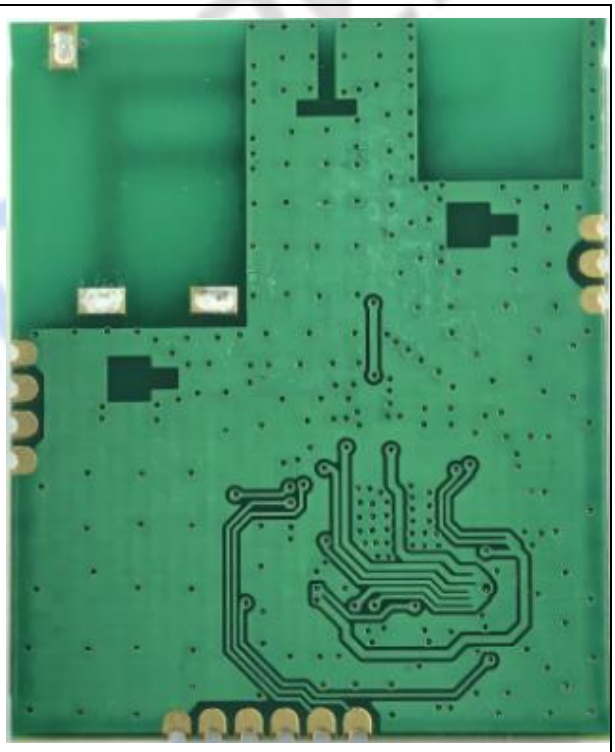


（Top view）

9. Suplier

Secondary supplier list	
Material name	**Supplier brand**
Crystal	JWT/FK/TKD/ECEC
Inductance	Sunlord/ DARFON/CHILISIN/DELI/Walsin
Wifi IC	Realtek
Capacitance	SAMSUNG /EYANG/ Walsin
Resistance	UniOhm /YAGEO
Diplexer	Sunlord
PCB	A,I,O,S,D,P,T

10. Physical photo

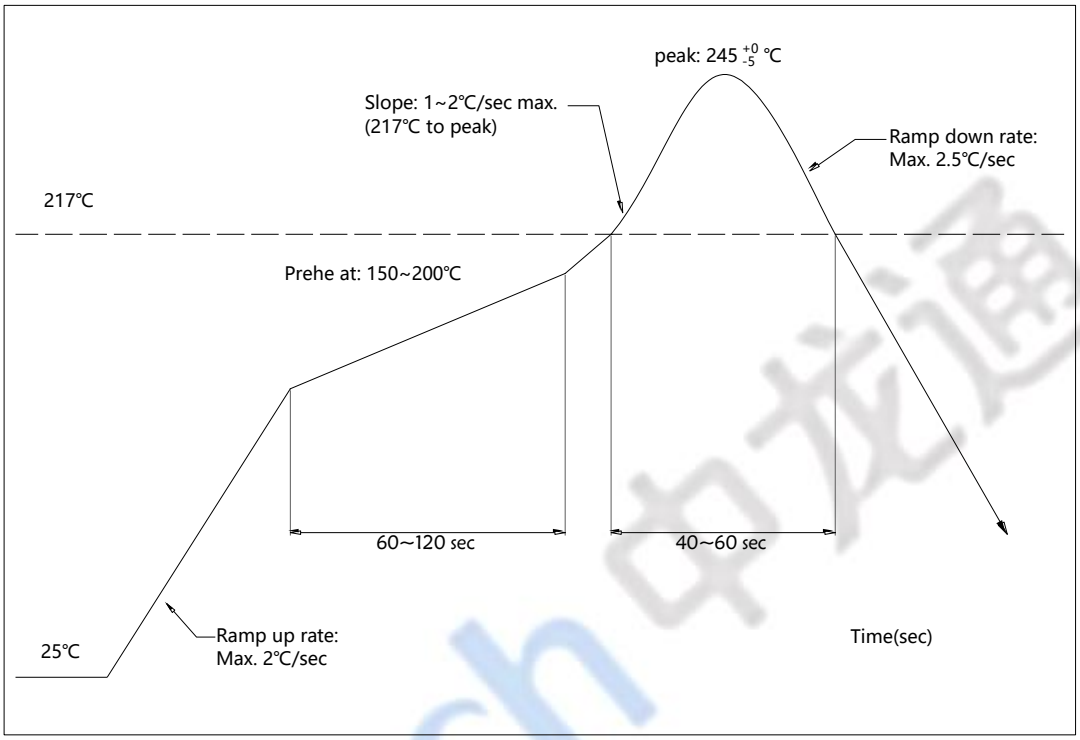
<table>
<tr><td> 
</td><td>  </td></tr>
<tr><td>TOP VIEW</td><td>BOTTOM VIEW</td></tr>
<tr><td colspan="2">Dimension:30.0*25.0*6.0mm (LxWxH) ±0.3mm</td></tr>
</table>

11. Recommended Reflow Profile

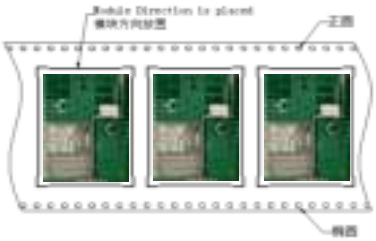
Referred IPC/JEDEC standard.

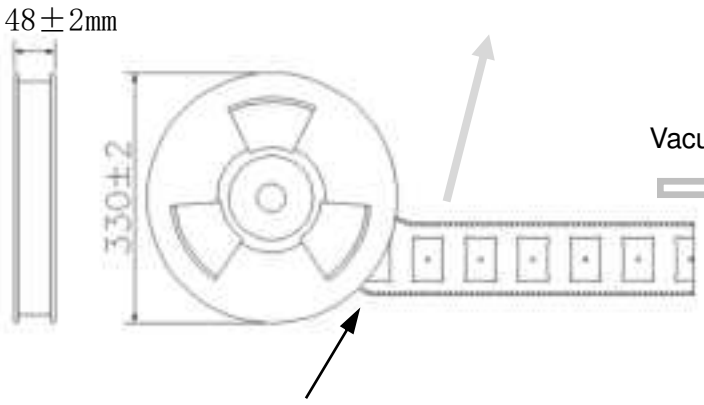
Peak Temperature : ＜50°C

Number of Times : ≤2 times



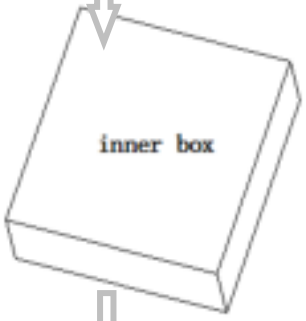
12. Packing information



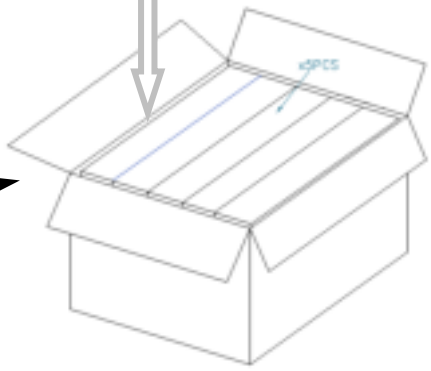


Vacuum packing

Color of plastic disc: blue
A roll of 300pcs(前后留空15pcs)



inner box K3K:
33.5cm*34.7cm*7cm
A box of 300 PCS



carton K=A:
36.4*35.7*37.5cm
A case of 1500 PCS

ESD CAUTION

The EL.RT8733BU-WFT is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although EL.RT8733BU-WFT is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

FCC WARNING

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this 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 device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

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

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

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

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

"Contains Transmitter Module 2AWY6-ELRT8733BUT"

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15C(15.247), FCC Part15 15.407.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The EUT has Shrapnel antenna and PCB antenna, the module contains 2 permanently attached antennas. The maximum gain value of Shrapnel antenna is 3.55dBi, The maximum gain value of PCB antenna is 1.2dBi

2.4 Limited module procedures

If a modular transmitter is approved as a "limited module," then the module manufacturer isresponsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited

module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.
Explanation: The module is a single module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.
a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
d) Appropriate parts by manufacturer and specifications;
e) Test procedures for design verification; and
f) Production test procedures for ensuring compliance.
The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.
Explanation: Yes, The module with Shrapnel antenna and PCB antenna designs, and This manual has been shown the antenna, connectors requirements.

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).
Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: 2AWY6-ELRT8733BUT.

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”)).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT has Shrapnel antenna and PCB antenna, the module contains 2 permanently attached antennas. The maximum gain value of Shrapnel antenna is 3.55dBi, The maximum gain value of PCB antenna is 1.2dBi

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2AWY6-ELRT8733BUT”

2.9 Information on test modes and additional testing requirements

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

Explanation: Can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not

covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15
Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.
Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.

IC statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic DevelopmentCanada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

The term "IC: " before the certification/registration number only signifies that the Industry Canada technical specifications were met.

This product meets the applicable Industry Canada technical specifications.

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences etDéveloppement économique Canada. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pasproduire 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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme auxCNR d'Innovation, Sciences et Développement économique 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;

2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre lefonctionnement.

Please notice that if the ISED certification number is not visible when the module is installed inside another device, then theoutside of the device into which the module is installed o display a label referring to the enclosed module. This exteriorlabel can use wording such as the following:

"Contains IC: 26332-ELRT8733BUT" any similar wording that expresses the same meaningmay be used.

l'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots «Contient un module d'émission », du mot « IC: 26332-ELRT8733BUT » ou d'une formulation similaireexprimant le même sens, comme suit

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 andcompliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure andcompliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 etla conformité

à l'expositionde RSS-102 rf, utilisateurs peut obtenir l'information canadienne surl'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna ortransmitter. This equipment should be installed and operated with a minimum distance of 20centimeters between the radiator and your body.
Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ouémetteur. Cet équipementdevrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.
Operation of this device is restricted to indoor use only. (5180-5240MHz)
Le fonctionnement de cet appareil est limité à une utilisation en intérieur uniquement.
(5180-5240MHz)

This radio transmitter 26332-ELRT8733BUT has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

	ANT Type	Manufacturer	Model	Peak Gain	Frequency range	impedance
BT Antenna	PCB antenna	INPAQ TECHNOLOGY CO., LTD.	ANT1	1.2dBi	2400-2500MHz	50Ω
WIFI Antenna	Shrapnel antenna	INPAQ TECHNOLOGY CO., LTD.	ANT2	2.4G: 1.76dBi 5G: 3.55dBi	2400-2500MHz 5150-5850MHz	50Ω