

EL.AIC8800D-CWFT

(CDT P/N : CDW.F78800D-00)

IEEE 802.11b/g/n/ax 1T1R+Bluetooth 2.1+EDR/3.0/4.x/5.2

EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED

Address : Floor1, Workshop1, No.88, South Baotong Road, Xikeng Community, Yuanshan Street, Longgang District, Shenzhen, Guangdong, China

Phone : (86 755) 81449957

FAX : (86 755) 81449967

E-mail: Info@cdtech.cn

[Http://www.cdtech.cn](http://www.cdtech.cn)

1. Overview

EL.AIC8800D-CWFT is based on AICSEMI AIC8800D, complied with IEEE 802.11b/g/n /ax & BT5.2 standard from 2.4-2.4835GHz.

The HW architecture for the module is shown in Figure 1. It combines a WLAN MAC, a 1T1R capable WLAN baseband, and RF in CMOS single chip, which are designed to meet both the low power and high throughput application. The AIC8800D provides a complete solution for a high-performance integrated wireless and Bluetooth device. This documentation describes the engineering requirements specification.

2. Features

2.1 Platform

- Provides a highly integrated WLAN system-on-chip (SoC) for 2.4GHz 802.11ax
- Support WLAN 2.4GHz
- Supports a USB 2.0 interface for WLAN and BT
- Supports BT 5.2, BLE, and backward compatibility with BT 1.x and BT 2.x + Enhanced Data Rate
- Supports 20 MHz/40 MHz
- Fully Compliance with USB v2.0 specification
- Supports a single-ended RF port for cleaner and lower cost design

3. Block Diagram

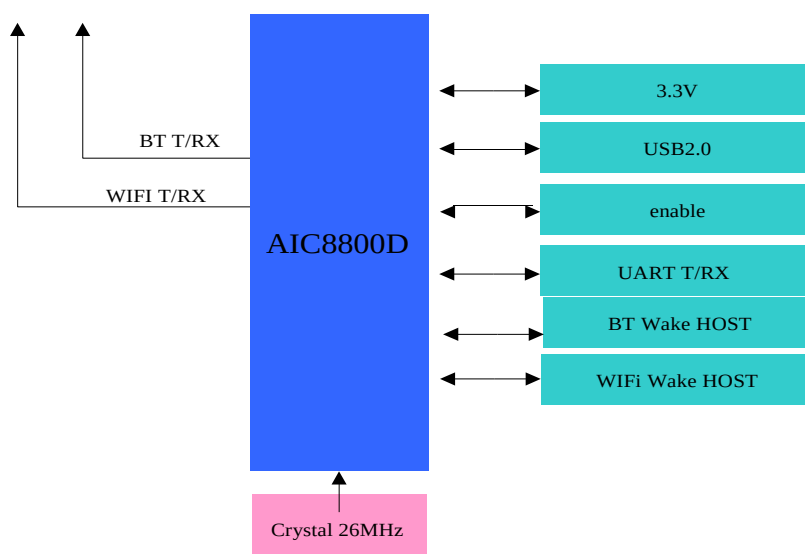


Figure 1

4. General Specification

Model	EL.AIC8800D-CWFT
Product Name	WLAN 802.11b/g/n/ax 1T1R + Bluetooth 5.2 module
Major Chipset	AIC8800D
Standard	802.11b/g/n/ax
Modulation Method	BPSK/ QPSK/ 16-QAM/ 64-QAM/1024-QAM
Frequency Band	2.4GHz-2.4835GHz
WiFi Interface	USB2.0
BT Interface	USB2.0
Ambient Operating Temperature	-20 °C ~ 70 °C
Storage Temperature	-20° C ~ 125°C
Humidity	5% to 90% maximum
Dimension	21*15*2.4mm (LxWxH) ±0.2mm

5. Electrical Characteristics

5.1 2.4GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11b/g/n/ax WiFi compliant
Frequency Range	2.412 GHz ~ 2.472 GHz (2.4 GHz ISM Band)
Number of Channels	2.4GHz : Ch1 ~ Ch13
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK 802.11 ax : OFDM /1024-QAM, 64-QAM, 16-QAM, QPSK, BPSK
MAX.Output Power(E.I.R.P)	802.11b / 1Mbps : 14dBm ± 2 dB @ EVM ≤ -10dB
	802.11g / 6Mbps : 13dBm ± 2 dB @ EVM ≤ -5dB

	802.11n /MCS0 : 12 dBm $\pm$ 2 dB @ EVM $\leq$ -5dB
	802.11ax /HE0(20/40M) : 12 dBm $\pm$ 2 dB @ EVM $\leq$ -5dB
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -83 dBm, typical
	- 2Mbps PER @ -80 dBm, typical
	- 5.5Mbps PER @ -79 dBm, typical
	- 11Mbps PER @ -76 dBm, typical
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -85 dBm, typical
	- 9Mbps PER @ -84 dBm, typical
	- 12Mbps PER @ -82 dBm, typical
	- 18Mbps PER @ -80 dBm, typical
	- 24Mbps PER @ -77 dBm, typical
	- 36Mbps PER @ -73 dBm, typical
	- 48Mbps PER @ -69 dBm, typical
	- 54Mbps PER @ -65 dBm, typical
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -82 dBm, typical
	- MCS=1 PER @ -79 dBm, typical
	- MCS=2 PER @ -77 dBm, typical
	- MCS=3 PER @ -74 dBm, typical
	- MCS=4 PER @ -70 dBm, typical
	- MCS=5 PER @ -66 dBm, typical
	- MCS=6 PER @ -65 dBm, typical
	- MCS=7 PER @ -64 dBm, typical
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -79 dBm, typical
	- MCS=1 PER @ -76 dBm, typical
	- MCS=2 PER @ -74 dBm, typical
	- MCS=3 PER @ -71 dBm, typical
	- MCS=4 PER @ -67 dBm, typical
	- MCS=5 PER @ -63 dBm, typical
	- MCS=6 PER @ -62 dBm, typical
	- MCS=7 PER @ -61 dBm, typical
Receive Sensitivity	- HE=0 PER @ -82 dBm, typical
	- HE=1 PER @ -79 dBm, typical
	- HE=2 PER @ -77 dBm, typical
	- HE=3 PER @ -74 dBm, typical

	- HE=4 PER @ -70 dBm, typical
	- HE=5 PER @ -66 dBm, typical
	- HE=6 PER @ -65 dBm, typical
	- HE=7 PER @ -64 dBm, typical
	- HE=8 PER @ -59 dBm, typical
	- HE=9 PER @ -57 dBm, typical
Receive Sensitivity (11ax,40MHz) @10% PER	- HE=0 PER @ -79 dBm, typical
	- HE=1 PER @ -76 dBm, typical
	- HE=2 PER @ -74 dBm, typical
	- HE=3 PER @ -71 dBm, typical
	- HE=4 PER @ -67 dBm, typical
	- HE=5 PER @ -63 dBm, typical
	- HE=6 PER @ -62 dBm, typical
	- HE=7 PER @ -61 dBm, typical
	- HE=8 PER @ -56 dBm, typical
	- HE=9 PER @ -54 dBm, typical
Antenna Reference	Small antennas with 1.09 dBi peak gain

5.2 Bluetooth Section:

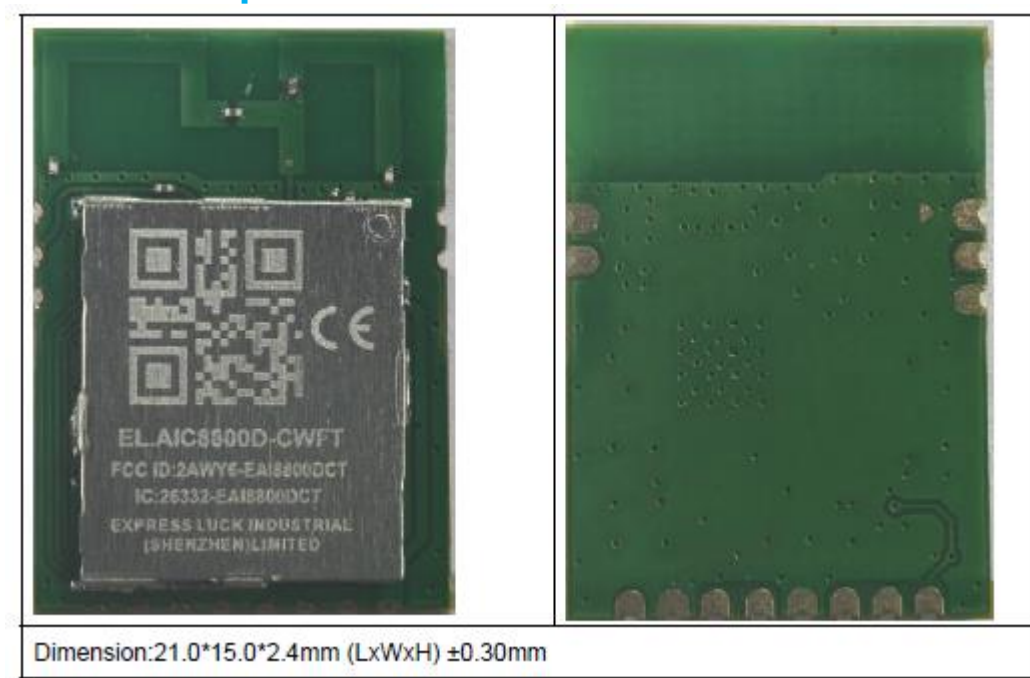
Feature	Description
General Specification	
Bluetooth Standard	Bluetooth V5.2 of 1, 2 and 3 Mbps.
Host Interface	USB2.0
Antenna Reference	Small antennas with -2.27 dBi peak gain
Frequency Band	2402 MHz ~ 2480 MHz
Number of Channels	BR/EDR :79 channels;BLE:40 channels
Modulation	FHSS, GFSK, DPSK, DQPSK
RF Specification	
Output Power, tolerance $\pm$ 2dBm	
MAX. Output Power(E.I.R.P)	7 dBm

BLE MAX.Output Power(E.I.R.P)	7 dBm
Sensitivity, tolerance ± 2 dBm	
Sensitivity @ BER=0.1% for GFSK(1Mbps)	-88 dBm
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK(2Mbps)	-91 dBm
Sensitivity @ BER=0.01% for 8DPSK(3Mbps)	-85 dBm
Sensitivity @ BLE=30.8% for LE(1Mbps)	-90 dBm
Sensitivity @ BLE=30.8% for LE(2Mbps)	-91 dBm

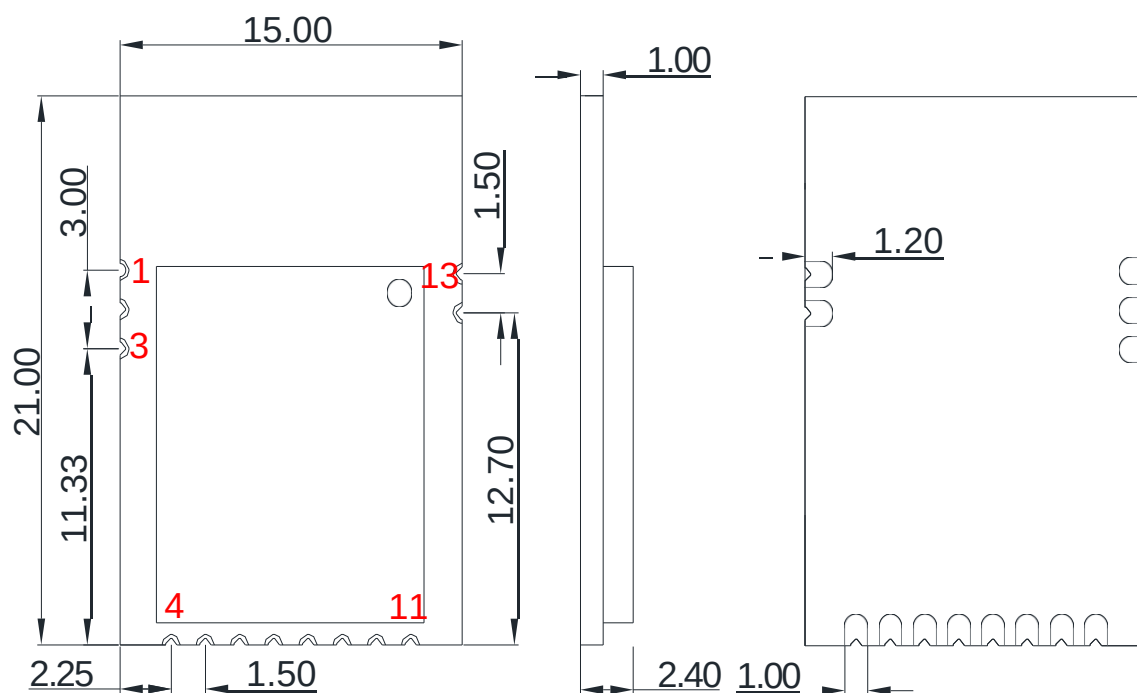
6. Supplier

Supplier list	
Name of material	Material brand
Crystal	JWT/FK/TKD/Murata/TXC
Inductor	Sunlord/ CHILISIN/ SAMWHA/Murata
Wifi chip	AIC
Capacitance	SAMSUNG /EYANG/Murata
Resistance	UniOhm /YAGEO
PCB(21*15*1mm)	A,O,I,F

7. Module photo



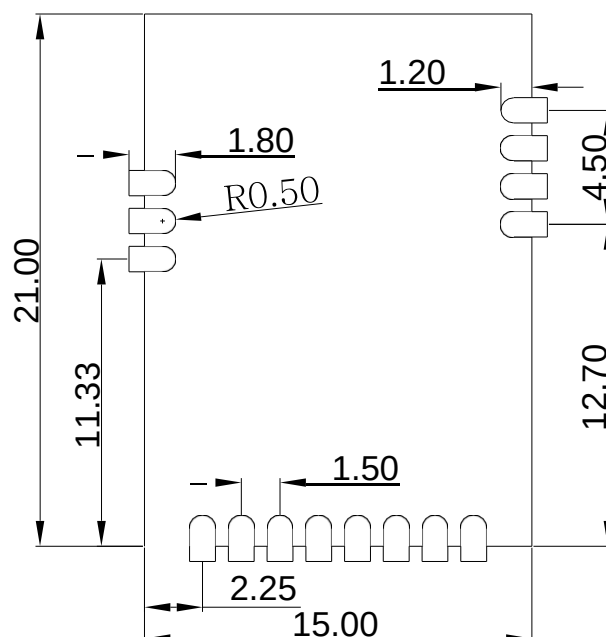
8. Module size



9.Pin Description

NO.	Symbol	Description
1	GND	Ground connections
2	BT_RF	BT_RF
3	GND	Ground connections
4	RST_N	Reset
5	WL_WAKE_HOST	WLAN wake up HOST
6	BT_WAKE_HOST	BT wake up HOST
7	GND	Ground connections
8	DM	USB_DM
9	DP	USB_DP
10	GND	Ground connections
11	VCC	3.3V Voltage input
12	NC	NC
13	GND	Ground connections

10. Package Size

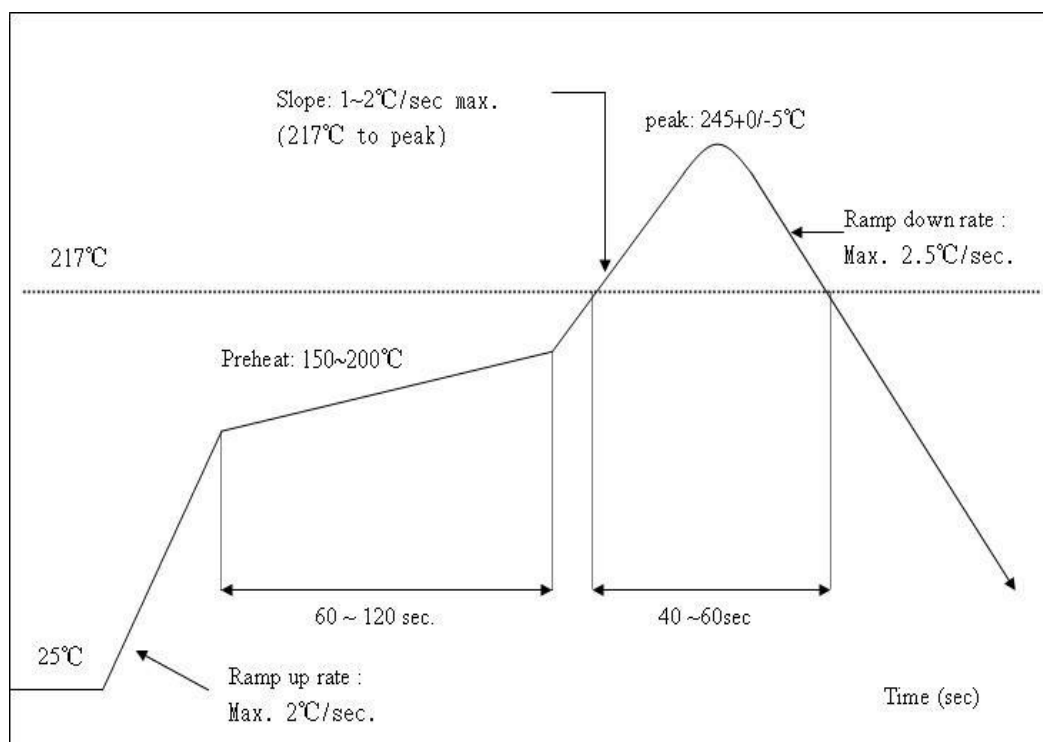


11. Recommended Reflow Profile

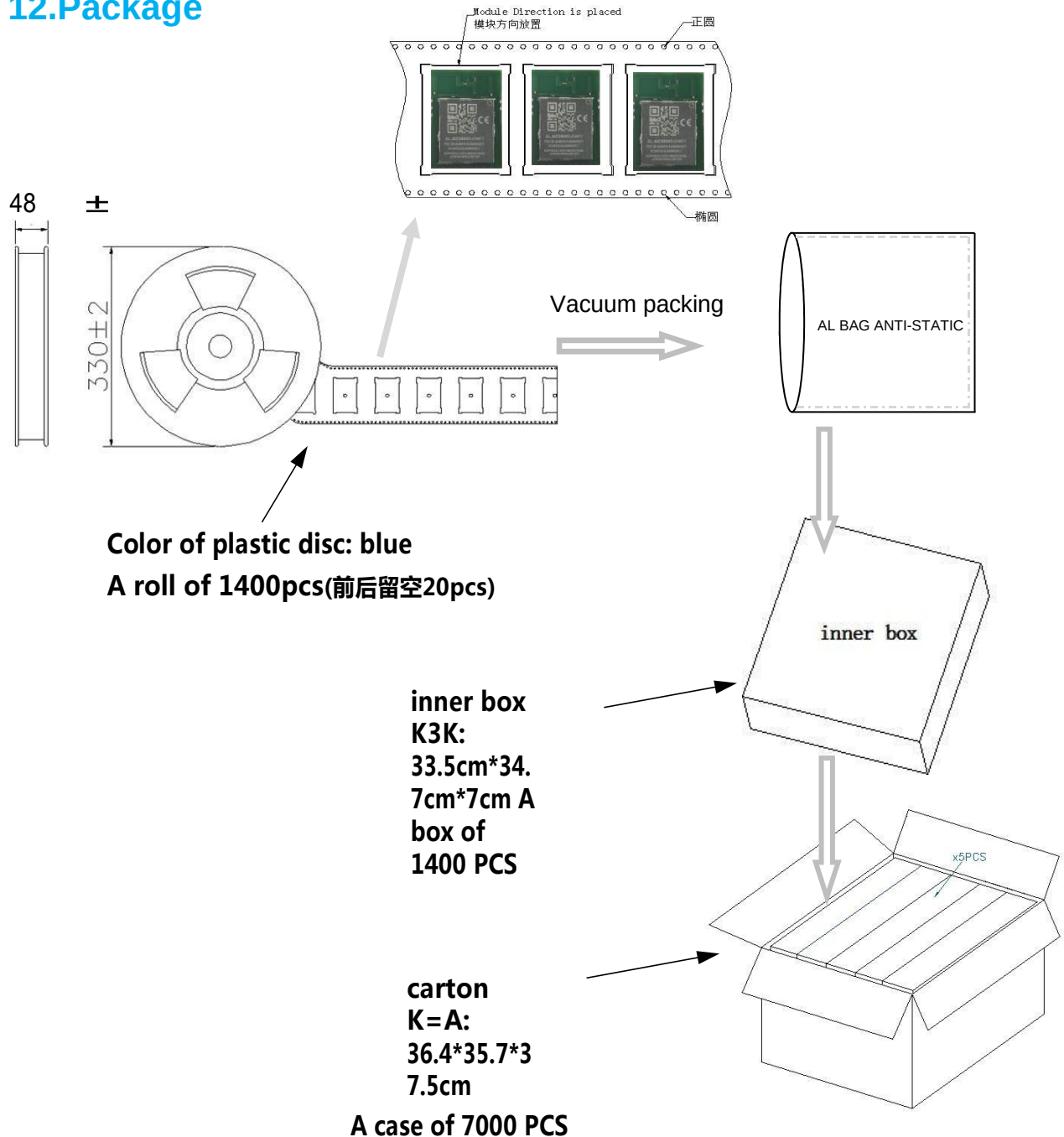
Referred PC/JEDEC standard.

Peak Temperature : $\leq 250^{\circ}\text{C}$

Number of Times : ≤ 2 times



12.Package



ESD CAUTION

The EL.AIC8800D-CWFT is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although EL.AIC8800D-CWFT is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

CE Statements:

Manufacturer's Name: EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED

Address: Floor1, Workshop1, No.88, South Baotong Road, Xikeng Community, Yuanshan Street, Longgang

District, Shenzhen, GuangDong, China

Product name : WiFi Module

Model number: EL.AIC8800D-CWFT

1. This device in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. All essential radio test suites have been carried out.
2. The device complies with RF specifications when the device used at 20cm form your body.
3. EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED hereby declares that this Product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.
4. According to Article 10(2) of Directive 2014/53/EU, the Product can be used in Europe without restriction.
5. OOperation temperature:--20~70℃
6. Operation Frequency:
BT:2402-2480MHz, Maximum output power:8.28dBm.
WIFI:2412-2472MHz, Maximum output power:15.74dBm.

ISED Statement:**EN**

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and

Economic Development Canada'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.

FR

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR 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 le fonctionnement.

Radiation Exposure Statement

This equipment complies with Canada 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.

Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

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.

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.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

FCC Certification

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

2.2 List of applicable FCC rules

The EL.AIC8800D-CWFT is an IEEE 802.11b/g/n/ax 1T1R+Bluetooth 2.1+EDR/3.0/4.x/5.2 Module. It is within U.S. FCC part 15.247 standard

2.3 Specific operational use conditions

The EUT is a IEEE 802.11b/g/n/ax 1T1R+Bluetooth 2.1+EDR/3.0/4.x/5.2 Operation Frequency: 2402-2480MHz for BT; 2412-2462MHz for WIFI 2.4G,
Modulation Type: GFSK, $\pi/4$ -DQPSK, 8-DPSK for BT, GFSK for BLE,
WLAN(DSSS/OFDM/OFDMA)

2.4 Limited module procedures

Not applicable; Single Modular Approval Request

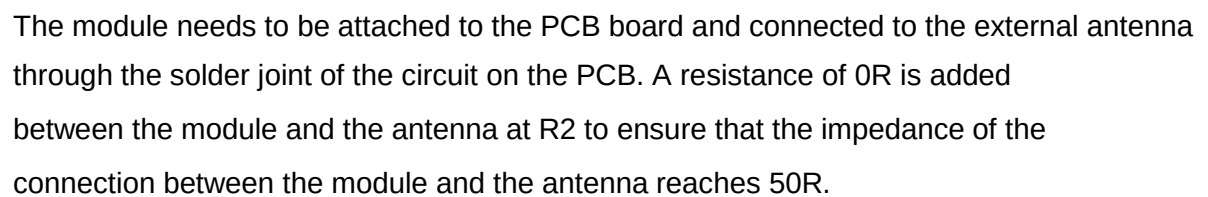
2.5 Trace antenna designs

The IEEE 802.11b/g/n/ax 1T1R+Bluetooth 2.1+EDR/3.0/4.x/5.2 beams signals and communicates with its antenna, which is PCB Antenna

Users should connect antennas to half hole pad through FP types of RF trace and the trace impedance must be controlled in 50Ω. recommends that the total insertion loss between the antenna pads and antennas should meet the following requirements:

Trace loss Frequency	Loss
2400MHz- 2500MHz	<0.6dB

To facilitate the antenna tuning and certification test, a RF connector and an antenna matching circuit should be added. The following figure is the recommended circuit.



To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

The IEEE 802.11b/g/n/ax 1T1R+Bluetooth 2.1+EDR/3.0/4.x/5.2 Module beams signals and communicates with its antenna, which have two PCB Antenna

The antenna pads and antennas should meet the following requirements: Antenna Type	Antenna Supplier	cable loss	cable length	Connector
WIFI: PCB	SHENZHEN ZHUOCHUANGTONG ELECTRONIC CO.,LTD	2.4G: 0.6dB	12.95±0.2mm	N/A
BT: PCB	SHENZHEN ZHUOCHUANGTONG ELECTRONIC CO.,LTD	2.4G:0.5dB	11.5±0.2mm	N/A

BT Antenna:-2.27dBi, WiFi Antenna:1.09dBi

2.8 Label and compliance information

The final end product must be label in a visible area , the Host must Contains FCC ID: 2AWY6-EAI8800DCT

2.9 Information on test modes and additional testing requirements

Data transfer module demo board can control the EUT work in RF test mode at specified test channel.

2.10 Additional testing, Part 15 Subpart B disclaimer

The module without unintentional-radiator digital circuit, so the module does not required an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B

2.11 OEM integration instructions:

This device is intended only for OEM integrators under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module. As long as the conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

2.12 Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module 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 authorization.

ATTENTION

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

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) This device and its antenna(s) must not be co - located with any other transmitters except in accordance with FCC multi - transmitter product procedures. Referring to the multi - transmitter policy, multiple transmitter(s) and module(s) can be operated simultaneously without C2PC.
- 3) For all products market in US, OEM has to limit the Operating Frequency: 2402-2480MHz for BT;

2412-2462MHz for WIFI 2.4G, by supplied firmware programming tool. OEM shall not supply any tool or info to the end - user regarding to Regulatory Domain change.

USERS MANUAL OF THE END PRODUCT:

In the user manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio - frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.