1. Overview

The EL.MT7668BUN-WFT is a highly integrated single chip Module which has built in a 2x2 dual-band wireless LAN radio and Bluetooth radio.It supports IEEE 802.11a/b/g/n 11ac standard and provides the highest PHY rate up to 867Mbps,offering feature-rich wireless connectivity and reliable throughput from an extended distance.It includes Bluetooth EDR and LE radio which complies with Bluetooth v2.1+EDR,v4.2,Low Energy, and v5.0.

The EL.MT7668BUN-WFT integrates PA/LNA such that the number of the external components is reduced to minimum.Intelligent MAC design deploys a high efficient DMA engine and hardware data processing accelerators which offloads the host processor.

The EL.MT7668BUN-WFTsupports the 802.11i security standard and implements hardware acceleration for TKIP,CCMP and WAPI. The device also supports 802.11e Qos for video,voice,and multimedia applications.

The EL.MT7668BUN-WFT can provide a comcurrent operation of Wi-Fi and Bluetooth over USB interace. An intelligent Wi-Fi/Bluetooth coexistence algorithm is implemented to reach the best Wi-Fi and Bluetooth radio performance.

2. Features

2.1 Platform

- Embedded high-performance 32-bit RISC microprocessor
- Highly integrated RF with 28nm CMOS technology
- Integrate high efficiency switching regulator
- 40MHz crystal clock support with low power operation in sleep mode
- Best-in-class active and idle power consumption performance
- Fully Compliance with USB v2.0 specification
- Internal thermal sensor for temperature compensation and thermal protection.
- Self calibration.
- Advanced FDD/TDD mode Wi-Fi/Bluetooth coexistence scheme.
- Wi-Fi and Bluetooth over USB.

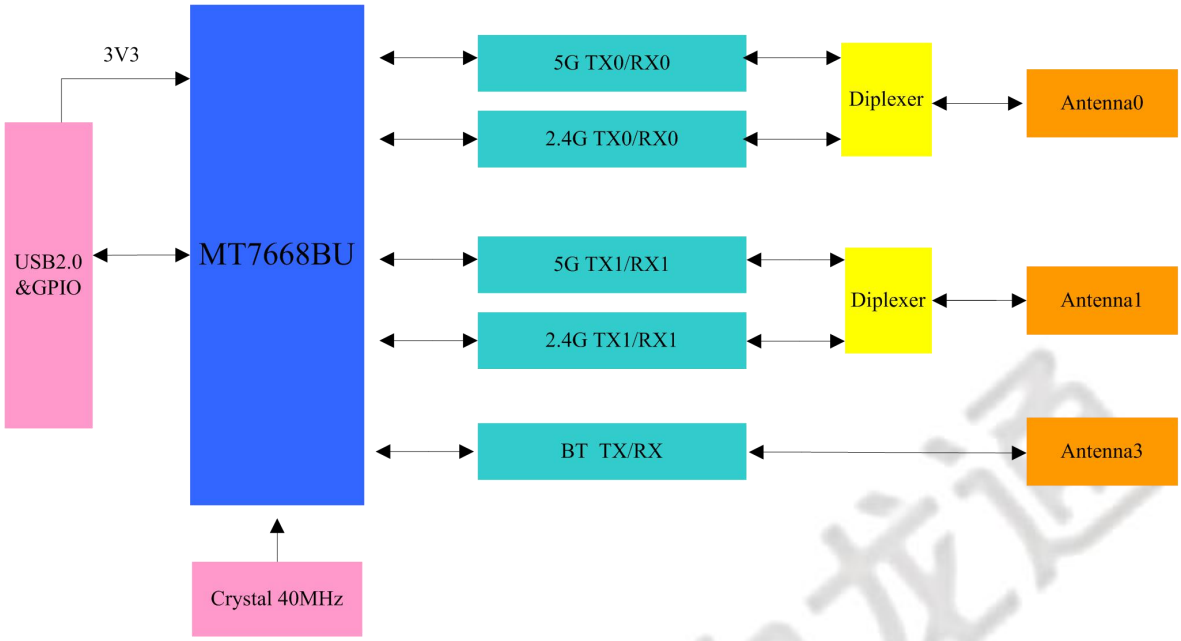
2.2 WLAN

- IEEE 802.11a/b/g/n11ac compliant
- Support 20MHz,40MHz,80MHz in 5GHz band,and 20MHz,40MHz bandwidth in 2.4GHz band.
- Embedded high-performance 32-bit RISC microprocessor
- Dual-band 2T2R mode with data rate up to 867Mbps
- Greenfield,mixed mode,legacy modes support
- Integrated LNA,PA,and T/R switch
- Optional external LNA and PA support.
- IEEE 802.11d/e/h/i/k/r/w support
- Security support for WGA WPA/WPA2 personal,WPS2.0,WAPI
- Supports 802.11w proteced managed frames
- QoS support of WFA WMM,WMM PS
- Supports Wi-Fi Direct
- Fully compliance with USB v2.0
- Wake on WLAN

2.3 Bluetooth

- Bluetooth specification v2.1+EDR
- Bluetooth v4.2 Low Energy(LE)
- Standard HCI interface over USB super-speed,high-speed and full-speed mode
- Best-in-class BT/Wi-Fi coexistence performance
- Scatternet support:Up to 7 piconets simultaneously with background inquiry/page scan
- Up to 7 simulaneous active ACL links
- Support SCO and SCO link with re-transmission
- Support wide-band speech and hardware accelerated SBC codec for A2DP streaming
- Packet loss concealment
- Channel assessment or AFH
- 3DD support

3. Block Diavgram



4. General Specification

Model	EL.MT7668BUN-WFT
Product Name	WLAN 11a/b/g/n/ac USB2.0 2T2R + Bluetooth 5.0module
Major Chipset	MT7668BU
Standard	802.11a/b/g/n/ac
Modulation Method	BPSK/ QPSK/ 16-QAM/ 64-QAM/256-QAM
Frequency Band	2.4GHz and 5GHz ISM Band
WiFi Interface	USB2.0
BT Interface	USB2.0
Ambient Operating Temperature	-10° C ~ 70° C
Storage Temperature	-40° C ~ 90°C
Humidity	5% to 90% maximum
Dimension	25.0*30*6.0mm (LxWxH) ±0.2mm

5. Electrical Characteristics

5.1 WiFi Section:

2.4GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11a/b/g/n/ac WiFi compliant
Frequency Range	2412 ~ 2462 MHz (2.4 GHz ISM Band)
Number of Channels	CH11
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK
Output Power	802.11b /11Mbps : 17dBm ± 2dB @ EVM ≤ -15dB
	802.11g /54Mbps : 15 dBm ± 2dB @ EVM ≤ -28dB
	802.11n HT20 /MCS7: 14 dBm ± 2dB @ EVM ≤ -30dB
	802.11n HT40 /MCS7 : 14 dBm ± 2dB @ EVM ≤ -30dB
Receive Sensitivity 11b,20MHz @8%PER	- 1Mbps PER @ -95 dBm, typical
	- 11Mbps PER @ -88dBm, typical
Receive Sensitivity 11g,20MHz @10%PER	- 6Mbps PER @ -93 dBm, typical
	- 54Mbps PER @ -75 dBm, typical
Receive Sensitivity 11n,20MHz @10%PER	- MCS=0 PER @ -93 dBm, typical
	- MCS=7 PER @ -74 dBm, typical
Receive Sensitivity 11n,40MHz @10%PER	- MCS=0 PER @ -89 dBm, typical
	- MCS=7 PER @ -70 dBm, typical

5GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11a/n/ac 2x2, WiFi compliant
Frequency Range	5150 MHz ~5250MHz;5725 MHz ~5850 MHz
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 802.11ac : OFDM /256-QAM
Output Power	802.11a 54Mbps: 15 dBm ± 2dB @ EVM ≤ -25dB
	802.11n HT20 /MCS7 : 14 dBm ± 2 dB @ EVM ≤ -28dB
	802.11n HT40 /MCS7 : 14 dBm ± 2 dB @ EVM ≤ -28dB
	802.11ac VHT20 /MCS8 : 14 dBm ± 2 dB @ EVM ≤ -30dB
	802.11ac VHT40 /MCS9 : 13 dBm ± 2 dB @ EVM ≤ -32dB
	802.11ac VHT80 /MCS9 : 13 dBm ± 2 dB @ EVM ≤ -32dB
Receive Sensitivity 11a,20MHz @10%PER	- 6Mbps PER @ -92 dBm, typical
	- 54Mbps PER @ -75 dBm, typical
Receive Sensitivity	- MCS=0 PER @ -92 dBm, typical

	- MCS=7	PER @ -73 dBm, typical
Receive Sensitivity 11n,40MHz @10%PER	- MCS=0	PER @ -89 dBm, typical
	- MCS=7	PER @ -70 dBm, typical
Receive Sensitivity 11ac,20MHz @10%PER	- MCS=0, NSS1	PER @ -90 dBm, typical
	- MCS=8, NSS1	PER @ -66 dBm, typical
Receive Sensitivity 11ac,40MHz @10%PER	- MCS=0, NSS1	PER @ -87 dBm, typical
	- MCS=9, NSS1	PER @ -63 dBm, typical
Receive Sensitivity 11ac,80MHz @10%PER	- MCS=0, NSS1	PER @ -84 dBm, typical
	- MCS=9, NSS1	PER @ -60 dBm, typical
Antenna Reference		

5.2 Bluetooth Section:

Feature	**Description**		
General Specification			
Bluetooth Standard	Bluetooth V2.1+EDR,V4.2,V5.0.		
Host Interface	USB2.0		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	GFSK, DPSK, DQPSK		
RF Specification			
	Min	**Typical**	**Max**
Output Power		8 dBm	
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

6.1 WLAN current consumption

Description	TYP	Unit
Sleep mode, radio off (USB suspend)	1.5	mA
2.4GHz RX Power saving, DTIM=1	3.3	mA
2.4GHz RX Active, HT20, MCS15	144	mA
2.4GHz TX CCK, 11Mbps @ 21dBm	403	mA
2.4GHz TX HT20, MCS15 @ 17.5dBm	496	mA
2.4GHz TX HT20, MCS8 @ 18dBm	520	mA
5GHz VHT80 RX Listen, 2RX	154	mA
5GHz RX Active, VHT80, MCS9, Nss=2	242	mA
5GHz TX VHT80, MCS9, Nss=2 @ 15dBm	678	mA
5GHz TX VHT80, MCS0, Nss=2 @ 16.5dBm	713	mA

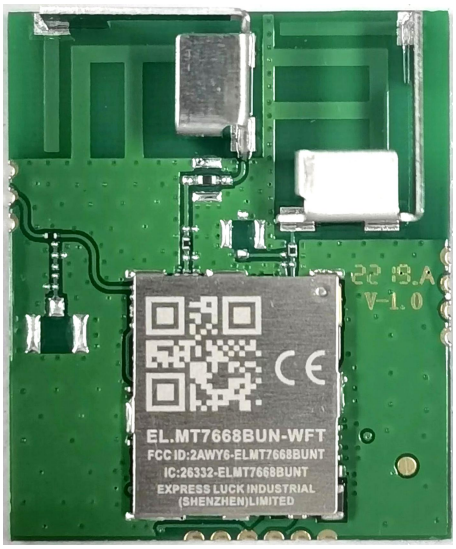
6.2 Bluetooth current consumption

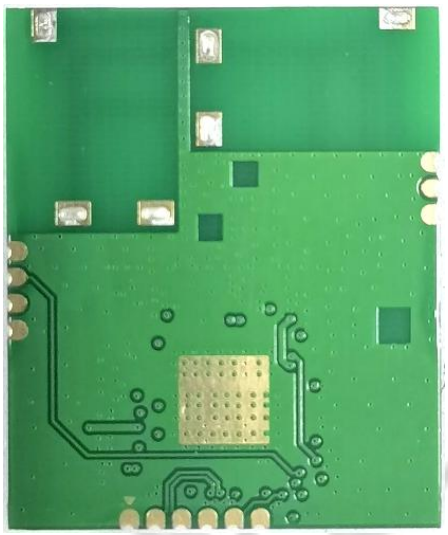
Description	TYP	Unit
Sleep mode, radio off (USB suspend)	1.5	mA
Bluetooth TX @ 9dBm	42	mA
Bluetooth RX	21	mA
Bluetooth SCO connection, HV3 packets+sniff mode+scan (Page scan internal=1.28sec,inquiry scan interval=2.56s,sniff interval=500ms)	21	mA
Bluetooth page scan+inquiry scan (Page scan interval=1.28s,inquiry scan interval=2.56s)	1.7	mA
Bluetooth page scan (Page scan interval=1.28s)	1.6	mA

7. Supplier

Material List		
Diplexer	DPX165900DT-8125A LD18D2450LAN-D30 RFDIP160806BLM6T68	TDK,GLEAD，PSA
Crystal	40M 3225	JWT ， FK , SFJ
IC	MTK7668BU-CG	MTK
Inductor		Sunlord

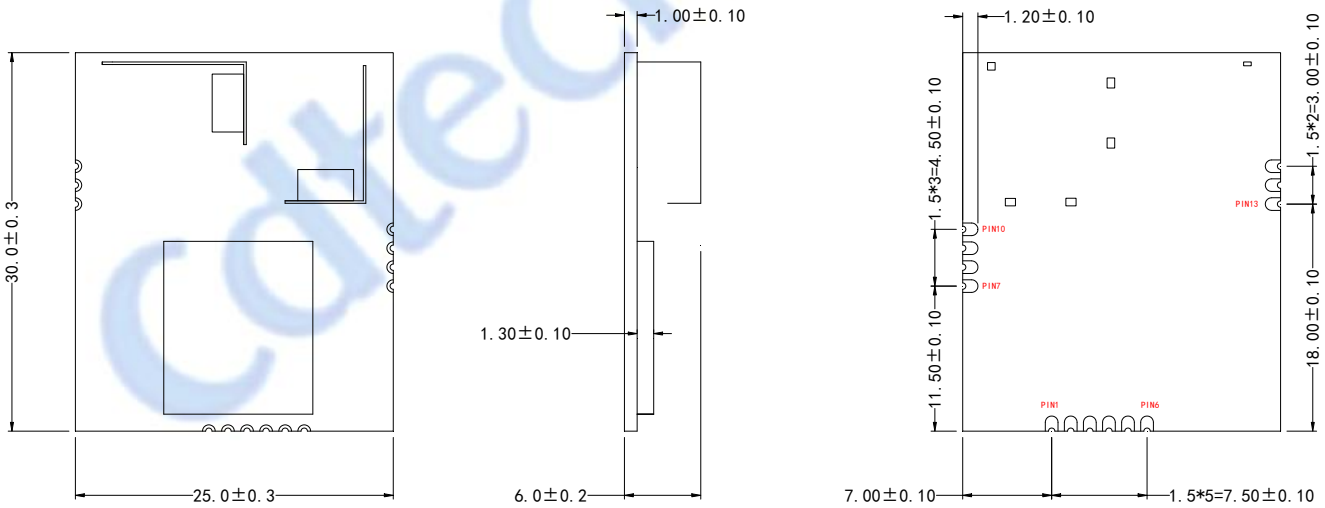
8. Module photo





Dimension:25.0*30.0*6.0mm (LxWxH) ±0.30mm

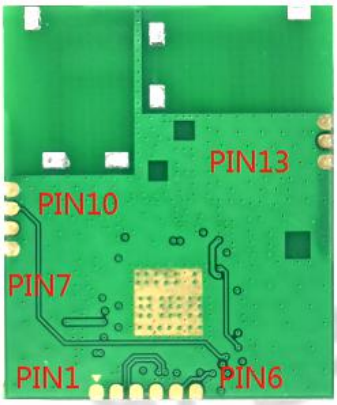
9. Module size



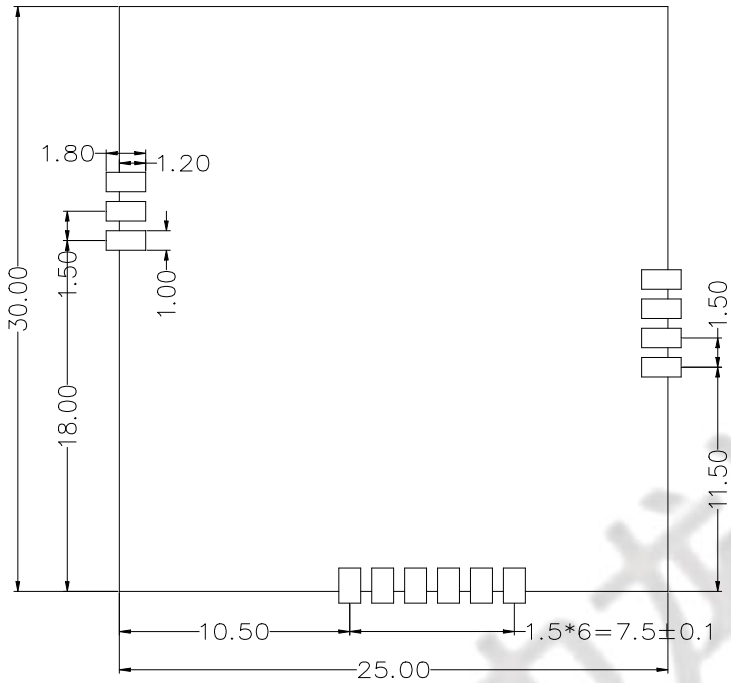
Main View　　Side View　　Back View

10. Pin Description

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	RESET	System reset MT7668BUN,low active(模组 10k 上拉)
6	WOW	Wake up system via wifi,low active(模组 10k 上拉)
7	GND	Ground connections
8	NC	
9	BT_WAKE_HOST	Wake up system via BT,low active(模组 10k 上拉)
10	GND	Ground connections
11	GND	Ground connections
12	BT_RF	Bluetooth RF output
13	GND	Ground connections

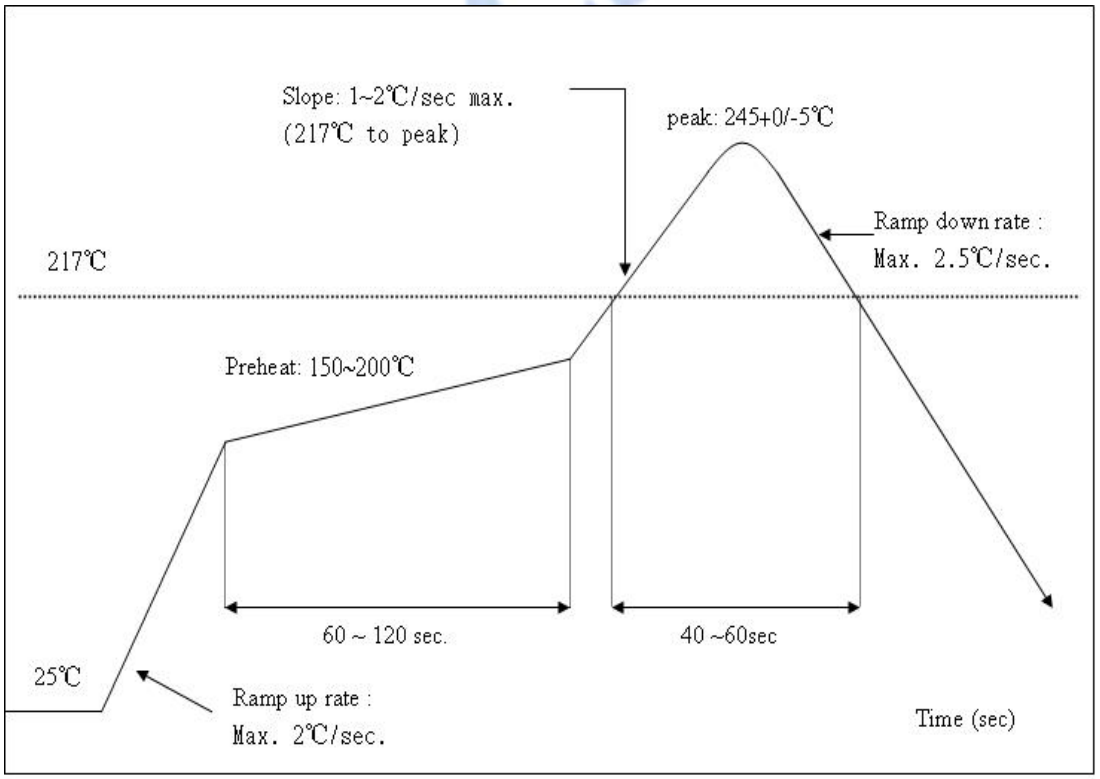


11. Package Size

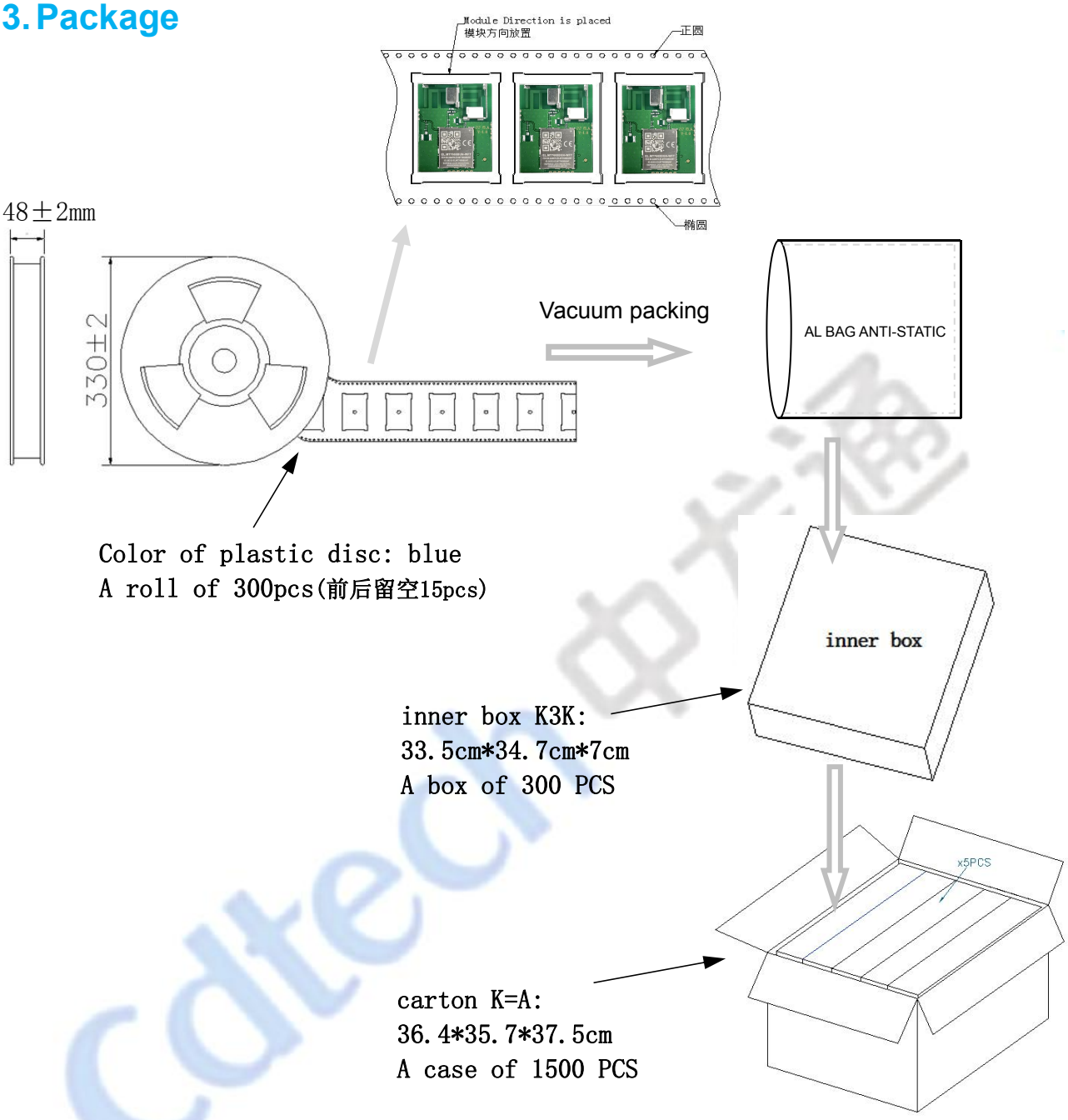


12. Recommended Reflow Profile

Referred PC/JEDEC standard.
Peak Temperature : <250°C
Number of Times : 2 times



13. Package



ESD CAUTION

The EL.MT7668BUN-WFTis ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although EL.MT7668BUN-WFT is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

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.).
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.
End product labeling:
The final end product must be labeled in a visible area with the following: “Contains Transmitter Module FCC ID: 2AWY6-ELMT7668BUNT”.
Information that must be placed in the end user manual:
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01
2.2 List of applicable FCCrules
FCC Part 15 Subpart C 15.247 & 15.207 & 15.209 & 15.407
2.3 Specific operational useconditions
The module WiFi Module is a module with WIFI 2.4G / BT/ WIFI 5G function.
Operation Frequency:
WIFI 2.4G:2412~2462MHz
BT:2402~2480MHz
WIFI 5G:5150 MHz ~5250MHz; 5725 MHz ~5850 MHz
Type:
WIFI 2.4G:PIFA Antenna; Gain: Antenna 1: 1.2 dBi; Antenna 2: 1.76dBi
WIFI 5G:PIFA Antenna; Gain: Antenna 1: 3.25 dBi; Antenna 2: 3.55dBi

BT:External Antenna; Gain: 1 dBi

The module can be used for mobile or applications with the maximum (WIFI 2.4G:Ant1:1.2dBi;Ant2:1.76dBi;WIFI5G:Antenna 1: 3.25 dBi; Antenna 2: 3.55dBi;BT: 1 dBi); The host manufacturer installing this module into their product must ensure that the final composit product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operaition. The host manufacturer has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.
2.4 Limited module procedures
Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.
2.5 Trace antennadesigns
Not applicable. The module has its own antenna, and doesn’t need a host’s printed board microstrip trace antenna etc.
2.6 RF exposureconsiderations
The module must be installed in the host equipment such that at least 20cm is maintained betweenthe antenna and users’ body; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCCauthorization

2.7 Antennas
Antenna Specification are as follows:
Type:
WIFI 2.4G:PIFA Antenna; Gain: Antenna 1: 1.2 dBi; Antenna 2: 1.76dBi
WIFI 5G:PIFA Antenna; Gain: Antenna 1: 3.25 dBi; Antenna 2: 3.55dBi

BT:External Antenna; Gain: 1 dBi

This device is intended only for host manufacturers 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 internal antenna(s) that has been originally tested and certified with this module.
The antenna must be either permanently attached or employ a 'unique' antenna coupler.
As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer 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.).
2.8 Label and complianceinformation
Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID:
2AWY6-ELMT7668BUNT"with their finished product.
2.9 Information on test modes and additional testingrequirements
Data transfer module demo board can control the EUT work in RF test mode at specified test channel. 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.
2.10 Additional testing, Part 15 Subpart Bdisclaimer
The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15.207 & 15.209 & 15.407 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.

FCC STATEMENT :
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.
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
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 generate, 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 20cm between the radiator & your body.

IC Caution:
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:
This device may not cause interference.
This device must accept any interference, including interference that may cause undesired operation of the device.

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 :
L'appareil ne doit pas produire de brouillage;
L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Cet équipement est conforme aux limites d'exposition aux rayonnements de la FCC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

Manufacturer's Name: EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED
Product Name: WiFi Module
Trade Mark: CDTECH
Model number: EL.MT7668BUN-WFT

This device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. All essential radio test suites have been carried out.
The device complies with RF specifications when the device used at 20cm from your body.
The product shall only be connected to a USB interface of version USB2.0

RF Secification:

Function	Operation Frequency	Max RF outputpower:	Limit
BLE	2402MHz–2480MHz	8.56dBm	20 dBm.
BT(BR+EDR)	2402MHz–2480MHz	8.14dBm	20 dBm.
WIFI 802.11b/g/n(HT20,HT40)	802.11b/g/n(20MHz): 2412~2472MHz; 802.11n(40MHz):2422~2462MHz	16.73dBm	20 dBm.
Wi-Fi 5.2G(802.11a/n(20/40)/ac(20/40/80))	5180MHz~5240MHz(20MHz) 5190MHz~5230MHz(40MHz) 5210MHz(80MHz)	11.29dBm	23 dBm.
Wi-Fi 5.8G(802.11a/n20/ac20/n40/ac40/ac80)	5745-5825 MHz for 802.11a/n(HT20)/ac20; 5755-5795 MHz for 802.11n(HT40)/ac40; 5775MHz for 802.11 ac80	11.99dBm	13.98 dBm.

This product can be used across EU member states.

DECLARATION OF CONFORMITY

I hereby declare that the product

Product Name: WiFi Module
Product Description: WiFi Module
Model: EL.MT7668BUN-WFT

(Name of product, type or model, batch or serial number)

System components:

Antenna Type:
WIFI 5G: PIFA Antenna
Antenna Gain: Antenna1: 3.25 dBi;Antenna 2: 3.55dBi
WIFI 2.4G: PIFA Antenna
Antenna Gain: Antenna 1: 1.2 dBi; Antenna 2: 1.76dBi
BT: External Antenna
Antenna Gain:1 dBi

Hardware Version: CDW-F97668U-01-V0
Software Version: CDW-F97668U-01-MT7668U_Efuse_V0_20220425

Satisfies all the technical regulations applicable to the product within the scope of Council Directives 2014/53/EU:and declare that the same application has not been lodged with any other notified body.

HEALTH & SAFETY Art. 3(1)(a):	EN IEC 62311:2020 EN 62368-1:2014+A11:2017
Electromagnetic Compatibility Art. 3.1(b):	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-3 V2.1.1 (2019-03) ETSI EN 301 489-17 V3.2.4 (2020-09)
Effective Use of Spectrum Art. 3.2	ETSI EN 300 328 V2.2.2 (2019-07) ETSI EN 301 893 V2.1.1 (2017-05) ETSI EN 300 440 V2.2.1 (2018-07)

All essential radio test suites have been carried out.

MANUFACTURER or **AUTHORISED REPRESENTATIVE**:

- **Address**:

EXPRESS LUCK INDUSTRIAL (SHENZHEN) LIMITED

Floor1,Workshop1, NO.88, SOUTH BAOTONG ROAD,XIKENG COMMUNITY, YUANSHAN STREET, LONGGANG DISTRICT, Shenzhen, China

This declaration is issued under the sole responsibility of the manufacturer and, if applicable, his authorised representative.