

**ALARM.COM[®]**

WM2020CU User Manual

TYPE OF PRODUCT

WLAN/BT MODULE

WM2020CU WLAN/BT USB Module



Version	Date	Change Description
1.0	20 Feb 2017	Initial release

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Description

WM2020CU is a highly integrated 802.11a/b/g/n/ac 2T2R and BT 2.1/3.0/4.1/4.2 module that support 2-stream 802.11ac Multi-user MIMO. It combines a WLAN MAC, a 2T2R capable WLAN baseband, BT Protocol Stack (LM, LL, and LE), BT Baseband, modem. It provides a complete solution for a high throughput performance integrated wireless LAN and Bluetooth device.

It is designed to provide excellent performance with low power consumption and enhance the advantages of robust system and cost-effective. It is targeted at competitive superior performance, better power management applications.

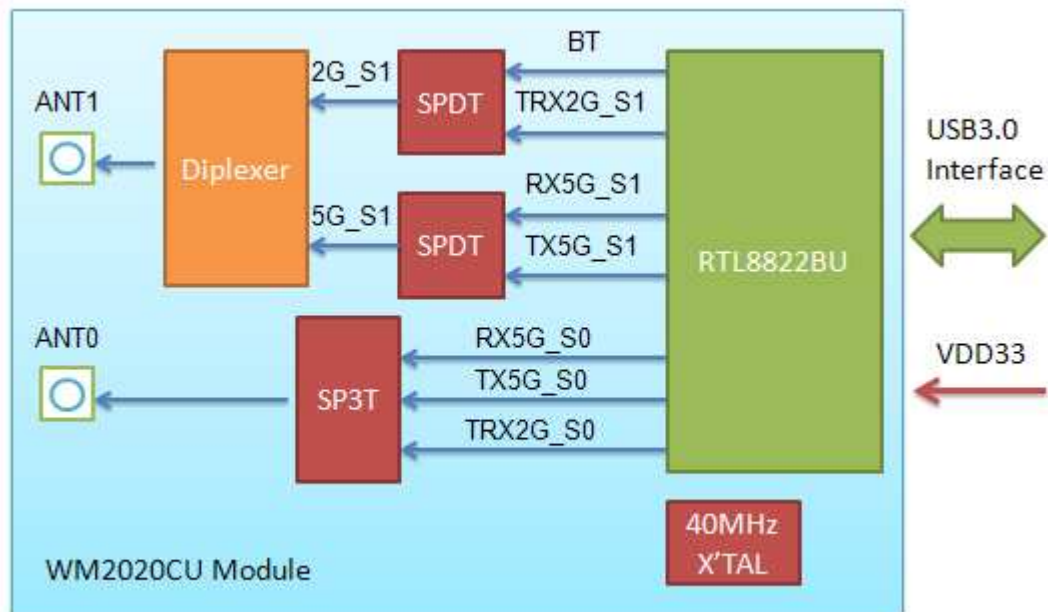
Features

- IEEE802.11a/b/g/n and 802.11ac compliant
- Support 802.11ac 2x2, Wave-2 compliant with MU-MIMO
- Operates in 2.4GHz and 5GHz frequency bands
- Dual band 2T2R mode improves effective throughput and range over existing 802.11 b/g/n products
- Data rates: 173.3Mbps using 20MHz bandwidth, 400Mbps using 40MHz bandwidth, and 866.7Mbps using 80MHz bandwidth.
- IEEE802.11k and 802.11h compliant
- BPSK, QPSK, 16 QAM, 64 QAM, 256QAM modulation schemes
- Security support for WPA/WPA2 personal, WPS2.0, WAPI
- Compatible with Bluetooth v2.1 and v3.0, support Bluetooth 4.2 Low Energy(BLE).
- Fully qualified Bluetooth 2.1+ EDR specification, Bluetooth 3.0 and Bluetooth 4.2 dual mode.
- Enhanced WLAN/BT coexistence control to improve transmission quality in different profiles.
- Small footprint: 27.0×17.7×2.2mm, half-holes PCB module
- OS support: Android, Windows
- RoHS compliance

Application

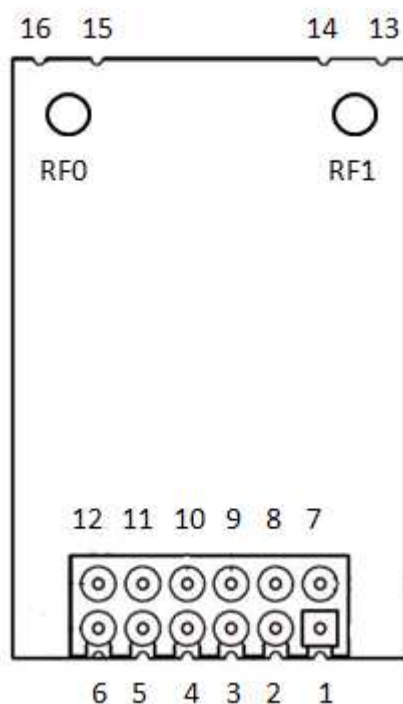
- Mobile Internet Device
- TV
- IP-cam
- STB

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**Functional Block Diagram**

Block Diagram

Pin Assignment (Top view)

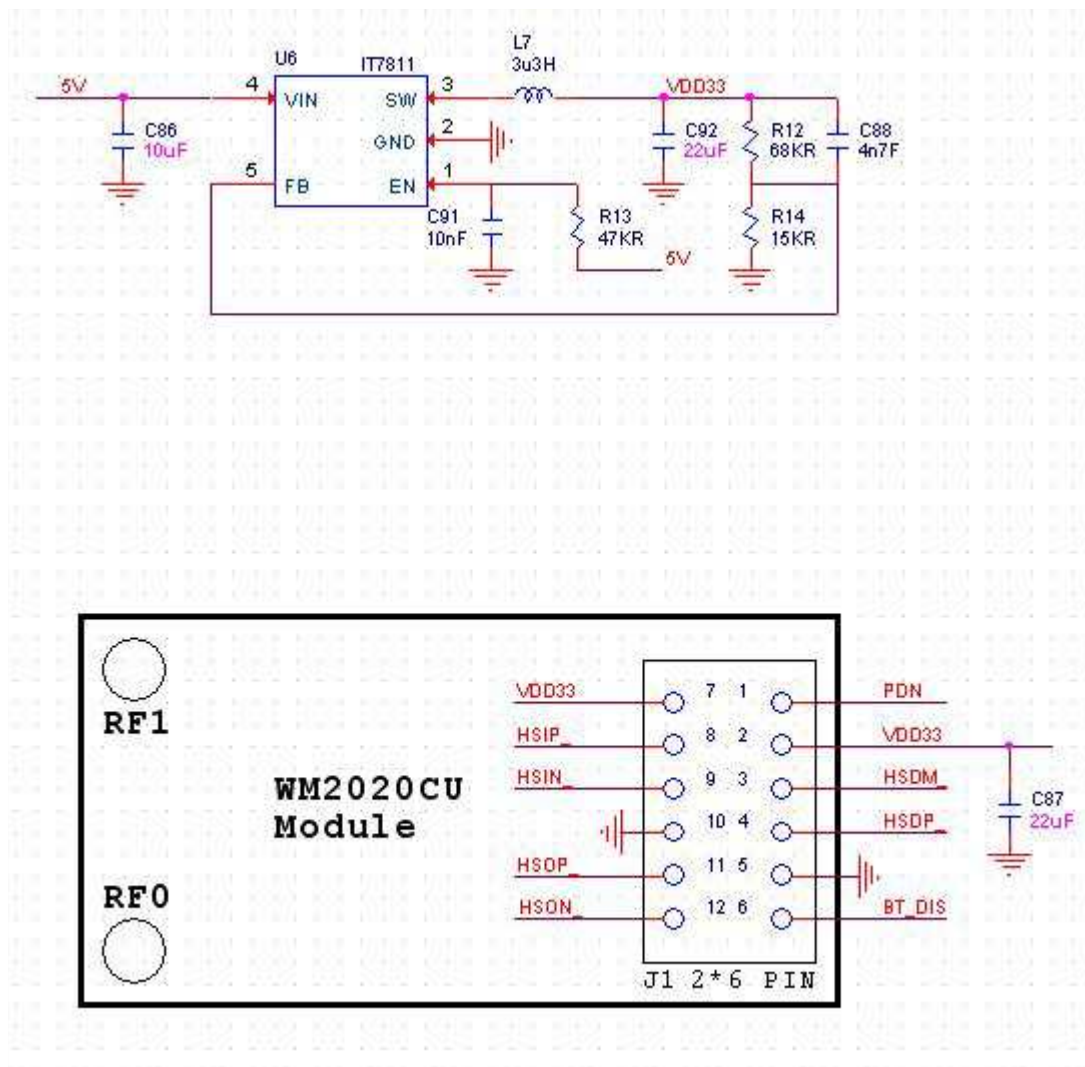


Pin Definition

Pin	Signal	Input /Output	Description
1	PDn	Input	This pin can externally shutdown the RTL8822BU(No extra power switch required). When this function is not required, external pull high is required.
2	VDD33	Power	Power
3	HS DM	I/O	High speed USB D- signal
4	HS DP	I/O	High speed USB D+ signal
5	GND	Power	Ground
6	BT_DIS	Input	This pin can externally shutdown the RTL8822BU BT function when BT_DIS is pulled low.
7	VDD33	Power	Power
8	HSIP	Input	Super speed USB RX+ signal
9	HSIN	Input	Super speed USB RX- signal
10	GND	Power	Ground
11	HSOP	Output	Super speed USB TX+ signal
12	HS ON	Output	Super speed USB TX- signal
13	GND	Power	Ground
14	GND	Power	Ground
15	GND	Power	Ground
16	GND	Power	Ground
RF0	RF	I/O	WLAN RF port
RF1	RF	I/O	WLAN/BT RF port

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Application Circuit



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Functional Specification

Product Description	
WLAN Standard	IEEE802.11a/b/g/n and 802.11ac compliant
Bluetooth Standard	v2.1+EDR, v3.0, v4.1, v4.2 LE
Main Chipset	RTL8822BU-CG
Host Interface	USB 3.0 for WLAN USB 2.0 for WLAN and BT
Dimension	27.0mm x 17.7mm x 2.2mm
Package	Half-hole PCB module
Electrical Specifications	
Frequency Range	ac/n ISM Band: 5.150 to 5.850 GHz b/g/n ISM Band and Bluetooth: 2.400 to 2.485 GHz
Data Rate	WLAN: 802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: MCS0~MCS15 802.11ac: MCS0~MCS9 Bluetooth: Basic rate: 1Mbps Enhance data rate: 2, 3Mbps
Modulation Technique	WLAN: 802.11a: BPSK, QPSK, 16-QAM, 64-QAM 802.11b: DBPSK, DQPSK, CCK 802.11g: BPSK, QPSK, 16-QAM, 64-QAM 802.11n: BPSK, QPSK, 16-QAM, 64-QAM 802.11ac BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM Bluetooth: GFSK, $\pi/4$ DQPSK, 8DPSK
Operational Channel	WLAN: Ch. 1-11 U-NII 1 (5.15~5.25 GHz) U-NII 2 (5.25~5.35 GHz) U-NII 3 (5.47~5.725 GHz) U-NII 4 (>5.725GHz) Bluetooth: Ch0 to Ch78
Security	WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit, IEEE 802.11x, IEEE 802.11i
Operating Voltage	3.3V

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Temperature Limit Ratings

Parameter	Min.	Max.	Units
Storage Temperature	-40	+125	°C
Ambient Operating Temperature	0	+70	°C

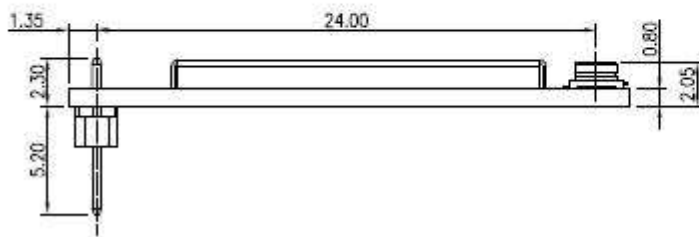
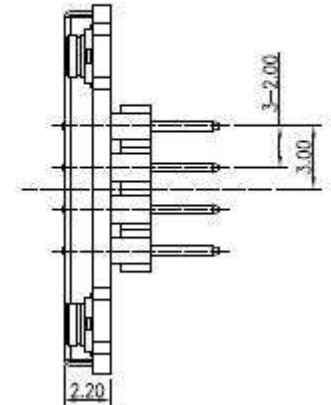
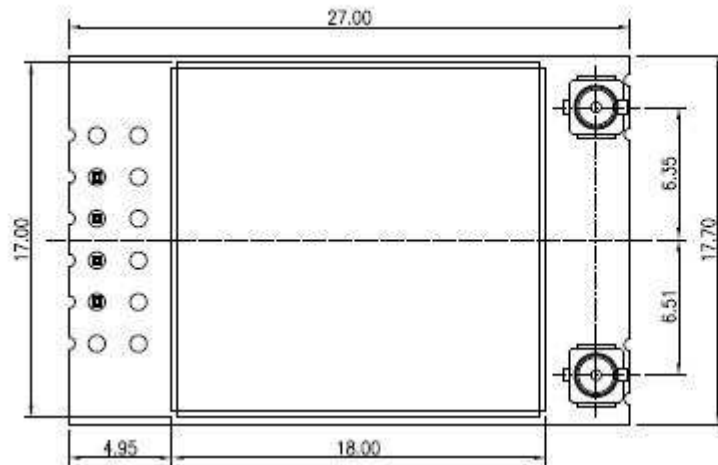
Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD33	USB interface VDD	-0.3 to 3.6	V

Recommended Operating Range

Symbol	Parameter	Min	Typ	Max	Units
VDD33	USB interface VDD	3.0	3.3	3.6	V

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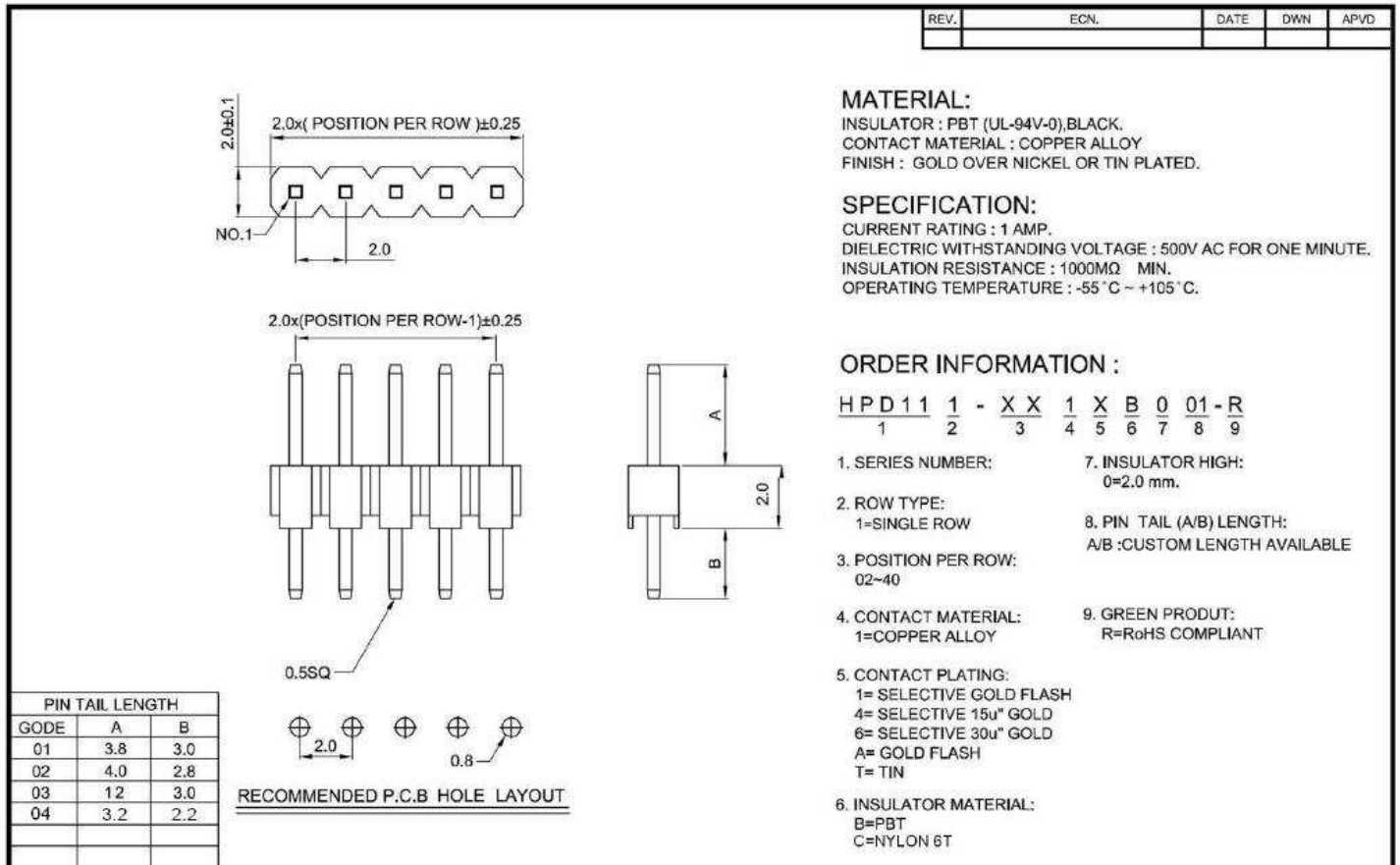
**Module Dimensions**

All dimensions are in millimeters.
Tolerance: +/- 0.15mm

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Pin Header Specification

Recommend part is code 04.



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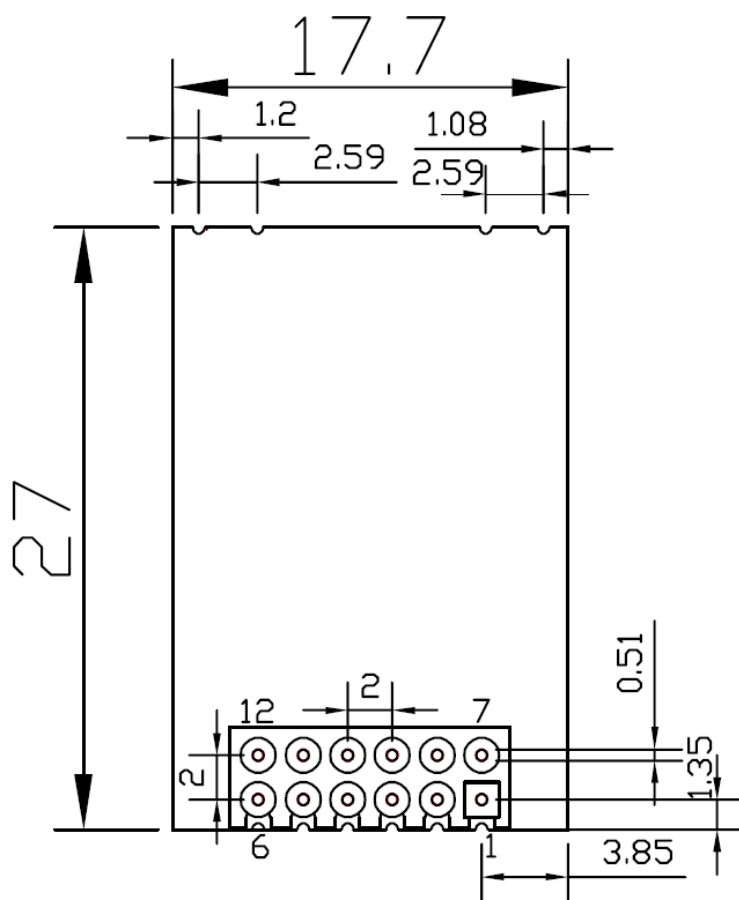


Layout Design Guide

The recommended layout pads for WM2020CU module are shown below. (Module top view)

- DO NOT route any digital or analog signal traces between the RF traces and reference ground.
- DO NOT put any metal shielding in the surrounding area of module and try to leave the module placed in the corner of chassis board as close as possible.
- DO NOT put any metal plane into clearance area. Please keep the clearance area close to the corner of main board or out of the board's edge.

Pin Header Solution



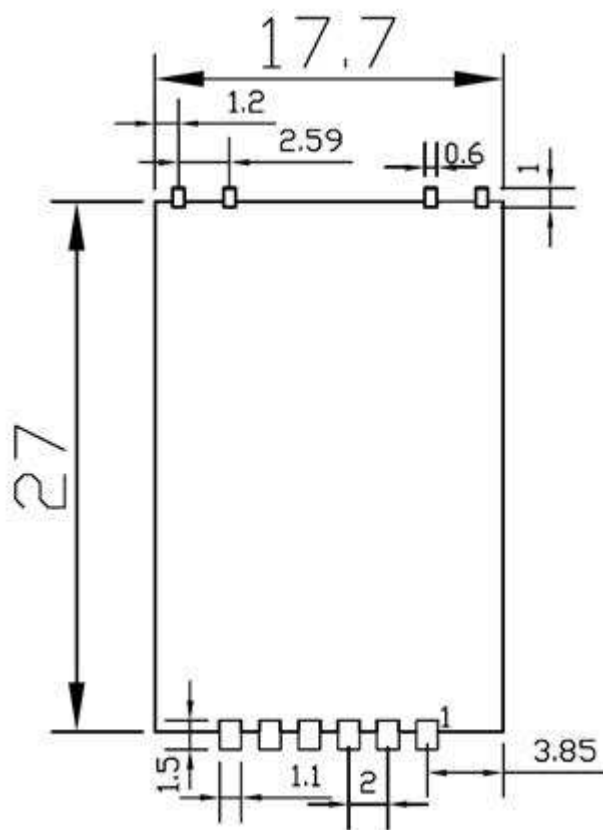
All dimensions are in millimeters.

Tolerance: $\pm 0.15\text{mm}$

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half-holes only for USB2.0 Solution



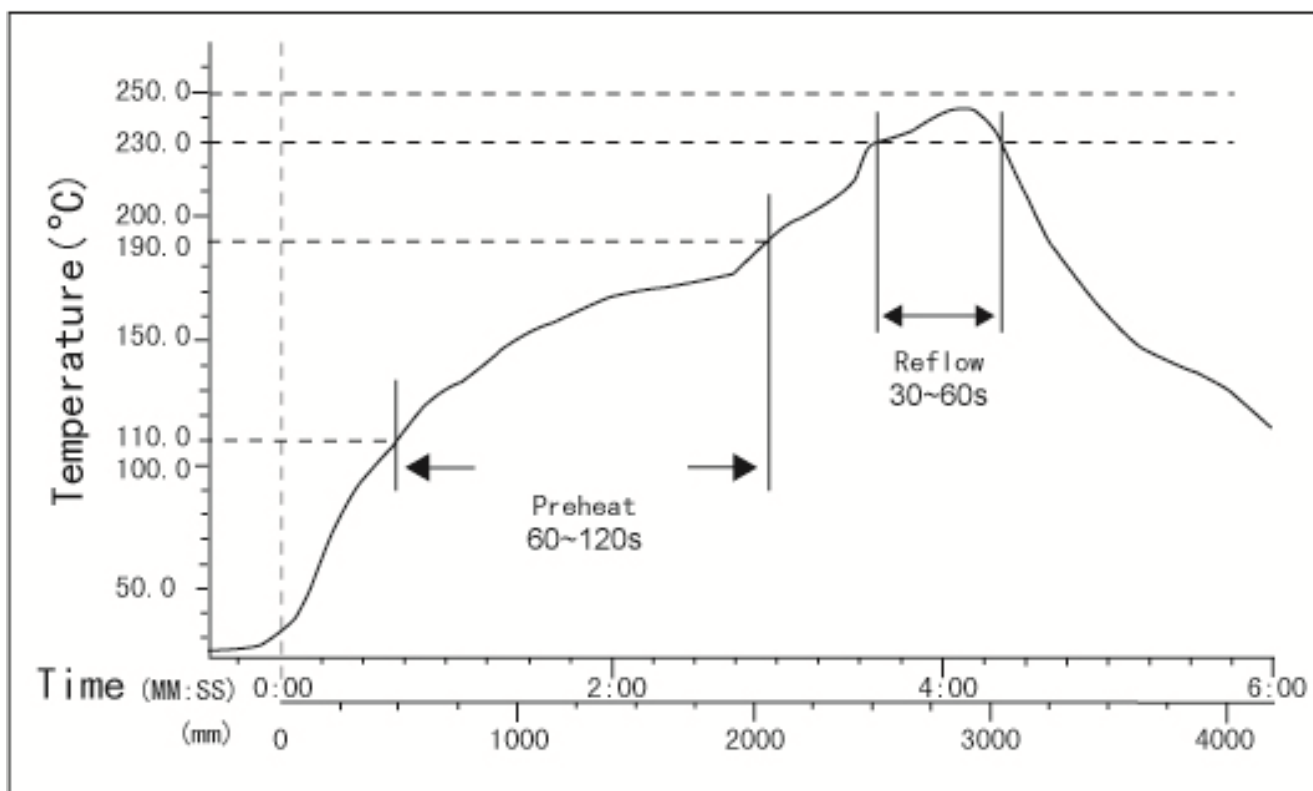
All dimensions are in millimeters.

Tolerance: $\pm 0.15\text{mm}$

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Reference Temperature Reflow Chart



Note:

1. If the system PCBA is double side design please reflow the side without this module first.
2. Don't let the solder machine temperature over 250°C or follow solder paste vender's recommended temperature.
3. The Ramp-up temperature speed is 1~4 °C per second, the Ramp-down temperature speed is 1~4 °C per second.
4. This temperature reflow chart is for reference only, it depends on the manufacturing machine's characters requirement.

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Compliance Information

■ FCC Compliance

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 the radio communications. However, there are no guarantees that interference will not occur in a particular installation.

■ Troubleshooting

If this equipment does cause harmful interference to radio reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one or more of the following instructions.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult dealer or an experienced radio technician.

■ Conditions

Operation is subject to the following conditions

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

■ FCC Caution

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 authority to operate equipment.

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and consider removing the no-collocation statement.

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**End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:

"Contains FCC ID: YL6WM2020CU"

Manual Information to the End User

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 shown in this manual.

■ ISED Caution

This device complies with Industry Canada licence-exempt RSS standard(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
-
- i. The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
 - ii. For device with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
 - iii. For device with detachable antenna (s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p limits as appropriate; and
 - iv. Where applicable, antenna type(s), antenna model(s), and worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p elevation mask requirement set forth in section 6.2.2.3 shall be clearly indicated.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- l'appareil ne doit pas produire de brouillage, et
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Pour se conformer aux exigences de conformité RF canadienne l'exposition, cet appareil et son antenne ne doivent pas être co-localisés ou fonctionnant en conjonction avec une autre antenne ou transmetteur.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:

"Contains IC ID: 9111A-WM2020CU"

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■ NCC 警語

根據 NCC 低功率電波輻射性電機管理辦法 規定：

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。

低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

應避免影響附近雷達系統之操作。

高增益指向性天線只得應用於固定式點對點系統。

此模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示「本產品內含射頻模組：ID 編號」字樣。

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (antennes sont supérieures à 20 cm à partir du corps d'une personne).

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