

# Product Specifications

## CM-8821CU ac1x1+BT Module

Confidential For 金寶電子 2018/10/30

**Version: 2.0**

Manufacturer	CC&C Technologies, Inc.
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## Revision History

Version	Date	Change Description
1.0	03/08, 2017	Initial release
2.0	07/5, 2017	Modify pin outs define

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## Overview

CM-8821CU is a WLAN 11ac and Bluetooth combo Module, provides a single USB interface to host, which fully supports the features and functional compliance of IEEE 802.11b/g/n/a/ac standards. Bluetooth v2.1, v3.0 and v4.2 standards. It supports up to 433Mbps high-speed WLAN network connections and Bluetooth protocol stack.

CM-8821CU Bluetooth controller complies with Bluetooth core specification v4.2 and supports dual mode(BR/EDR+AMP+low Energy Controllers). It is backward compatible with previous versions including v2.1+EDR and v3.0+HS. Both BR/EDR and LE can operate simultaneously.

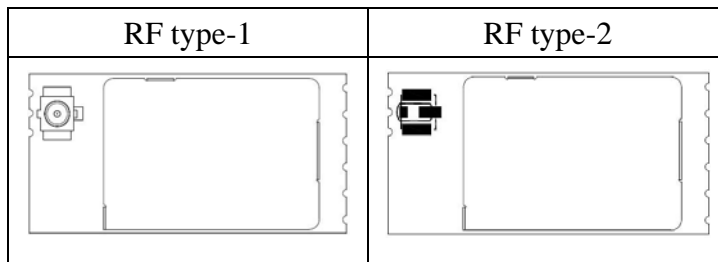
CM-8821CU provides a complete solution for a high throughput performance integrated wireless LAN and Bluetooth module, and is targeted at competitive superior performance, better power management applications.

## Features

- 802.11ac solution for 5G band
- Support 802.11ac 1x1
- Complies with USB Specification Revision 2.0
- Operate at ISM frequency bands (2.4GHz and 5GHz)
- IEEE standards support: IEEE 802.11b/ g/ n/ a/ ac/
- 5MHz / 10MHz / 20MHz / 40MHz / 80MHz bandwidth transmission
- OFDM with BPSK, QPSK, 16QAM, 64QAM and 256QAM modulation.  
Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6
- Maximum PHY data rate up to 72.2 Mbps using 20MHz bandwidth, 150Mbps using 40MHz bandwidth, and 433Mbps using 80MHz bandwidth
- Backward compatible with 802.11a/b/g devices while operating at 802.11n data rate
- Supports WPA, WPA2
- Compatible with Bluetooth v2.1+EDR
- Support Bluetooth v4.2 system
- Support Low Power Mode(Sniff/Sniff Sub-rating)
- Enhanced BT/WIFI Coexistence Control to improve transmission quality in different profiles
- Bluetooth v4.0 Dual Mode support: Simultaneous LE and BR/EDR
- Supports multiple Low Energy states
- RoHS compliance
- Low Halogen compliance

### Factory options

- DC power input 3.3V or 5V
- RF output by RF connector(type-1),  
RF output on half-hole(type-2)



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## General Specification

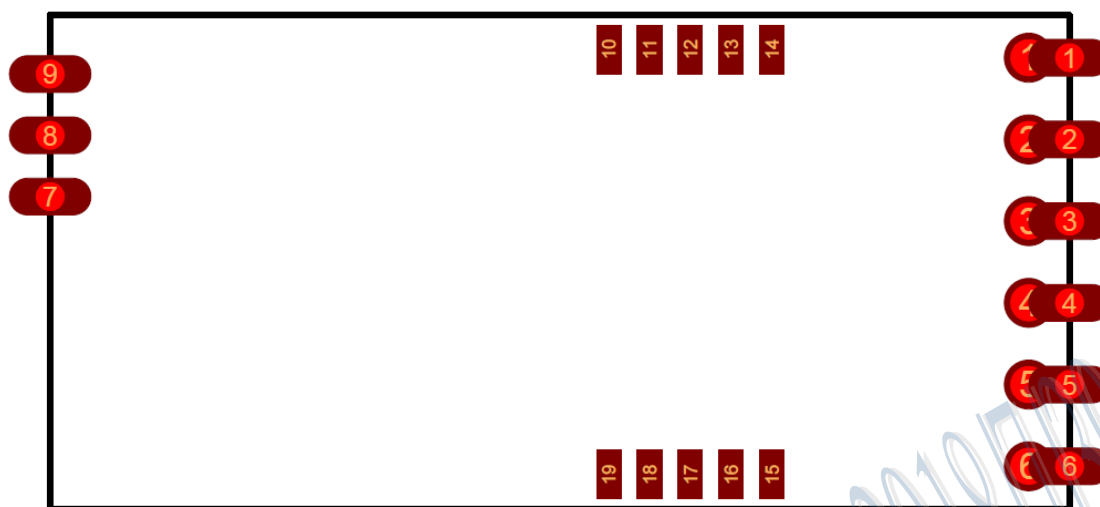
<b>Model Name</b>	<b>CM-8821CU</b>
Product Name	ac1x1+BT Module
Standard	IEEE 802.11b/g/n/a/ac/ e/ h/ i/ Bluetooth v2.1+EDR/ v3.0/ v3.0+HS/ v4.2/
Data Transfer Rate	WLAN: 802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: MCS0 to 7 for HT20MHz, MCS0 to 7 for HT40MHz 802.11ac: MCS0 to 8 for HT20MHz, MCS0 to 9 for HT40MHz, NSS1 MCS0 to 9 for VHT80MH Bluetooth: Basic rate: 1Mbps Enhanced data rate: 2, 3 Mbps High Speed: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Modulation Method	WLAN: CCK, DQPSK, DBPSK, BPSK, QPSK, 16QAM, 64QAM, 256QAM Bluetooth: 8DPSK, $\pi/4$ DQPSK, GFSKFSK
Frequency Band	2.4GHz and 5GHz ISM Band
Spread Spectrum	IEEE 802.11b: CCK (Complementary Code Keying) IEEE 802.11g/n/a/ac: OFDM (Orthogonal Frequency Division Multiplexing) Bluetooth: FHSS (Frequency Hopping Spread Spectrum)
Receiver Sensitivity	WLAN: -80dBm – 802.11b@11Mbps -71dBm – 802.11g@54Mbps -67dBm – 802.11n@MCS7_BW20 -64dBm – 802.11n@MCS7_BW40 -57dBm – 802.11ac@NSS1_MCS9_BW20 -54dBm – 802.11ac@NSS1_MCS9_BW40 -51dBm – 802.11ac@NSS1_MCS9_BW80 Bluetooth: -89dBm@1Mbps -90dBm@2Mbps -83dBm@3Mbps
Antenna	IPEX Antenna x 1
Security	WPA, WPA2
Operating Temperature	0 - 50° C ambient temperature
Storage Temperature	-10 - 70°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Size	25 x 12 mm (L x W)

**DC power input:(factory option)**

Module	Minimum	Typical	Maximum	Unit
DC 5V module	4.75	5	5.25	V
DC 3.3V module	3.135	3.3	3.465	V

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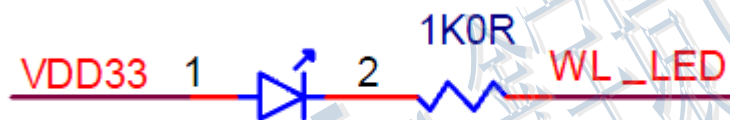
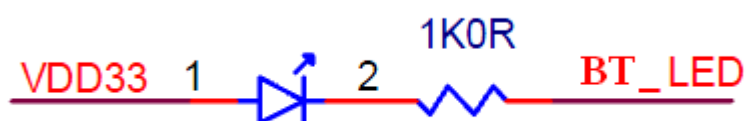
Pin outs define:



Pin	Signal	Input /Output	Description
1	BT_LED	Output	BT LED Pin(Active Low)
2	VDD	Power	3.3V or 5V by factory option
3	HSDM	I/O	High-Speed USB D- Signal
4	HSDP	I/O	High-Speed USB D+ Signal
5	GND	-	Ground
6	WL_LED	I/O	WLAN LED Pin(Active Low), General Purpose Input/ Output Pin
7	GND	-	Ground
8	RFIO_OUT	RF	WLAN(2.4G/5G)/BT RF port (if don't using IPEX connector)
9	GND	-	Ground
10	BT_WAKE_HOST	Output	Signal from module to wake up host, refer driver source code for details.
11	GPIO2	I/O	General Purpose Input/ Output Pin
12	CHIP_EN	Input	This Pin Can externally shut down the RTL8821CU-CG(No Extra Power Switch Required).
13	GPIO1	I/O	General Purpose Input/ Output Pin
14	BT_DIS	Input	Shared with GPIO11. This pin can externally shut down the RTL8821CU-CG BT function when BT_DIS is pulled Low. When this pin is pulled low. USB interface will be also disabled. This pin can be also defined as the BT Radio-off function with host interface remaining connected
15	GPIO8	I/O	WLAN LED Pin(Active Low), shared with GPIO8 General Purpose Input/ Output Pin
16	HOST_WAKE_BT	Input	Signal from host to wake up module, refer driver source code for details.
17	WL_DIS	Input	Shared with GPIO9. This pin can externally shut down the

			RTL8821CU-CG WLAN function when WL_DIS is pulled Low. When this pin is pulled low. USB interface will be also disabled. This pin can also be configured as the WLAN Radio-off function with host interface remaining connected
18	HOST_WAKE_WL	Input	Signal from host to wake up module, refer driver source code for details.
19	WL_WAKE_HOST	Output	Signal from module to wake up host, refer driver source code for details.

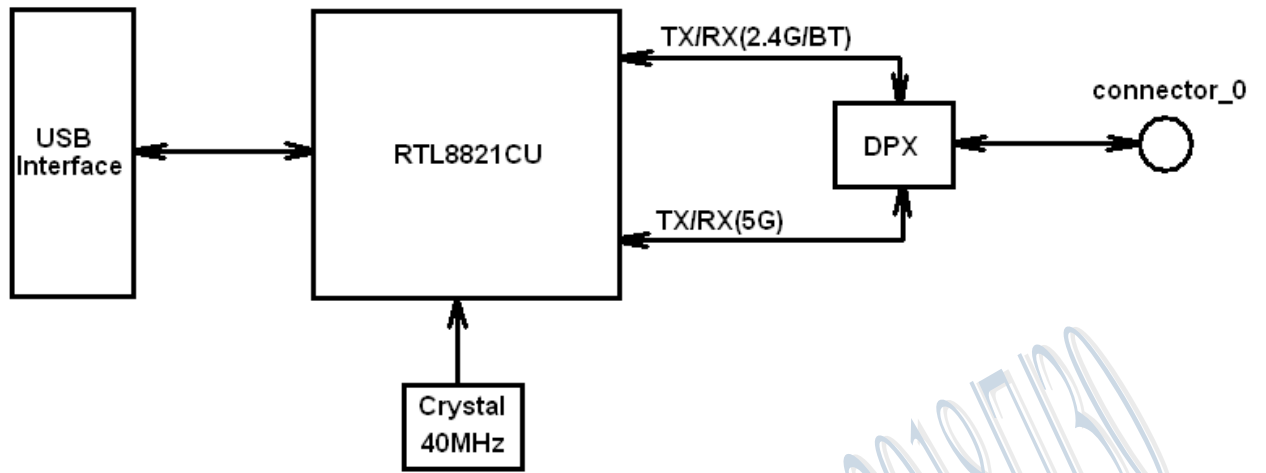
The external circuits for WiFi and BT activity LED display



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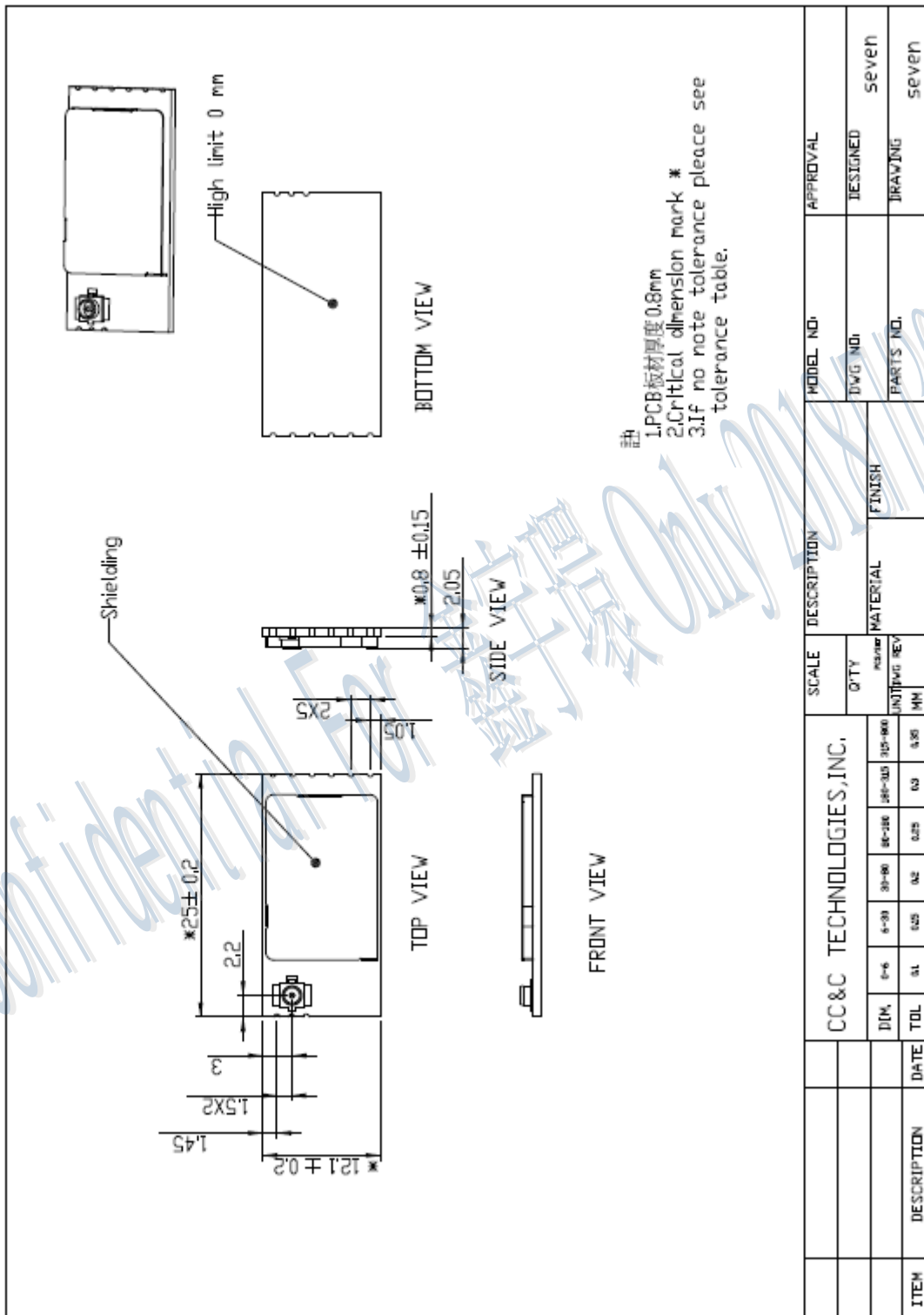


### Block Diagram



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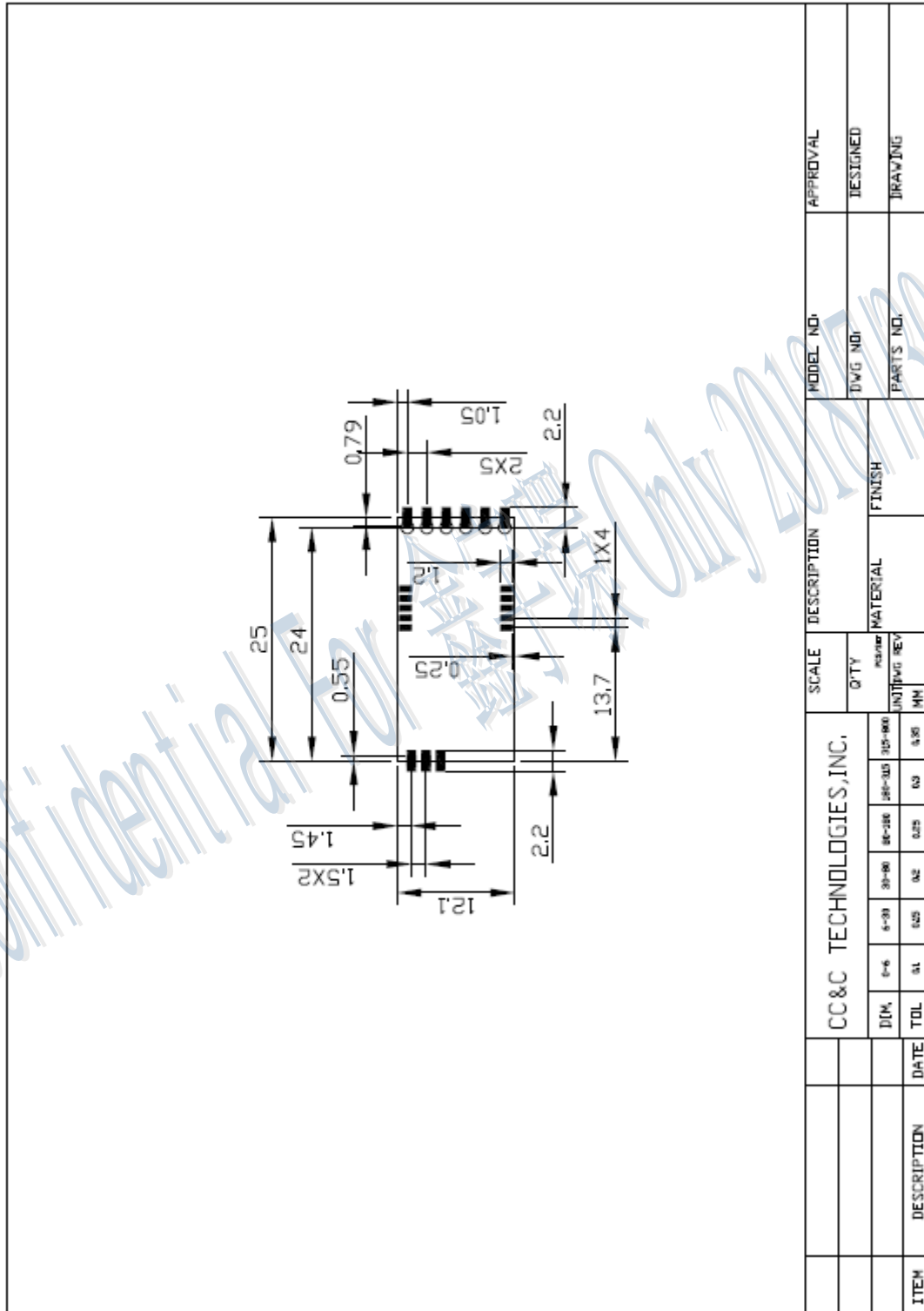
## Dimension



Subject to change without notice

## PCB Layout footprint

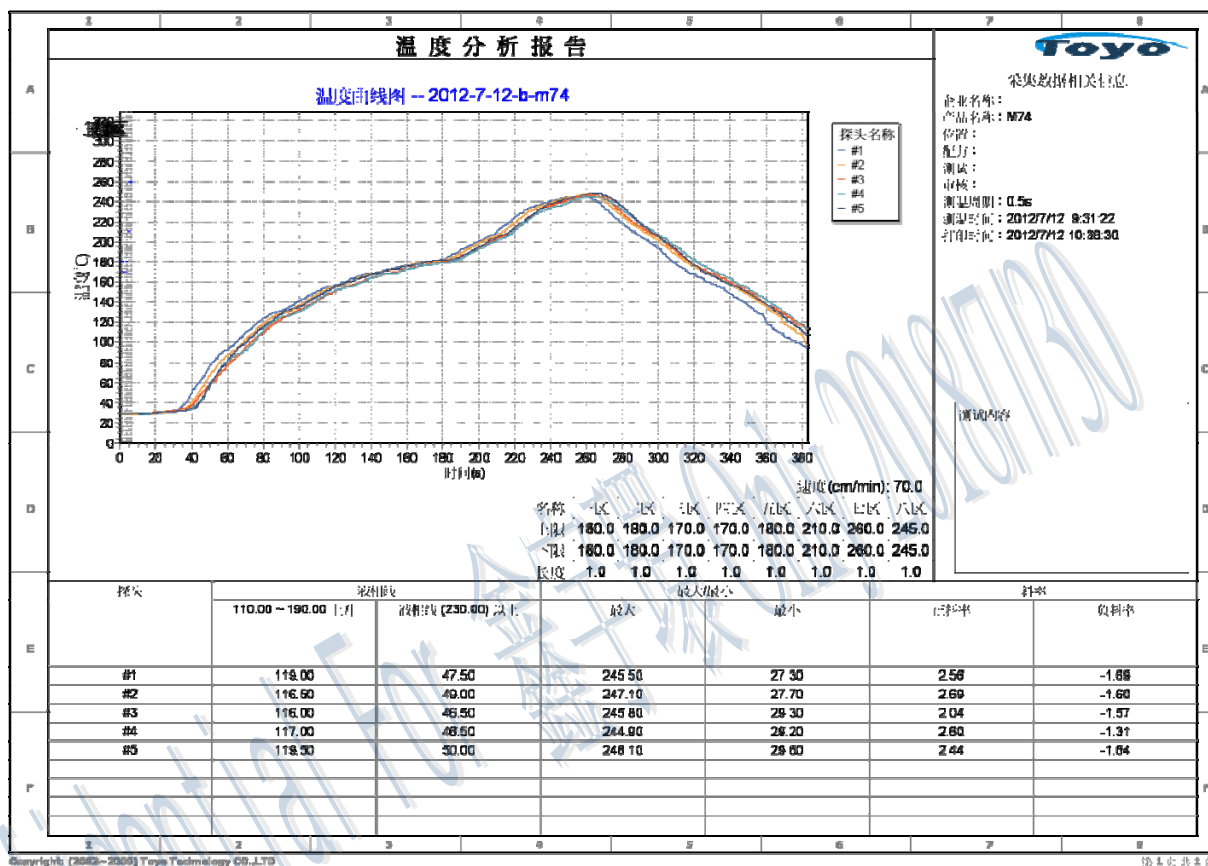
The recommended layout pads for CM-8821CU module are shown below. (Module top view)



All dimensions are in millimeters.

Tolerance: +- 0.05mm

## Reference Temperature Reflow Chart



This module is surface mount device; please refer below conditions for drying before solder reflow processes. (extracted from IPC/JEDEC J-STD-033B.1)

Bake @ 125 °C		Bake @ 90 °C		Bake @ 40 °C	
Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h	Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h	Exceeding floor Life By > 72h	Exceeding floor Life By ≤ 72h
9 hours	7 hours	33 hours	23 hours	13 days	9 days

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. For 15 B (§15.107 and if applicable §15.107) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating.

Furthermore the module should be transmitting and the evaluation should confirm that the module's intentional emissions (15C) are compliant (fundamental / out-of-band). Finally the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in §15.101.

Integrator is reminded to assure that these installation instructions will not be made available to the end user of the final host device.

The final host device, into which this RF Module is integrated" has to be labelled with an auxiliary label stating the FCC ID of the RF Module, such as "Contains FCC ID: PANCM8821CU

"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."

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.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Module statement**

The single-modular transmitter is a self-contained, physically delineated, component for which compliance can be demonstrated independent of the host operating conditions, and which complies with all eight requirements of § 15.212(a)(1) as summarized below.

- 1) The radio elements have the radio frequency circuitry shielded.
- 2) The module has buffered modulation/data inputs to ensure that the device will comply with Part 15 requirements with any type of input signal.
- 3) The module contains power supply regulation on the module.
- 4) The module contains a permanently attached antenna.
- 5) The module demonstrates compliance in a stand-alone configuration.
- 6) The module is labeled with its permanently affixed FCC ID label
- 7) The module complies with all specific rules applicable to the transmitter, including all the conditions provided in the integration instructions by the grantee.
- 8) The module complies with RF exposure requirements.

This transmitter/module must not be collocated or operating in conjunction with any other antenna or transmitter.

This device is acting as slave and operating in the 2.4 GHz (2412 ~2462 MHz) band. Ad Hoc function is supported but not able to operate on non-US frequencies.

**FCC Radio Frequency Exposure Statement**

The device has been evaluated to meet general RF exposure requirements. The device can be used in fixed/mobile exposure conditions. The min separation distance is 20cm.