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## Product Specifications

### CM-8822CU ac2x2+BT5.0 USB2.0



**Version: 2.0**

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

Version	Date	Change Description
1.0	03/19, 2019	Initial release
2.0	04/18,2019	Modified Specification and Dimension

Confidential For 金錫 Only 2019/4/29

## Overview

CM-8822CU 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 and v5.0 standards. It supports up to 866.7Mbps high-speed WLAN network connections and Bluetooth protocol stack.

It is designed to provide excellent performance with low power consumption and enhance the advantages of robust system and cost-effective.

CM-8822CU 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 MIMO solution for 5G band
- Support 802.11ac 2T2R, wave-2 compliant with MU-MIMO
- 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/
- 2x2 MIMO technology for extended reception robustness and exceptional throughput
- 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 173.3 Mbps using 20MHz bandwidth, 400Mbps using 40MHz bandwidth, and 866.7Mbps using 80MHz bandwidth
- Backward compatible with 802.11a/b/g devices while operating at 802.11n data rate
- Compatible with Bluetooth v2.1
- Support Bluetooth v5.0 system
- Support Low Power Mode(Sniff/Sniff Sub-rating)
- Enhanced BT/WIFI Coexistence Control to improve transmission quality in different profiles
- Dual Mode supports Simultaneous LE and BR/EDR
- Supports multiple Low Energy states
- RoHS compliance
- Low Halogen compliance

## General Specification

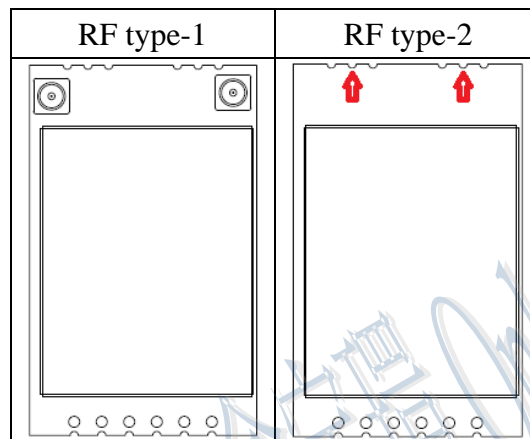
Model Name	CM-8822CU
Product Name	ac2x2+BT5.0 USB2.0
Standard	IEEE 802.11b/g/n/a/ac/ Bluetooth v2.1/v5.0
Data Transfer Rate	WLAN: 802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: MCS0 to 7 for HT20MHz, MCS0 to 7 for HT40MHz 802.11ac: MCS0 to 8 for HT20MHz, MCS0 to 9 for HT40MHz, NSS1 MCS0 to 9 for VHT80MH Bluetooth: Basic rate: 1Mbps Enhanced data rate: 2, 3 Mbps Low Energy: LE_1Mbps, LE_125kbps, LE_500kbps, LE_2Mbps
Modulation Method	WLAN: CCK, DQPSK, DBPSK, BPSK, QPSK, 16QAM, 64QAM, 256QAM Bluetooth: 8DPSK, $\pi/4$ DQPSK, GFSK
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)
RF Output Power (tolerance $\pm 2$ dBm)	WLAN: 17dBm, EVM< 8% – 802.11b@CCK 11Mbps 15dBm, EVM< -25dB – 802.11g@OFDM 54Mbps 14dBm, EVM< -28dB – 802.11n@MCS7_HT20 14dBm, EVM< -28dB – 802.11n@MCS7_HT40 15dBm, EVM< -25dB – 802.11a@OFDM 54Mbps 12dBm, EVM< -32dB – 802.11ac@NSS1 MCS9_BW80 Bluetooth: Max +8dBm
Receiver Sensitivity	WLAN: <-76dBm – 802.11b@11Mbps <-65dBm – 802.11g@54Mbps <-64dBm – 802.11n@MCS7_BW20 <-61dBm – 802.11n@MCS7_BW40 <-51dBm – 802.11ac@NSS1_MCS9_BW80 Bluetooth: <-85dBm, BER<0.01% – Basic rate @1Mbps <-80dBm, BER<0.1% – Enhanced data rate @2,3Mbps <-85dBm, BER<=-30.8% – Low Energy @1Mbps, 125kbps, 500kbps, 2Mbps,
Antenna	IPEX Antenna x2
Power supply	USB / DC 3.3V
Operating Temperature	0 - 50° C ambient temperature
Storage Temperature	-10 - 70° C ambient temperature



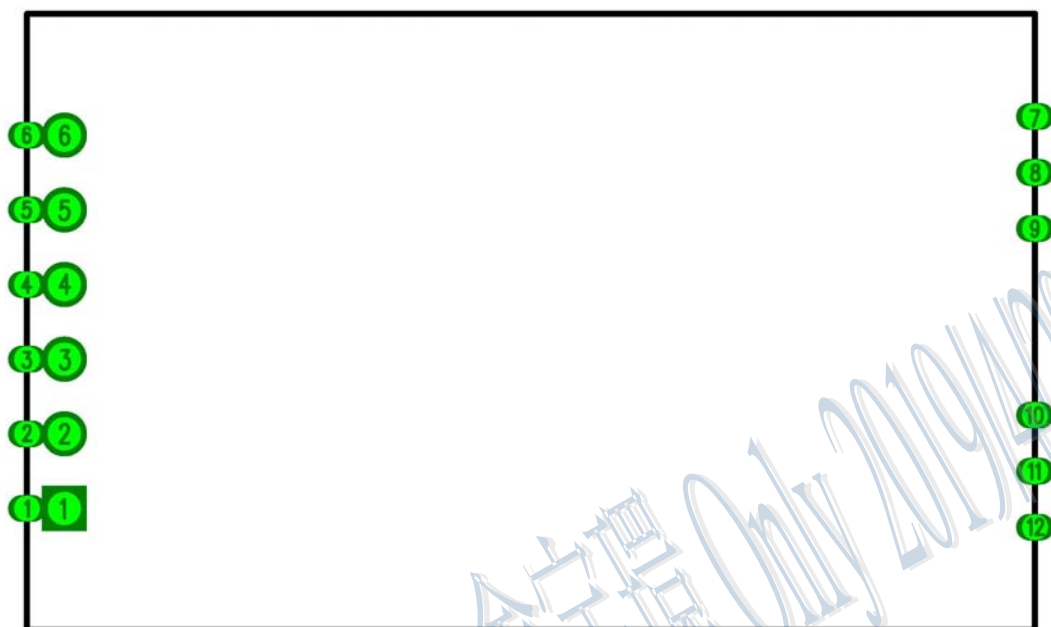
Humidity	5 to 90 % maximum (non-condensing)
Size	27 x 16.5 mm (L x W)

## Factory options

- RF output by IPEX connector(RF type-1), Half Hole(RF type-2)

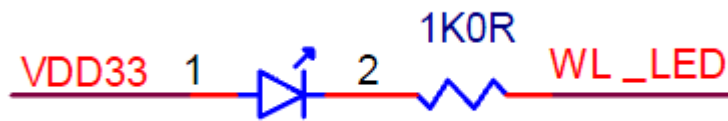


Pin outs define:

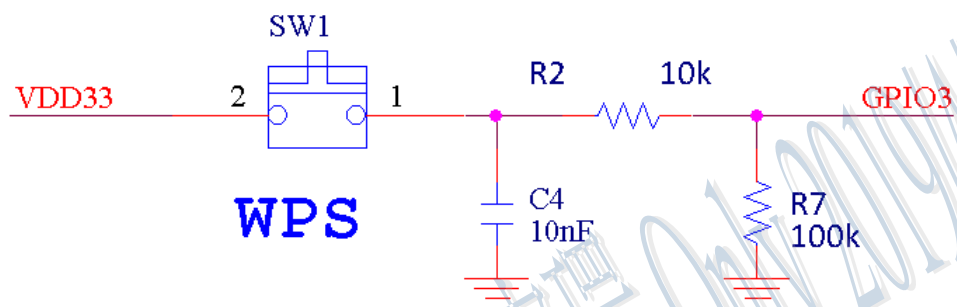


Pin	Signal	Input /Output	Description
1	WPS	Output	WPS Pin(Active Low), shared with GPIO3 General Purpose Input/ Output Pin
2	VDD	Power	DC 3.3V
3	HSDM	I/O	USB 2.0 Transceiver Differential Pair
4	HSDP	I/O	USB 2.0 Transceiver Differential Pair
5	GND	-	Ground
6	WL_LED	I/O	WL LED Pin(Active Low), shared with GPIO8 General Purpose Input/ Output Pin
7	GND	-	Ground
8	RF_S0	RF	WLAN RF port (if don't using IPEX connector)
9	GND	-	Ground
10	GND	-	Ground
11	RF_S1	RF	WLAN /BT RF port (if don't using IPEX connector)
12	GND	-	Ground

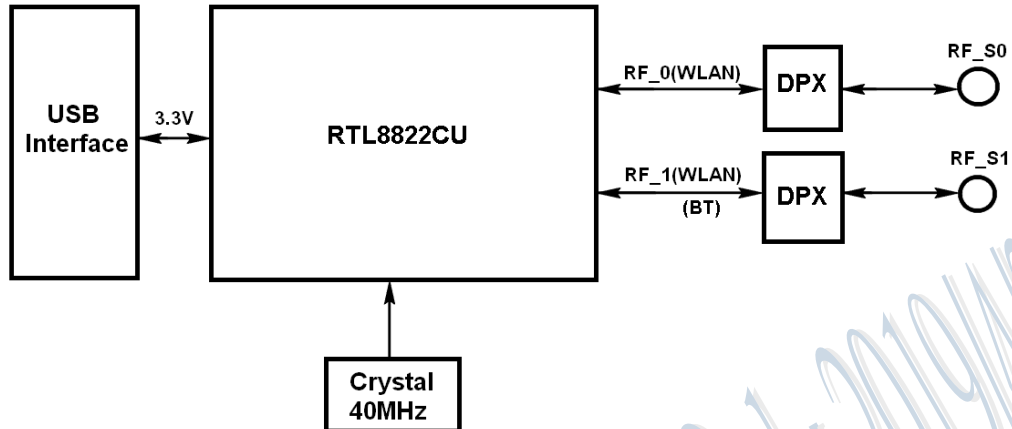
The external circuit for WiFi activity LED display



The external circuit for WiFi activity WPS display

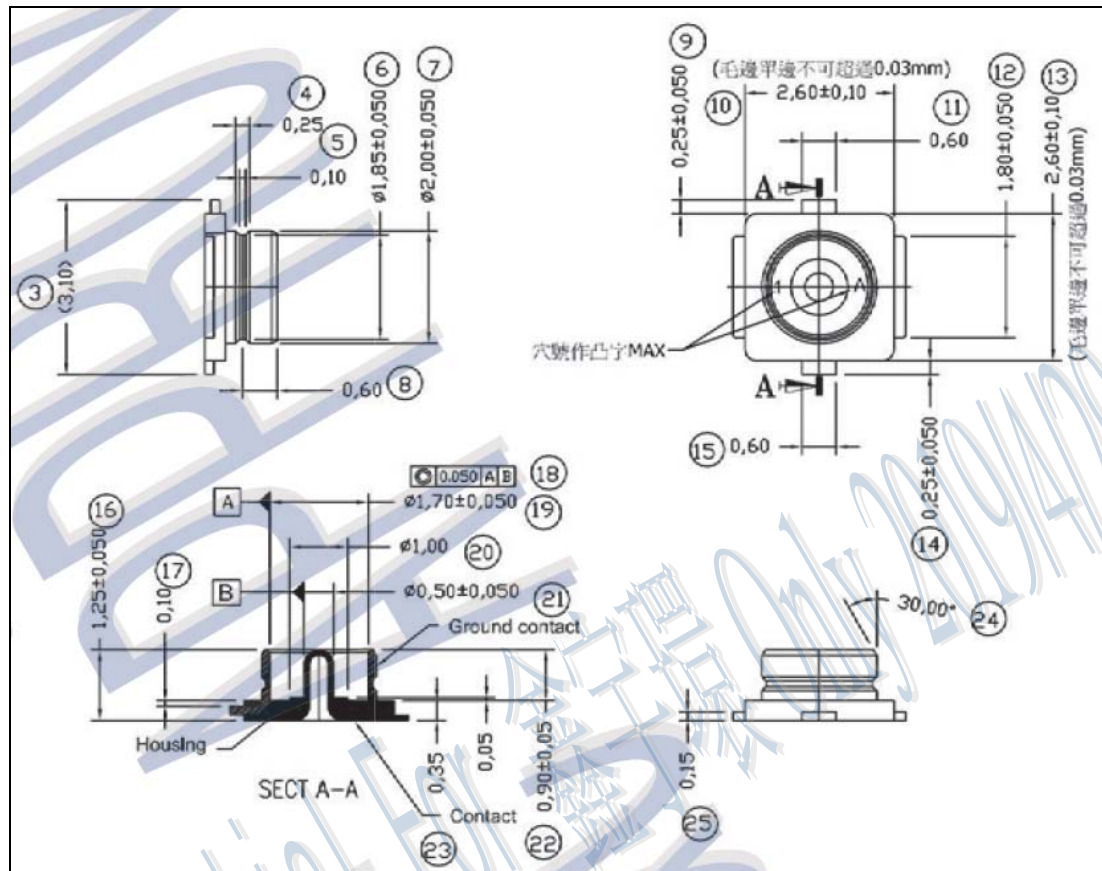


## Block Diagram

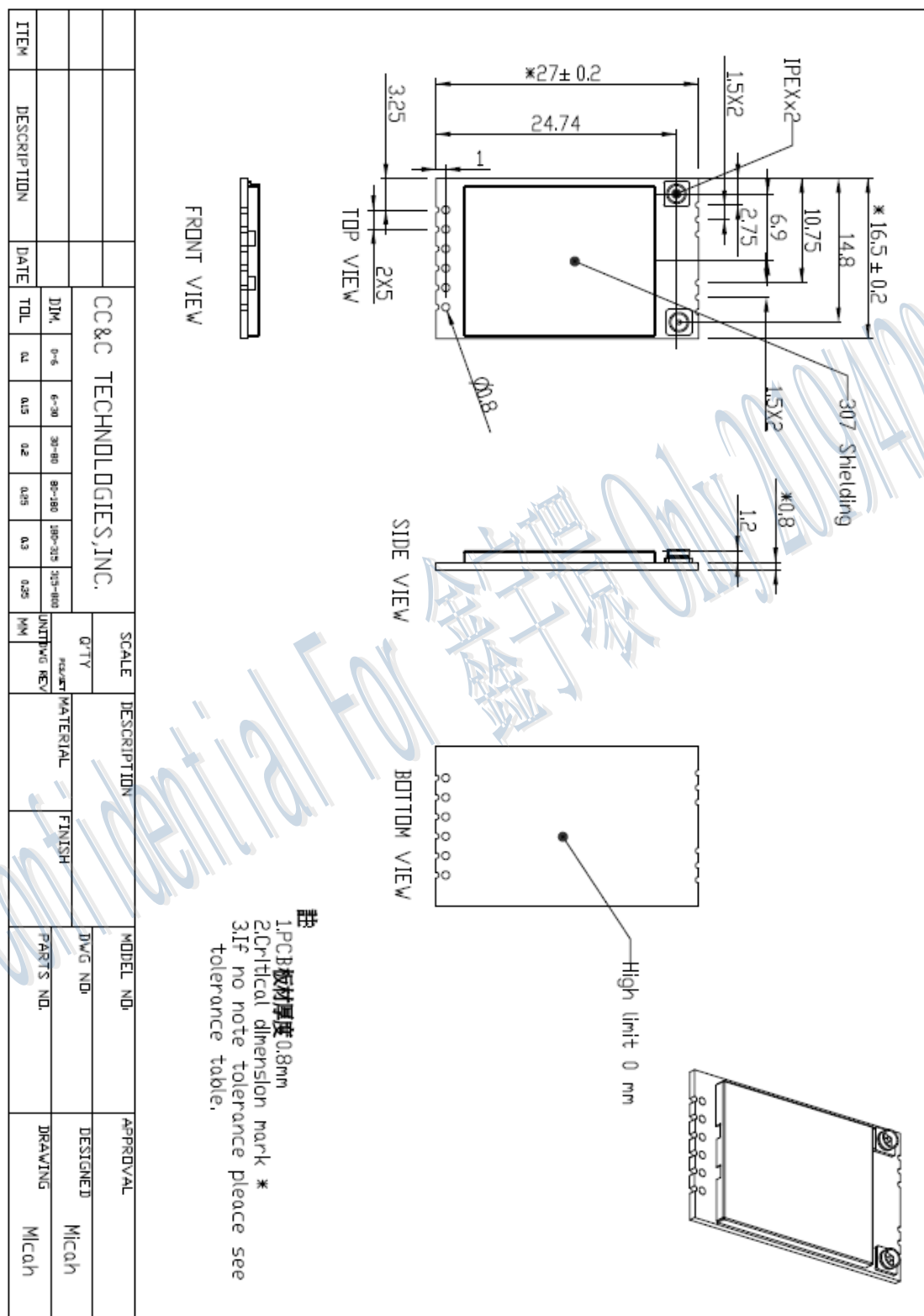




## RF connector dimensions (unit: mm)



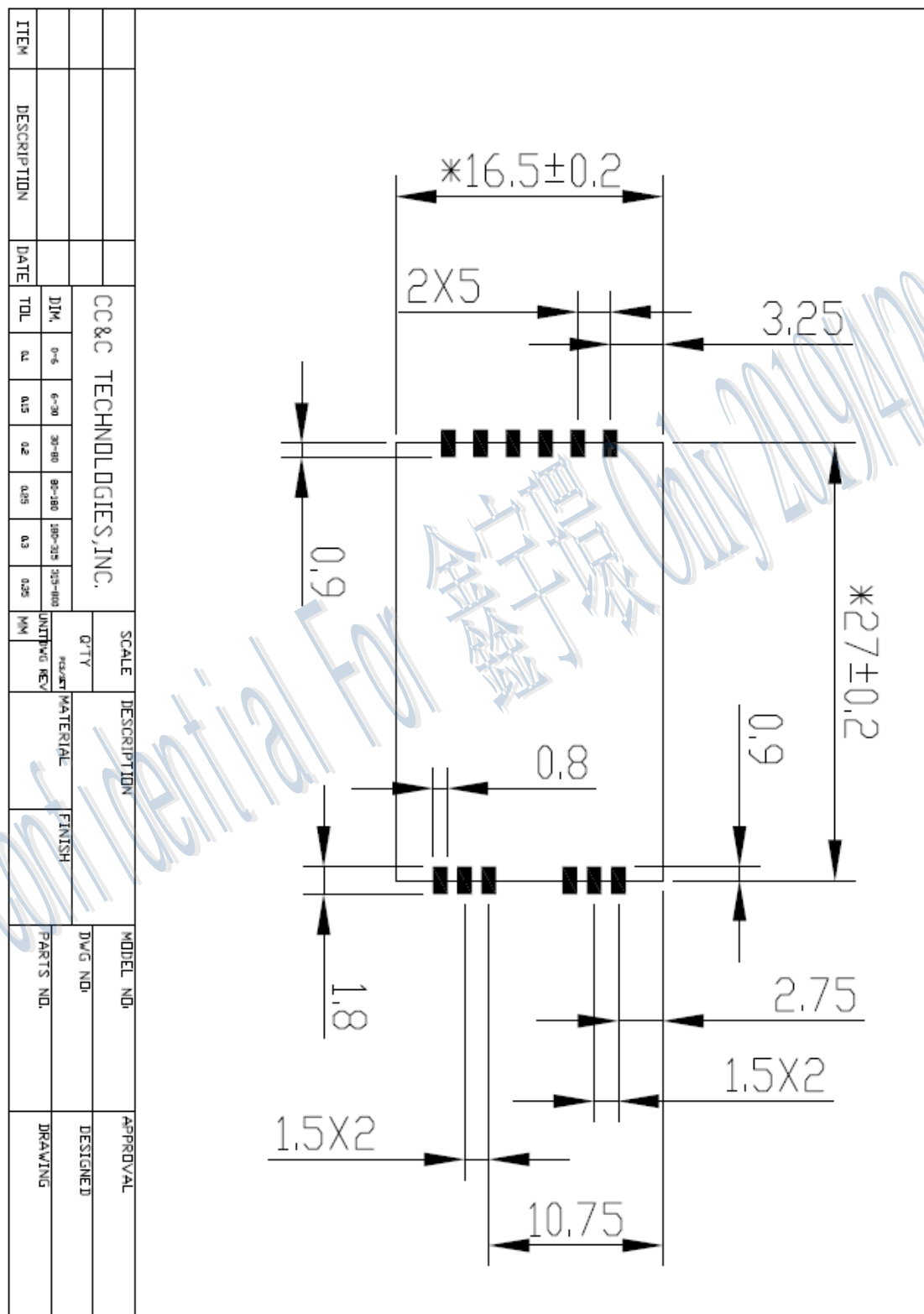
## Dimension



Subject to change without notice

## PCB Layout footprint

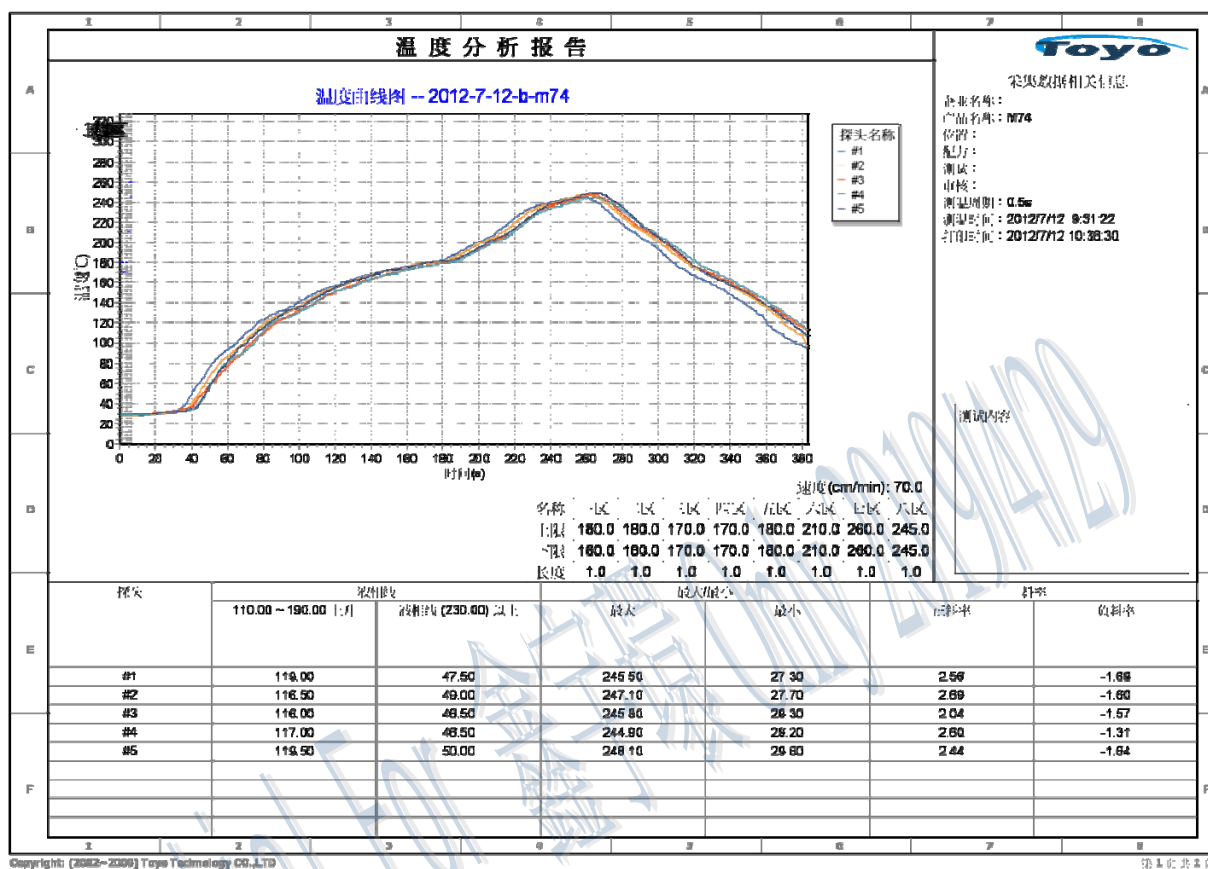
The recommended layout pads for CM-8822CU module are shown below. (Module top view)



All dimensions are in millimeters.

Tolerance:  $\pm 0.2\text{mm}$

## 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:

"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.

- List of applicable FCC rules      FCC Part 15.407, KDB 789033 D02 v02r01; FCC Part 15.247
- Summarize the specific operational use conditions      This transmitter/module and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. This information also extends to the host manufacturer's instruction manual.
  
- Limited module procedures      not applicable
- Trace antenna designs      It is "not applicable" as trace antenna which is not used on the module.
  
- RF exposure considerations      This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This compliance to FCC radiation exposure limits for an uncontrolled environment, and minimum of 20cm separation between antenna and body.  
The host product manufacturer would provide the above information to end users in their end-product manuals.
  
- Antennas      The module only equipped with antenna connector, the dipole antennas will be sold with this module.  
ANT 1: -0.08dBi (2.412 GHz ~ 2.462 GHz), 3.77 dBi (5.15 GHz ~ 5.25 GHz; 5.725 GHz ~ 5.85 GHz)  
ANT 2: -0.46dBi (2.412 GHz ~ 2.462 GHz), 3.3 dBi (5.15 GHz ~ 5.25 GHz; 5.725 GHz ~ 5.85 GHz)
  
- Label and compliance information      The end product must carry a physical label or shall use e-labeling followed KDB784748D01 and KDB 784748 stating "Contains Transmitter Module FCC ID: PANCM8822CU". 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.
  
- Additional testing, Part 15 Subpart B disclaimer      The modular transmitter is only FCC authorized for the specific rule parts (FCC Part15.407, 15.247) 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. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuitry.

## **Information on test modes and additional testing requirements.**

### **Information on test modes:**

The host manufacturer can use software for access to the test modes. Connected to the device through the serial port of the host product and control the module. If it does not work, then the host product manufacturer should coordinate with the module manufacturer for access to test mode software.

### **The following provides guidance to host product when installing this module on how they may verify the end product:**

- A. If the modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).
- B. The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.
- C. If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference has been corrected.