Uascent Technology Co., Ltd
Universal Ascent Holdings Limited

UAM022

Wi-Fi Single-band 1T1R 802.11b/g/n

Module Datasheet

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Revision History.

Version	Date	Revision Content	Draft	Approved
1.0	2023/03/10	New version	-	Uascent

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1 Overview.

1.1 Introduction.

UAM022 is a wireless Wi-Fi + Bluetooth BLE module, and support WiFi and Bluetooth BLE working at the same time. Support for independent operation or communicates with peripherals through the SPI/I2C/GPIO/PWM/UART/ADC/IRDA interface. The module works in the 2.4GHz band and supports 802.11b/g/n wireless standard. The module adopts 3.3V single power supply and SMT installation mode, which can be flexibly applied to all kinds of consumer products to meet customer needs to the greatest extent. This WLAN Module design is based on BEKEN BL2028N. It is a highly integrated single-chip Wireless network interface controller complying with the IEEE 802.11b/g/n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent performance with low power Consumption and enhance the advantages of robust system and cost-effective.

This compact module is a total solution for Wi-Fi technology. The module is specifically developed for Smart phones and Portable devices.

1.2 Features.
- Operate at ISM frequency bands (2.4GHz).
- Standard IEEE 802.11b/g/n.
- Support WiFi+Bluetooth 5.1.
- Support Wi-Fi and BLE coexist.
- Support BLE assists in fast Wi-Fi connection.
- Built-in low-power 32-bit MCU speed up to 120 MHz, can be used as an application processor.
- Built-in 256KB RAM, 2MB or 4MB internal Flash, 32 bytes eFUSE.
- Peripherals: Support UART/SPI, I2C/GPIO/PWM/ADC, DAC/IR remote.
- Built-in lightweight TCP/IP stack.
- Built-in TR switch, BALUN, LNA, PA, and PCB onboard antenna.
- Support remote firmware OTA upgrade, support start upgrade through AT command.
- Support STA and AP and Direct working modes.
- Support WPS/WEP/WPA/WPA2 Personal/WPA2 Enterprise/WPA3 security protocol.

1.3 Model General Specification.

Model Name	UAM022
Product Description	Support Wi-Fi functionalities
Dimension	L x W x T: 17.3 x 15 x 2.5 (typical) mm
Wi-Fi Interface	Support UART/SPI, I2C/GPIO/PWM/ADC, DAC/IR remote
Operating temperature	-40°C to 105°C
Storage temperature	-55°C to +125°C

1.4 Recommended Operating Rating.

Description		Min.	Typ.	Max.	Unit
Ambient Temperature (TA)		-20	25	85	deg.C
Vcc		3.0	3.3	3.6	V
(VOL)	Output low voltage when	VSS	-	VSS+0.3	V
(VOH)	Output high voltage when	VCC-0.3	-	VCC	V

1.5 Reference power consumption for conventional continuous operation.

Parameter	Condition / Notes	Typ.	Unit
	TX model		
I_{RF}	11b 11M	270	mA
I_{RF}	11g 54M	260	mA
I_{RF}	11n HT20 MCS7	250	mA
	RX model		
I_{RF}	11b 11M	80	mA
I_{RF}	11g 54M	80	mA
I_{RF}	11n HT20 MCS7	80	mA

1.6 System Power Consumption.

**Note: All results are measured at the condition that VIO and Vcc are 3.3V.
Peak operating reference power consumption.**

WLAN Operational Modes	Typ.	Unit
Rx, CCK, 1 Mbps	50	mA
Rx, OFDM, 54 Mbps	60	mA

Rx, HT20, MCS7	80	mA
Tx, CCK, 1 Mbps	212	mA
Tx, OFDM, 54 Mbps@15dBm	182	mA
Tx, HT20, MCS7@15dBm	183	mA
Power-saving(MCU_off)b , DTIM1	0.63	mA
Power-saving(MCU_off)b , DTIM3	0.32	mA
Normal standby current	30	uA
Low voltage standby current	10	uA
Deep sleep current	5	uA
OFF, CEN=0	1	uA

1.7 ESD Specifications

Pin Type	Test Conditio	ESD Rating	Unit
Human Body Mode (HBM)	refers to MIL-STD- 883G Method 3015.7	Pass ±3.5	KV
CDM	-20	Pass ±1	KV

2 WiFi &BLE Specification.

Features	Descriptions
Main Chipset	BEKEN ： BL2028N
Operating Frequency	WIFI:2.412～2.484GHz
Operating Voltage	3.3Vdc ±10% supply voltage
Host Interface	UART/SPI, I2C/GPIO/PWM/ADC, DAC/IR remote
WIFI Standard	Wi-Fi: IEEE 802.11b CCK, DQPSK, DBPSK, IEEE 802.11g 64-QAM,16-QAM, QPSK, BPSK, IEEE 802.11n 64-QAM,16-QAM, QPSK, BPSK,
Modulation	Wi-Fi: 802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), DSSS (Direct Sequence Spread Spectrum) 802.11 g/n: OFDM (Orthogonal Frequency Division Multiplexing)
PHY Data rates	Wi-Fi: 802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: up to 72.2Mbps HT20 MCS0-MCS7
Transmit Output Power	Wi-Fi: 802.11b@11Mbps 17±2dBm 802.11g@54Mbps 15±2dBm 802.11n@65Mbps 14±2dBm Other rate power control by power by rate.

EVM	802.11b /11Mbps: EVM≦-18dB 802.11g /54Mbps: EVM≦-26dB 802.11n /MCS7: EVM≦-28dB		
Receiver Sensitivity (HT20)	802.11b@8% PER11Mbps< -88dBm		
	802.11g@10% PER 54Mbps< -74dBm		
	802.11n@10% PER MCS 7 <-71dBm		
Operating Channel	Wi-Fi 2.4GHz: 11: (Ch. 1-11) – United States(North America) 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan		
WFA features	Wi-Fi: WPS,WEP,WPA, WPA2,WPA3		
Antenna	PCB onboard antenna		
OS Supported	freeRtos		
Operating Frequency	BLE:2.412～2.484GHz		
Data Rate	**Min.**	**Typ.**	**Max.**
	-	1 M	-
Transmit Output Power	-20dBm	6dBm	20dBm
Frequency deviation	-150KHz		150KHz
Receiver Sensitivity	-	-93dBm	-

3 Pin Descriptions.

3.1 Pin Outline.

<TOP>

3.2 Pin Definition.

Pin No.	Name	Type	Description	Voltage
1	P8	I/O	GPIO8/PWM2	
2	P7	I/O	GPIO7/PWM	
3	P6	I/O	GPIO7/PWM	
4	P26	I/O	GPIO26/PWM5	
5	P24	I/O	GPIO24/PWM4	
6	GND	P	Ground connections	
7	VCC	P	Main power voltage source input 3.3V	

※ P:POWER   I:INPUT   O:OUTPUT

4 Dimensions.

4.1 Module Picture.

TOP

BOTTOM

L:17.3 x W:15 x H:2.8 (±0.2) unit=mm

Weight	0.42g
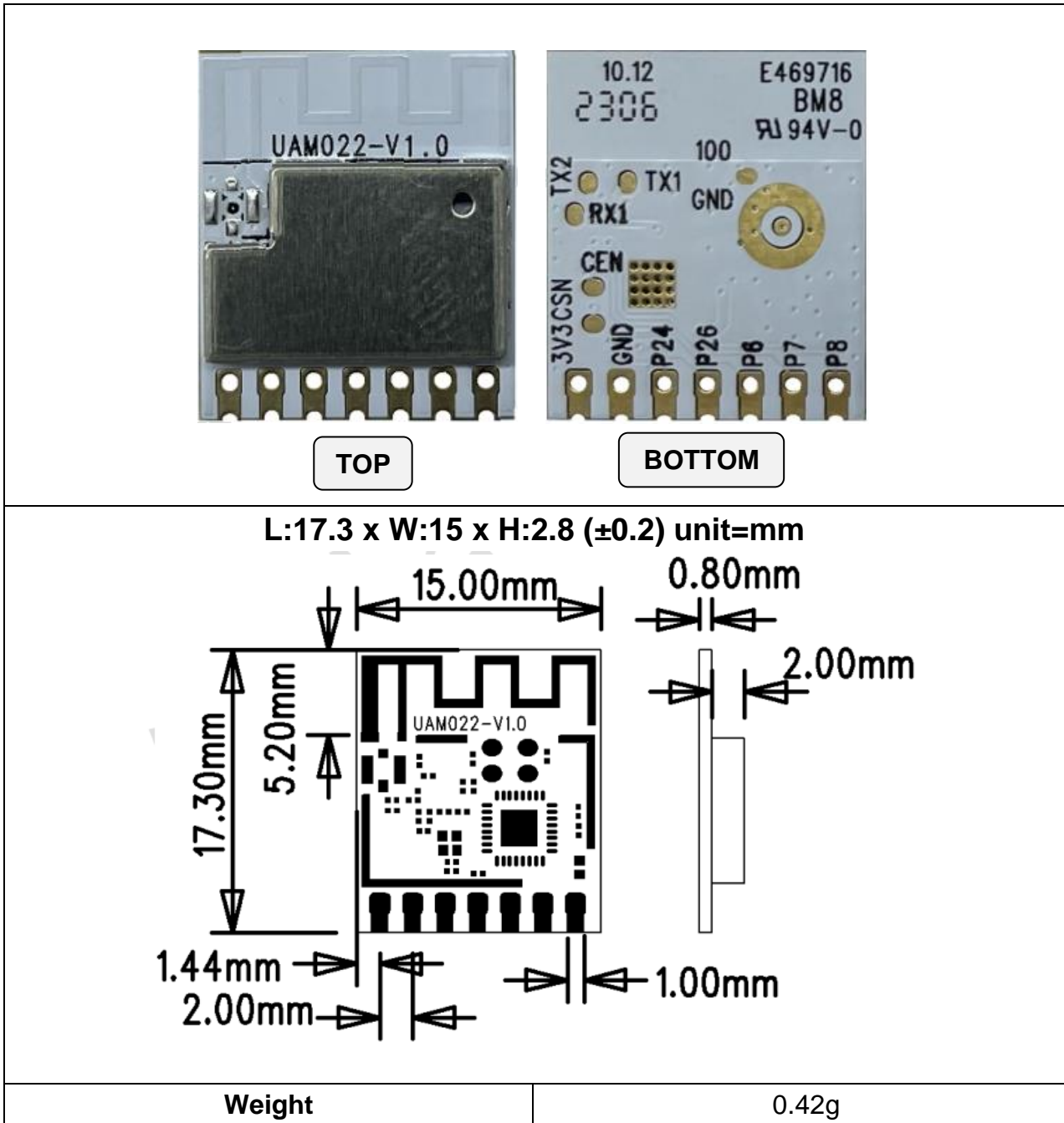
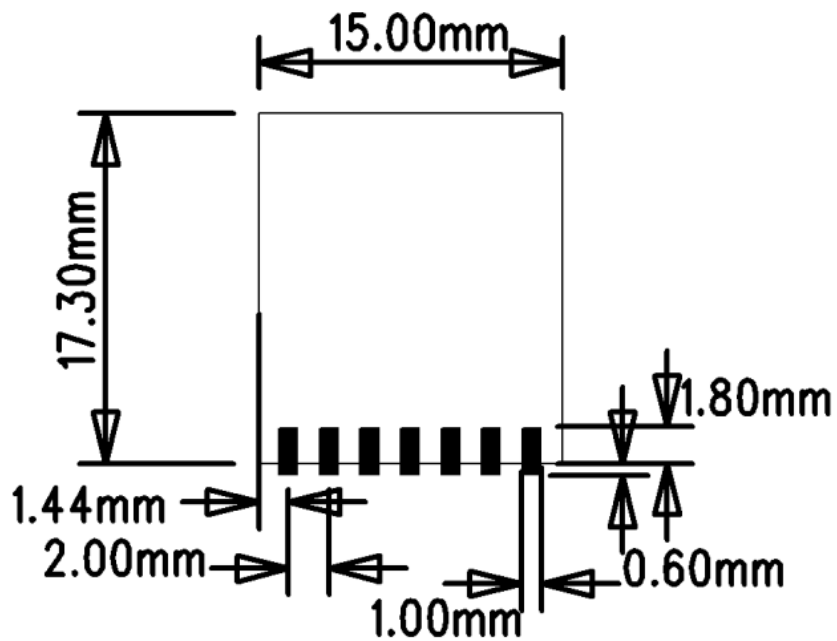## 4.2 Module Physical Dimensions.

TOP
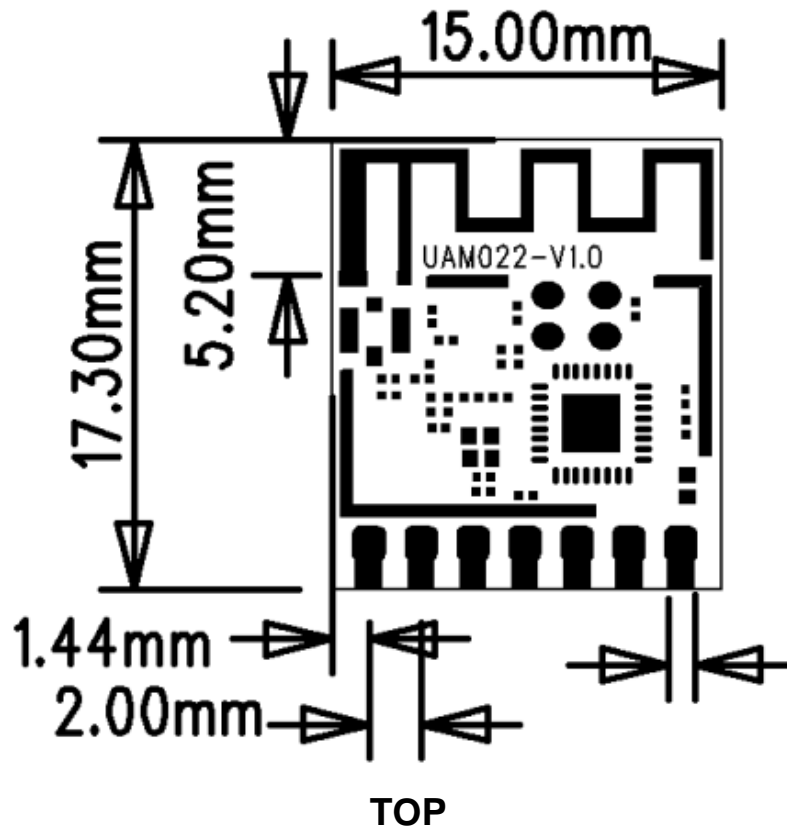
4.3 PCB Layout Reference.

5 Production Guide.

Note:

1. The design of the antenna should be far away from the metal parts, and the antenna connecting wire should choose the braided mesh shielding copper wire with low loss.

2. RF line as short as possible, and need to do 50 ohm impedance.

3. Please use curved or straight lines for RF layout.

4. The π-type network is reserved between the RF port of the module and the antenna, and of the π-type network is close to the antenna.

5. Data line PCB Layout needs the same length, and then the ground wire is used to wrap it.

6. If PCB board antenna is used, no other metal is allowed within 8mm around the antenna, nor can copper beryllium be laid.

5.1 Antenna type.

This module antenna type is PCB on-board antenna with antenna gain of 0dBi (MAX)

5.2 Module layout considerations.

The UAM022 module shall be welded to the PCB board. In order to obtain the best RF performance. Under the PCB on-board antenna, there should be no copper laying, device and wiring. During PCB design, the corresponding area should be cleared. As shown in the following figure.
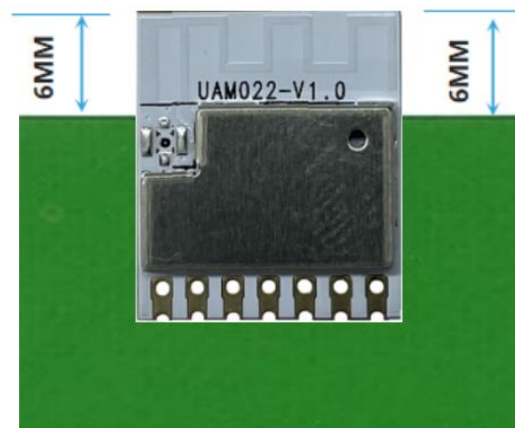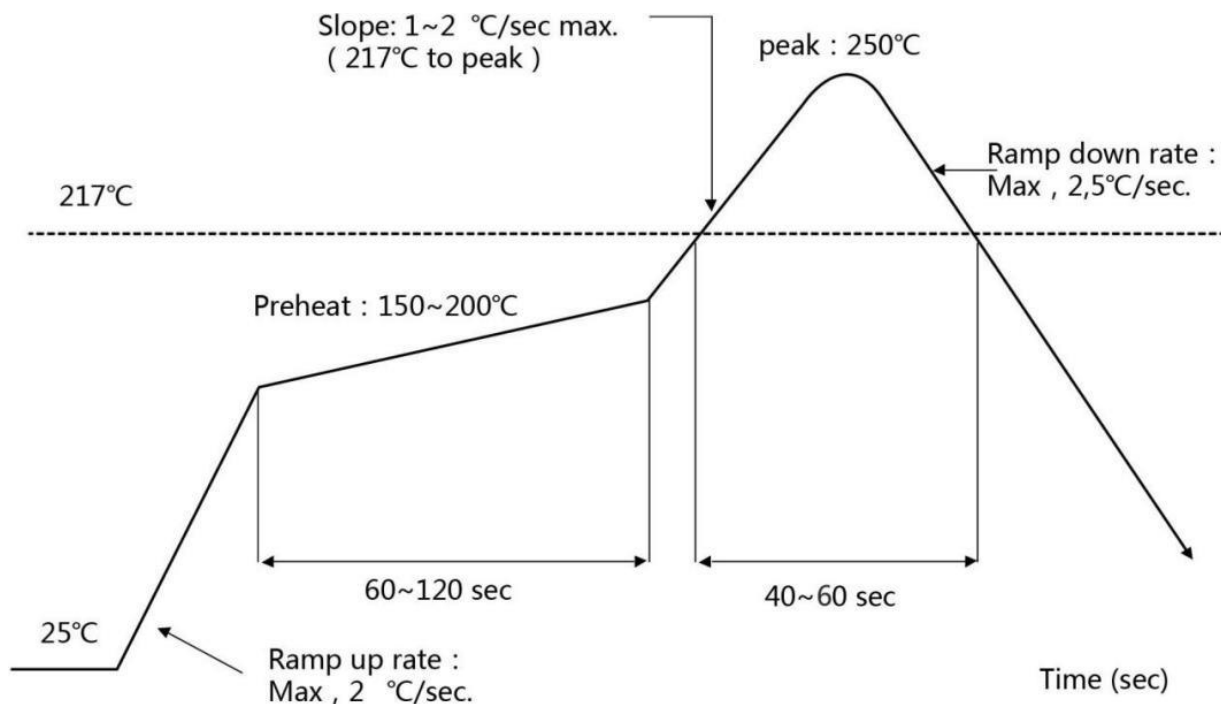
Correct PCB layout
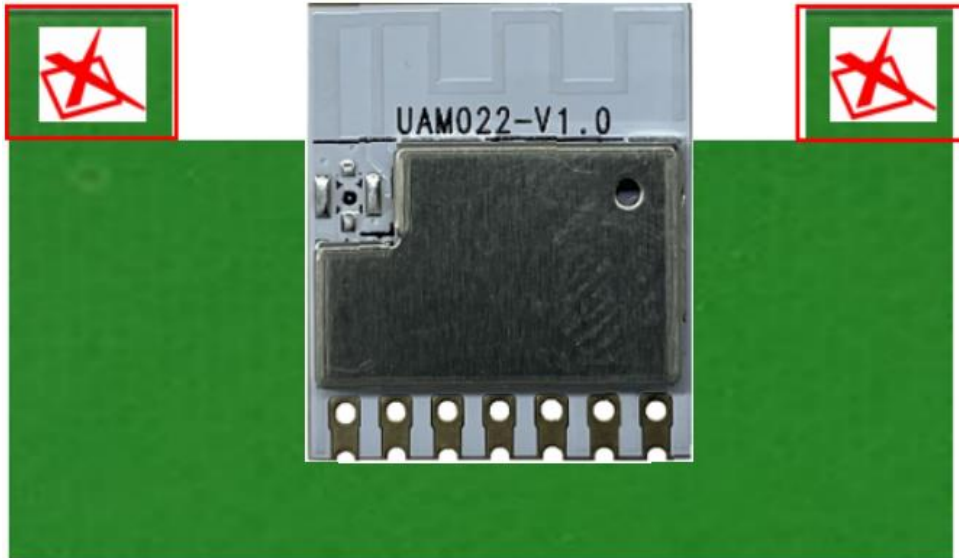
Wrong PCB layout

6 Environmental Requirements.

6.1 Recommended Reflow Profile.

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times

6.2 Patch Wi-Fi modules installed before the notice.

Wi-Fi module installed note:

1. Take and use the WIFI module, please insure the electrostatic protective measures.

2. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5 ℃ for the MID motherboard. About the module packaging, storage and use of matters needing attention are as follows:

1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 ℃, relative humidity: < 90% r.h.

2. The module vacuum packing once opened, time limit of the assembly:

Card:1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.

2.) factory environmental temperature humidity control: ≦ -30 ℃, ≦ 60% r.h..

3). Once opened, the workshop the preservation of life for 168 hours.

3. Once opened, such as when not used up within 168 hours:

1). The module must be again to remove the module moisture absorption.

2). The baking temperature: 125 ℃, 8 hours.

3). After baking, put the right amount of desiccant to seal packages.

6.3 Humidity sensitive control.

CAUTION

This bag contains
MOISTUR-SENSITIVE DEICES

LEVEL

3

If blank, see adjacent

bar code label

1. Calculatied shelf life an sealed bag: 12 months at < 40℃ and <90% relative humidity(RH)

2. Peak package body temperature :＿＿＿＿260＿＿＿＿℃

3. After bag is opened ,devices that will be subjected to reflow solder of other high temperature process must
   a) Mounted within:＿＿＿168＿＿＿hrs. of factory confitions ≤30℃/60%RH, OR
   b) Stored at<10% RH

4. Devices require bake,before mounting, if:
   a) Humidity Indicator Care is > 10% when read at 23 ± 5℃
   b) 3a or 3b not met.

5. If baking is required , devices may be baked for 48 hrs. at 125 ± 5℃

   Note : If device containers cannot be subjected to high temperature of shorted bake times are desired, reference IPC/JDEC J-STD-033 for bake procedure
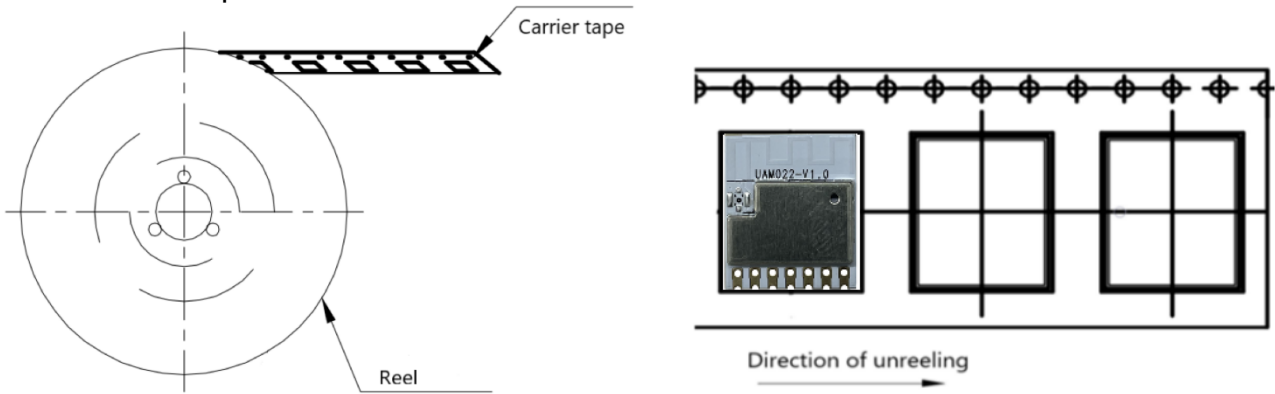
bag Seal Date : ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Note : level and body temperature defined by IPC/JEDEC J-STD-020
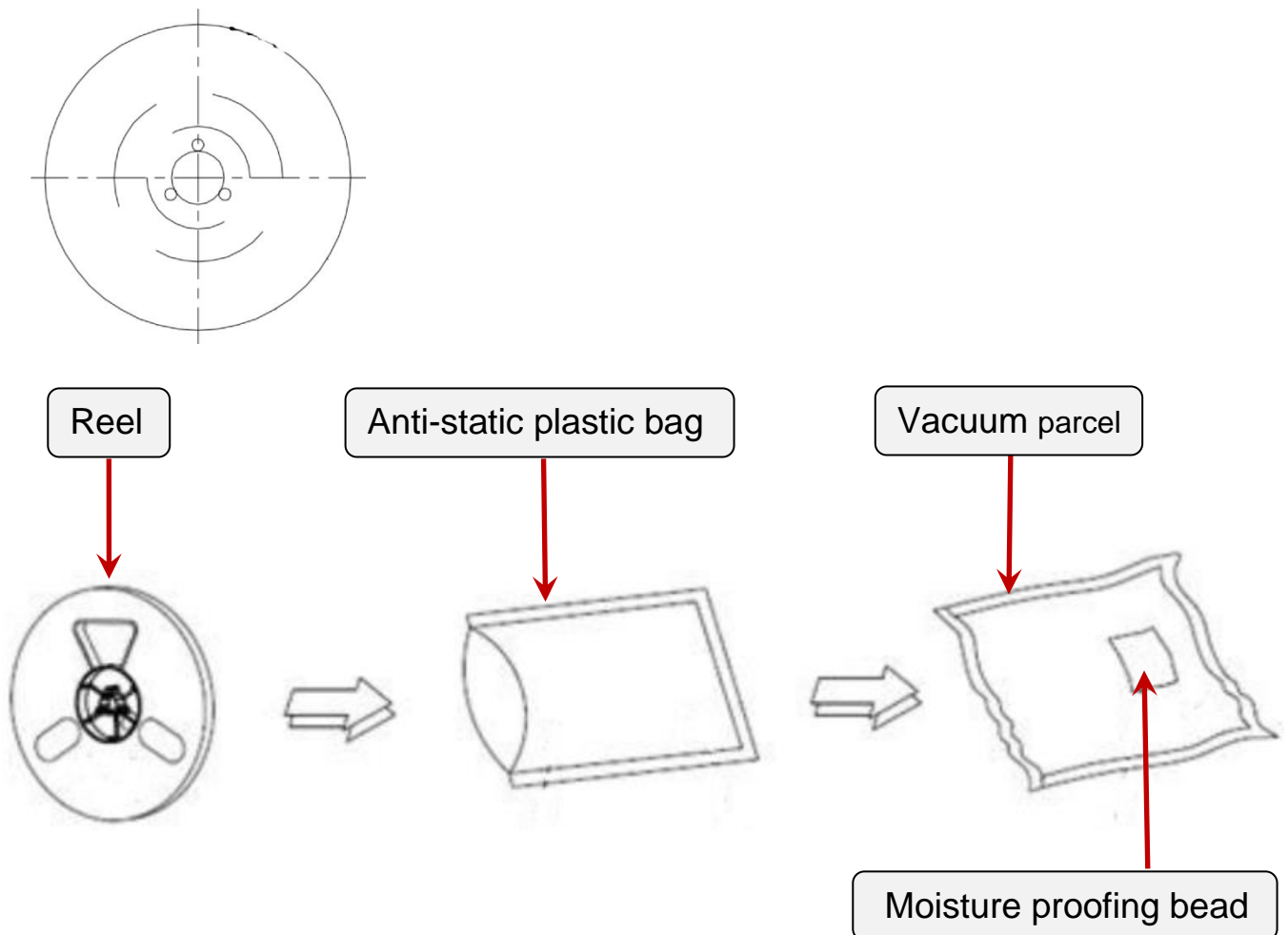
7 Package style.

7.1 Reel.

A roll of 1500pcs.

7.1.1 Packaging Detail.

Reel Size: 330mm*32mm

Reel	Anti-static plastic bag	Vacuum parcel

Moisture proofing bead

A roll of 1500pcs.

Vacuum parcel effect diagram.
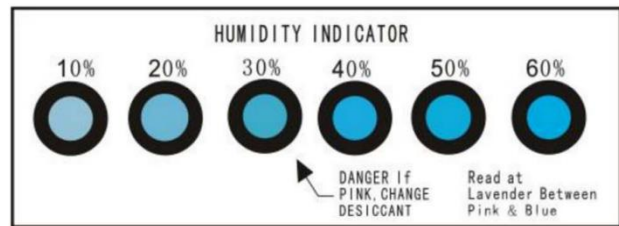

Size： 395mm X 370mm X 50mm

A box of 7500pcs

Outer box size:410mm X 395mm X 280mm

Note:
There is a "triangular arrow" on the humidity indicator card indicating at 30%RH (as shown in the picture below). If the chemical changes to pink in the circle it points to, the element is damp and needs baking.

8 Purchase Packaging Information.

Part No.	Description	Small package	Big box
UAM022	Reel style	1500PCS	7500PCS
Note: Please confirm the packaging style with our sales staff before purchasing this product. If no packing style is specified before purchase, we will ship the goods by our own choice of packing method.			

9 Disclaimer and copyright notice.

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The contents of this document disclaim any warranties, including any warranties of fitness for sale, fitness for a particular purpose or non-infringement, and any warranties mentioned elsewhere in any proposal, specification or sample.

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10 Attention.

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11 FCC statements:

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: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.
The device has been evaluated to meet general RF exposure requirement, The device can be used in portable exposure condition without restriction. Federal Communication Commission (FCC) Radiation Exposure Statement Power is so low that no RF exposure calculation is needed.
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. 2. The transmitter module may not be co-located with any other transmitter or antenna. As long as the two conditions above are met, additional transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for the installed module.
Important Note: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Federal Communications

Commission of the U.S. Government (FCC) and the Canadian Government authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator shall be responsible for re-evaluating the end-product (including the transmitter) and obtaining a separate FCC authorization in the U.S. and candada.

OEM Integrators – End Product Labeling Considerations: This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm 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: 2A68EJX-UAM022". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

OEM Integrators – End Product Manual Provided to the End User: The OEM integrator shall not provide information to the end user regarding how to install or remove this RF module in end product user manual. The end user manual must include all required regulatory information and warnings as outlined in this document.