6222D-UUB

Wi-Fi Dual-band 2X2 11ac +Bluetooth 4.2

Combo Module Datasheet

6222D-UUB Module Datasheet

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Customer Approval :

_____ Company

_____ Title

_____ Signature

_____ Date

_____ Fn-Link

Revision History

Version	Date	Revision Content	Draft	Approved
1.0	2018/10/29	New version	Lzm	Jacky
1.1	2018/12/18	Modify the telephone number	Lzm	Lxy
1.2	2018/12/25	Modify the office and TEL	Lzm	Lxy
1.3	2019/01/08	Add Carrier Tape Detail	Lzm	Lxy
1.4	2019/07/05	Update timing information	Lxy	Szs
1.5	2019/08/02	Update module dimension	Lxy	Szs
1.6	2020/06/11	Update file format	Lxy	Szs
1.7	2021/08/30	Update recommended pad dimension	Lxy	QJP
1.8	2021/11/26	Update PCB information	LXY	QJP

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1 Overview

1.1 Introduction

Fn-Link Technology would like to announce a low-cost and low-power consumption module which has all of the Wi-Fi and Bluetooth functionalities. The highly integrated module makes the possibilities of web browsing, VoIP, Bluetooth headsets applications. With seamless roaming capabilities and advanced security, also could interact with different vendors' 802.11a/b/g/n/ac 2x2 Access Points in the wireless LAN.

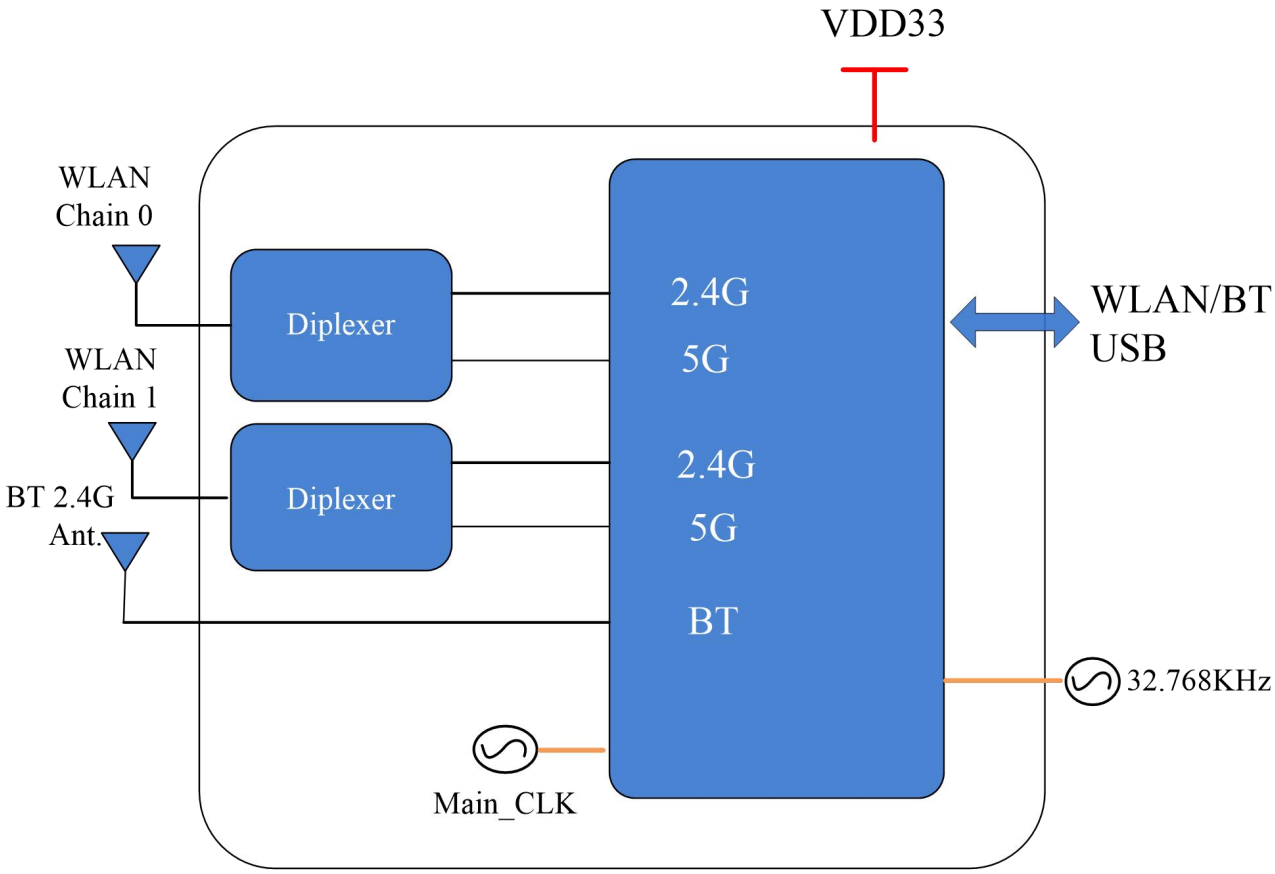
The wireless module complies with IEEE 802.11 a/b/g/n/ac 2x2 MIMO standard and it can achieve up to a speed of 867Mbps with dual stream in 802.11n to connect the wireless LAN. The integrated module provides USB interface for Wi-Fi and Bluetooth.

This compact module is a total solution for a combination of Wi-Fi + BT technologies. The module is specifically developed for Smart TV and OTT Box application.

1.2 Features

- Highly integrated wireless local area network(WLAN) system-on-chip (SOC) for 5 GHZ 802.11ac, or 2.4G/5G 802.11n WLAN applications.
- Dual-stream spatial multiplexing up to 867 Mbps data rate.
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports USB interface for WLAN and Bluetooth.
- Complies with USB2.0 for WLAN and BT controller.
- Supports Bluetooth V4.2+HS, BLE and be backwards compatible with Bluetooth 1.2, 2.X+ enhance data rate.
- Supports Bluetooth for class1 and class2 power level transmissions.

Block Diagram:



1.3 General Specification

Model Name	6222D-UUB
Product Description	Support Wi-Fi/Bluetooth
Dimension	L x W x H: 27 x 18 x 1.9 mm
Wi-Fi Interface	Support USB 2.0
BT Interface	USB 2.0
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C
Humidity	Operating Humidity 10% to 95% Non-Condensing
RoHS	All hardware components are fully compliant with EU RoHS directive

1.4 Recommended Operating Rating

		Min.	Typ.	Max.	Unit
Operating Temperature		-10	25	70	deg.C
VCC33		3.15	3.3	3.45	V
VDDIO		-	-	-	V
Power Consumption		VCC33 = 3.3V(Unit:mA)			
	Wi-Fi on Mode	130			
	TX (2.4G HT20)	385			
	RX (2.4G HT20)	189			
	TX (5G HT80)	495			
	RX (5G HT80)	206			
	BT on	32			

※1.5 EEPROM Information

WI-FI

Vendor ID	0BDA
Product ID	B82C

2 Wi-Fi RF Specification

2.1 2.4GHz RF Specification

Feature	Description			
WLAN Standard	IEEE 802.11b/g/n Wi-Fi compliant			
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)			
Number of Channels	2.4GHz：Ch1 ~ Ch14			
Output Power	802.11b /11Mbps : 17 dBm ± 1.5 dB @ EVM ≤ -9dB			
	802.11g /54Mbps : 15 dBm ± 1.5 dB @ EVM ≤ -25dB			
	802.11n /MCS7 : 14 dBm ± 1.5 dB @ EVM ≤ -28dB			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st side lobes(to fc ± 11MHZ)	-	-40/-30/-40	-	dBr

2st side lobes(to fc ± 22MHZ)	-	-51/-33/-58	-	dBr
Freq. Tolerance	-20/-20/-20	-	20/20/20	ppm

Test Items	Test Value		Standard Value
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps	PER @ -92 dBm, typical	≤-83
	- 2Mbps	PER @ -90 dBm, typical	≤-80
	- 5.5Mbps	PER @ -87 dBm, typical	≤-79
	- 11Mbps	PER @ -85 dBm, typical	≤-76
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps	PER @ -89 dBm, typical	≤-85
	- 9Mbps	PER @ -88 dBm, typical	≤-84
	- 12Mbps	PER @ -87 dBm, typical	≤-82
	- 18Mbps	PER @ -84 dBm, typical	≤-80
	- 24Mbps	PER @ -81 dBm, typical	≤-77
	- 36Mbps	PER @ -78 dBm, typical	≤-73
	- 48Mbps	PER @ -73 dBm, typical	≤-69
	- 54Mbps	PER @ -71 dBm, typical	≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -89 dBm, typical	≤-85
	- MCS=1	PER @ -86 dBm, typical	≤-82
	- MCS=2	PER @ -84 dBm, typical	≤-80
	- MCS=3	PER @ -80 dBm, typical	≤-77
	- MCS=4	PER @ -77 dBm, typical	≤-73
	- MCS=5	PER @ -72 dBm, typical	≤-69
	- MCS=6	PER @ -71 dBm, typical	≤-68
	- MCS=7	PER @ -69 dBm, typical	≤-67
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -88 dBm, typical	≤-82
	- MCS=1	PER @ -85 dBm, typical	≤-79
	- MCS=2	PER @ -83 dBm, typical	≤-77
	- MCS=3	PER @ -79 dBm, typical	≤-74
	- MCS=4	PER @ -76 dBm, typical	≤-70
	- MCS=5	PER @ -71 dBm, typical	≤-66
	- MCS=6	PER @ -70 dBm, typical	≤-65
	- MCS=7	PER @ -68 dBm, typical	≤-64
Maximum Input Level	802.11b : -10 dBm		
	802.11g/n : -20 dBm		
Antenna Reference	Small antennas with 0~2 dBi peak gain		

2.2 5GHz RF Specification

Feature	Description	
WLAN Standard	IEEE 802.11a/n/ac 2x2, Wi-Fi compliant	
Frequency Range	5.150 GHz ~ 5.850 GHz (5.0 GHz ISM Band)	
Number of Channels	5.0GHz：Please see the table[1]	
Output Power	802.11a /54Mbps : 12 dBm ± 1.5 dB @ EVM ≤ -25dB	
	802.11n /MCS7 : 11 dBm ± 1.5 dB @ EVM ≤ -28dB	
	802.11ac /MCS9 : 10 dBm ± 1.5 dB @ EVM ≤ -32dB	
Test Items	**Test Value**	**Standard Value**
SISO Receive Sensitivity (11a,20MHz) @10% PER	- 6Mbps PER @ -88 dBm	≤-85
	- 9Mbps PER @ -87 dBm	≤-84
	- 12Mbps PER @ -86 dBm	≤-82
	- 18Mbps PER @ -83 dBm	≤-80
	- 24Mbps PER @ -80 dBm	≤-77
	- 36Mbps PER @ -77 dBm	≤-73
	- 48Mbps PER @ -72 dBm	≤-69
	- 54Mbps PER @ -70 dBm	≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -88 dBm	≤-85
	- MCS=1 PER @ -85 dBm	≤-82
	- MCS=2 PER @ -83 dBm	≤-80
	- MCS=3 PER @ -80 dBm	≤-77
	- MCS=4 PER @ -76 dBm	≤-73
	- MCS=5 PER @ -71 dBm	≤-69
	- MCS=6 PER @ -70 dBm	≤-68
	- MCS=7 PER @ -68 dBm	≤-67
SISO Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -85 dBm	≤-82
	- MCS=1 PER @ -82 dBm	≤-79
	- MCS=2 PER @ -80 dBm	≤-77
	- MCS=3 PER @ -77 dBm	≤-74
	- MCS=4 PER @ -73 dBm	≤-70
	- MCS=5 PER @ -69 dBm	≤-66
	- MCS=6 PER @ -67 dBm	≤-65
	- MCS=7 PER @ -66 dBm	≤-64
SISO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=0, NSS1 PER @ -86 dBm	≤-82
	- MCS=1, NSS1 PER @ -84 dBm	≤-80

	- MCS=2, NSS1 PER @ -82 dBm	≤-77
	- MCS=3, NSS1 PER @ -79 dBm	≤-73
	- MCS=4, NSS1 PER @ -75 dBm	≤-69
	- MCS=5, NSS1 PER @ -70 dBm	≤-68
	- MCS=6, NSS1 PER @ -69 dBm	≤-67
	- MCS=7, NSS1 PER @ -68 dBm	≤-62
	- MCS=8, NSS1 PER @ -64 dBm	≤-60
SISO Receive Sensitivity (11ac,40MHz) @10% PER	- MCS=0, NSS1 PER @ -84 dBm	≤-79
	- MCS=1, NSS1 PER @ -81 dBm	≤-77
	- MCS=2, NSS1 PER @ -79 dBm	≤-74
	- MCS=3, NSS1 PER @ -76 dBm	≤-70
	- MCS=4, NSS1 PER @ -73 dBm	≤-66
	- MCS=5, NSS1 PER @ -68 dBm	≤-65
	- MCS=6, NSS1 PER @ -67 dBm	≤-64
	- MCS=7, NSS1 PER @ -66 dBm	≤-59
	- MCS=8, NSS1 PER @ -61 dBm	≤-57
	- MCS=9, NSS1 PER @ -60 dBm	≤-55
SISO Receive Sensitivity (11ac,80MHz) @10% PER	- MCS=0, NSS1 PER @ -81 dBm	≤-79
	- MCS=1, NSS1 PER @ -78 dBm	≤-76
	- MCS=2, NSS1 PER @ -76 dBm	≤-74
	- MCS=3, NSS1 PER @ -72 dBm	≤-71
	- MCS=4, NSS1 PER @ -69 dBm	≤-67
	- MCS=5, NSS1 PER @ -66 dBm	≤-63
	- MCS=6, NSS1 PER @ -64 dBm	≤-62
	- MCS=7, NSS1 PER @ -62 dBm	≤-61
	- MCS=8, NSS1 PER @ -58 dBm	≤-56
	- MCS=9, NSS1 PER @ -56 dBm	≤-54
Maximum Input Level	802.11a/n : -30 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

[1]5GHz(20MHz) Channel table

Band range	Operating Channel Numbers	Channel center frequencies(MHz)
5150MHz~5250MHz	36	5180
	40	5200
	44	5220
	48	5240
5250MHz~5350MHz	52	5260

	56	5280
	60	5300
	64	5320
5470MHz~5725MHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5725MHz~5850MHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

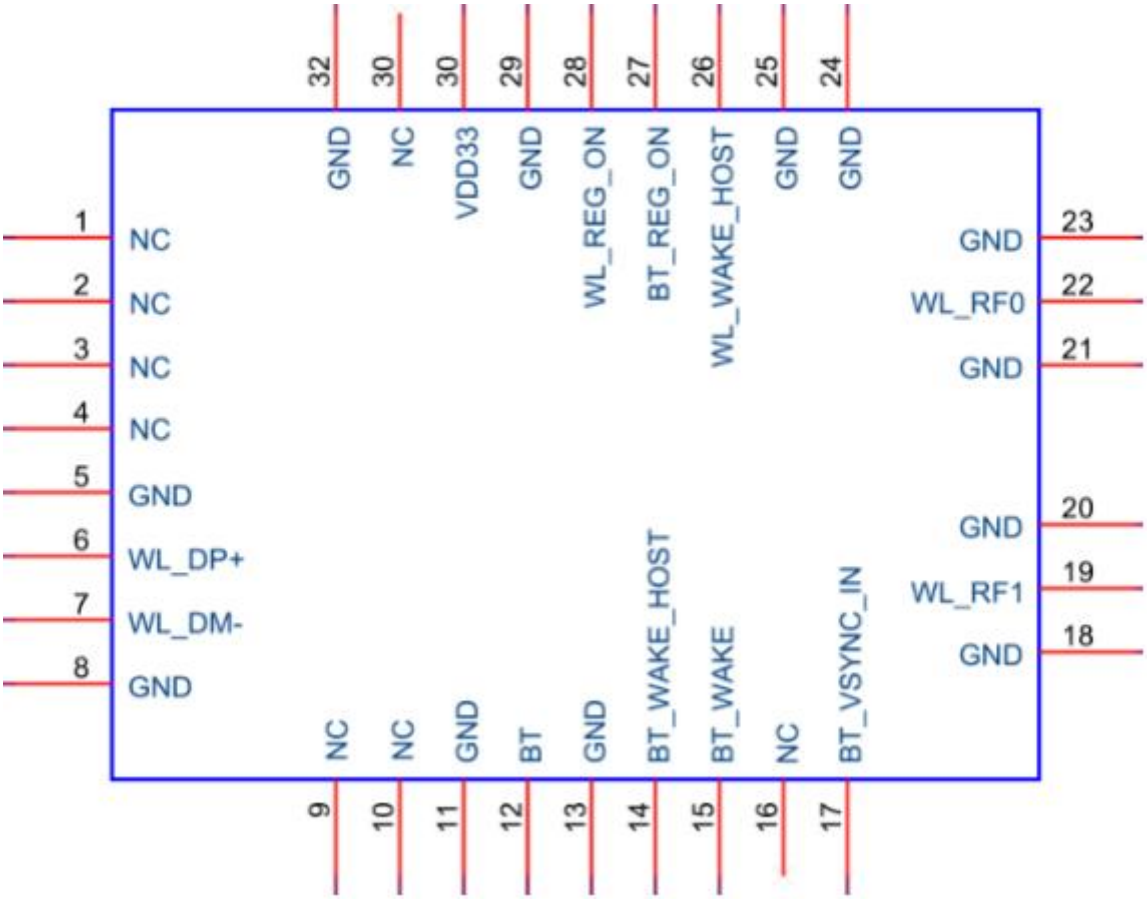
3 Bluetooth Specification

3.1 Bluetooth Specification

Feature	**Description**		
General Specification			
Bluetooth Standard	Bluetooth V4.2 of 1, 2 and 3 Mbps.		
Host Interface	USB2.0		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2400 MHz ~ 2483.5 MHz		
Number of Channels	79 channels		
Modulation	GFSK, π/4-DQPSK,8DPSK		
RF Specification			
	Min.	**Typical.**	**Max.**
Output Power (Class 1.5)	4 dBm	5dBm	20 dBm
Sensitivity @ BER=0.1%	-92 dBm	-82 dBm	-70 dBm

for GFSK (1Mbps)			
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)	-92 dBm	-80 dBm	-70 dBm
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)	-85 dBm	-80 dBm	-70 dBm
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		
	8DPSK (3Mbps) :-20dBm		

4 Pin Assignments

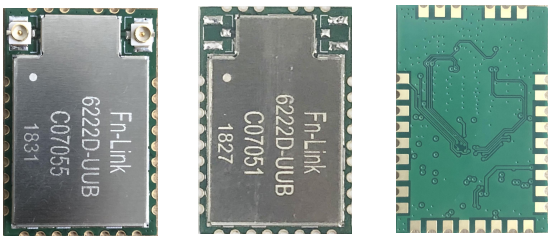


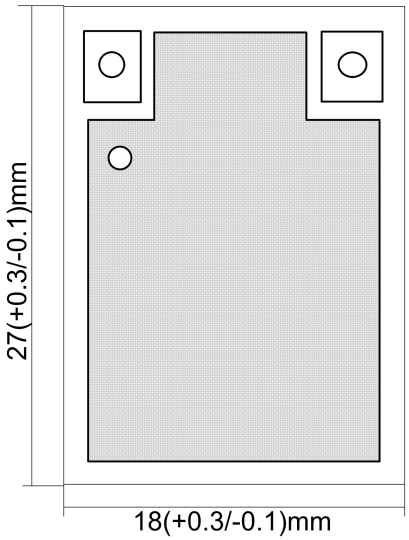
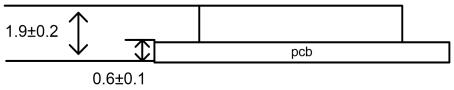
NO.	Name	Type	Description	Voltage
1	NC	-	No connection (Floating)	
2	NC	-	No connection (Floating)	
3	NC	-	No connection (Floating)	
4	NC	-	No connection (Floating)	
5	GND	—	Ground connections	
6	WL_DP+	I/O	USB data+ (USB2.0)	

7	WL_DM-	I/O	USB data- (USB2.0)	
8	GND	—	Ground connections	
9	NC	—	No connection (Floating)	
10	NC	—	No connection (Floating)	
11	GND	—	Ground connections	
12	BT_RF	I/O	BT RF port	
13	GND	—	Ground connections	
14	BT_WAKE_HOST	O	BT wake up HOST Active high	3.3V
15	HOST_WAKE_BT	I	Host Wake up BT Active low	3.3V
16	NC	—	No connection (Floating)	
17	NC	—	No connection (Floating)	
18	GND	—	Ground connections	
19	WL_RF1	I/O	2.4G/5G Wi-Fi RF port1	
20	GND	—	Ground connections	
21	GND	—	Ground connections	
22	WL_RF0	I/O	2.4G/5G Wi-Fi RF port0	
23	GND	—	Ground connections	
24	GND	—	Ground connections	
25	GND	—	Ground connections	
26	WL_WAKE_HOST	O	WLAN wake up HOST Active high	3.3V
27	BT_REG_DIS	I	GPIO Control BT device disabled, External pull low can shutdown BT function This pin function is not supported	3.3V
28	WL_REG_DIS	I	GPIO Control Wi-Fi device disabled, External pull low can shutdown WLAN function This pin function is not supported	3.3V
29	GND	—	Ground connections	
30	VDD33	P	3.3V Voltage input	3.3V
31	NC	—	No connection (Floating)	
32	GND	—	Ground connections	

5 Dimensions

5.1 Module Picture

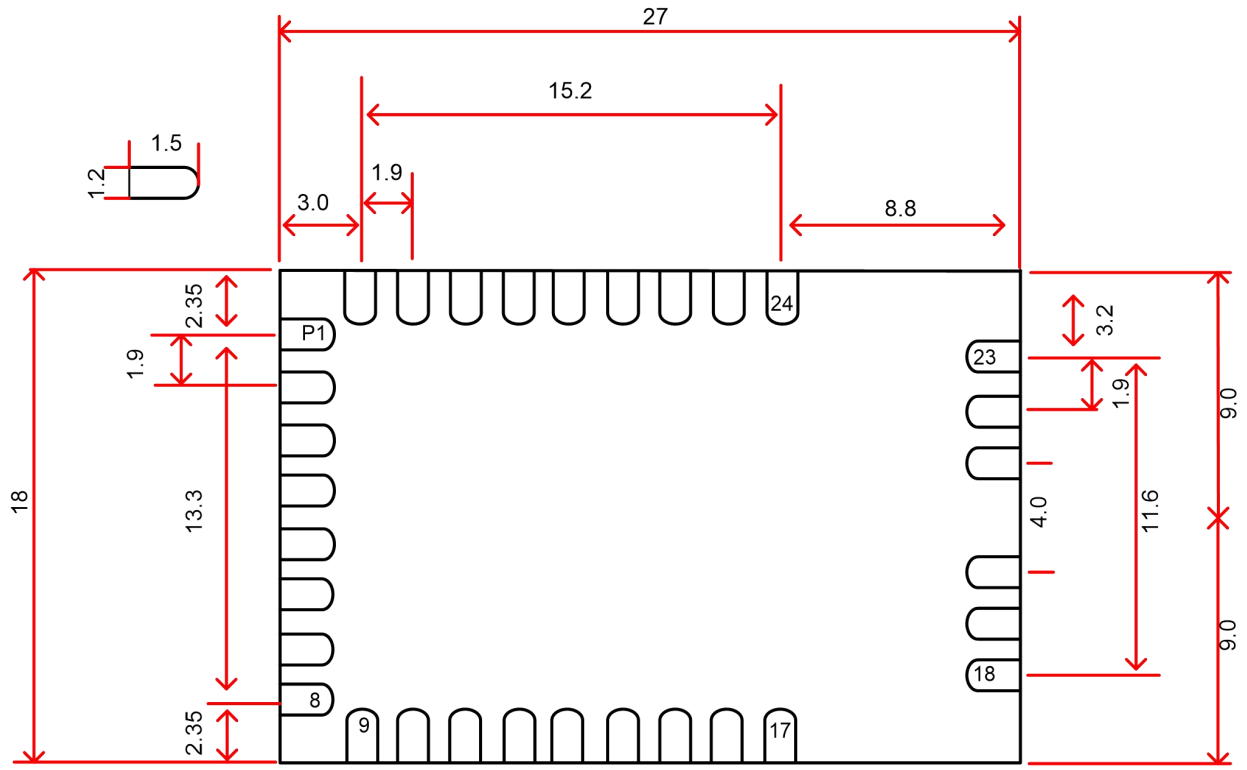
<table>
<tr><td>L x W: 27x 18(+0.3/-0.1) mm
 

-W2 -W1</td><td> 
</td></tr>
<tr><td>H: 1.9 mm</td><td> 
</td></tr>
<tr><td>Weight</td><td>1.58g</td></tr>
</table>

5.2 Physical Outline

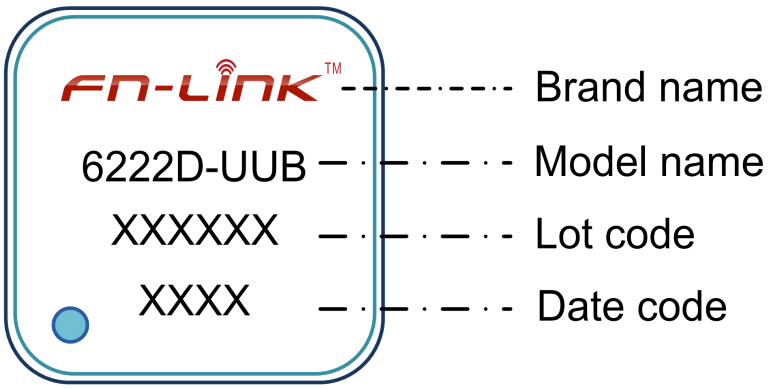
(Unit: mm)

< TOP VIEW >



5.3 Marking Description

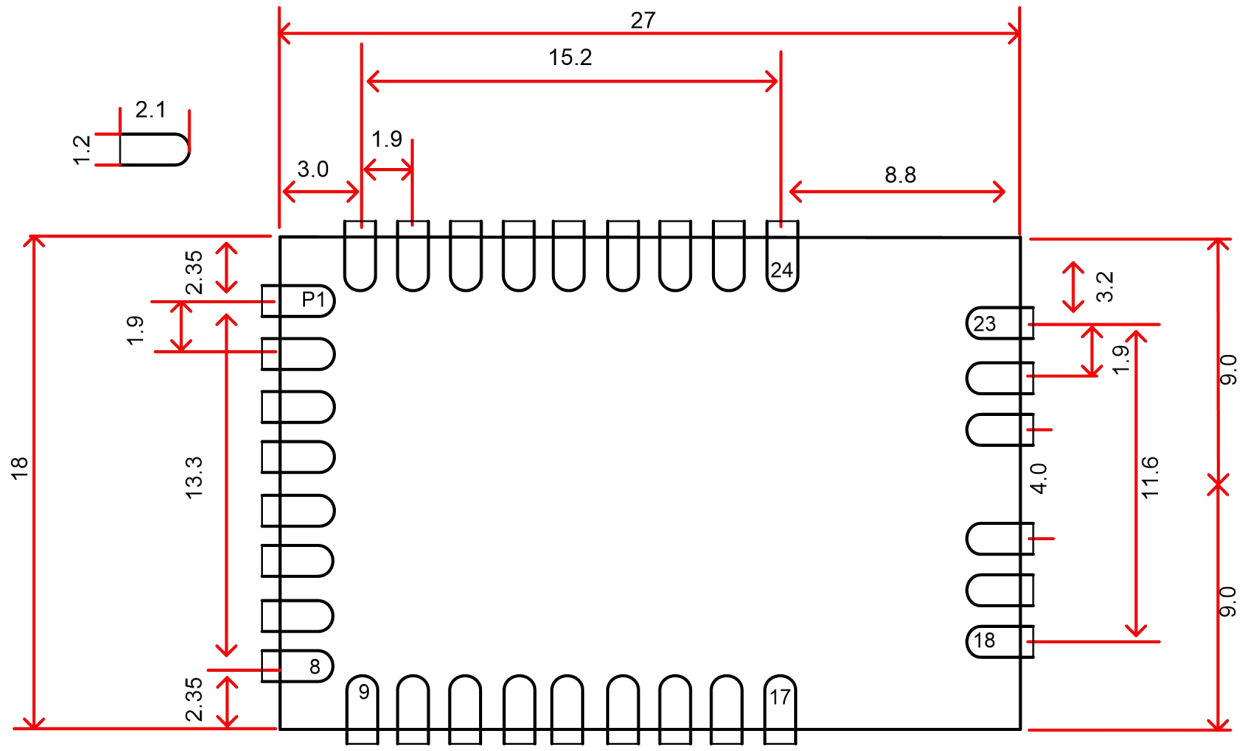
< TOP VIEW >

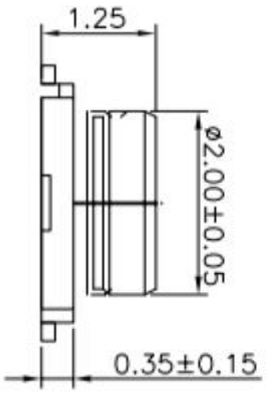


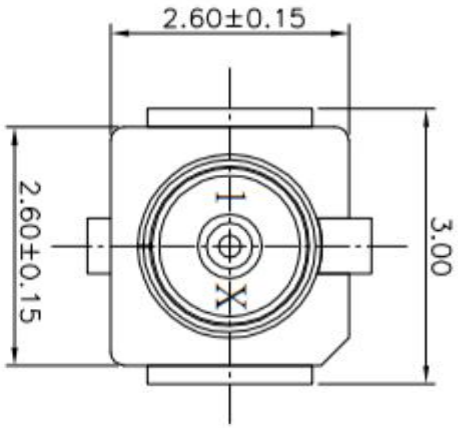
5.4 Layout Recommendation

(Unit: mm)

< TOP VIEW >

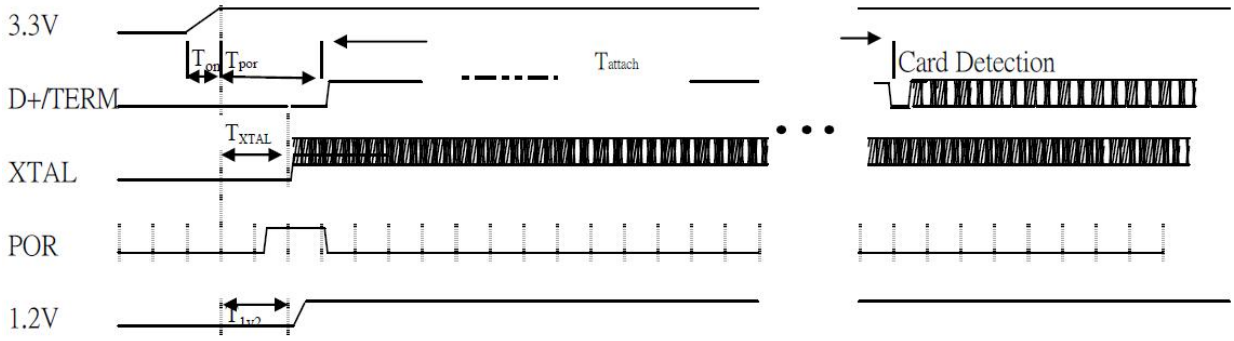

27
15.2
2.1
1.2
1.9
3.0
8.8
2.35
1.9
P1
24
23
3.2
1.9
9.0
18
13.3
4.0
11.6
9.0
8
2.35
9
17
18


1.25
ø2.00±0.05
0.35±0.15


2.60±0.15
2.60±0.15
3.00

6 Host Interface Timing Diagram

6.1 USB Bus during Power On Sequence



T_{on}: The main power ramp up duration

T_{por}: The power on reset releases and power management unit executes power on tasks

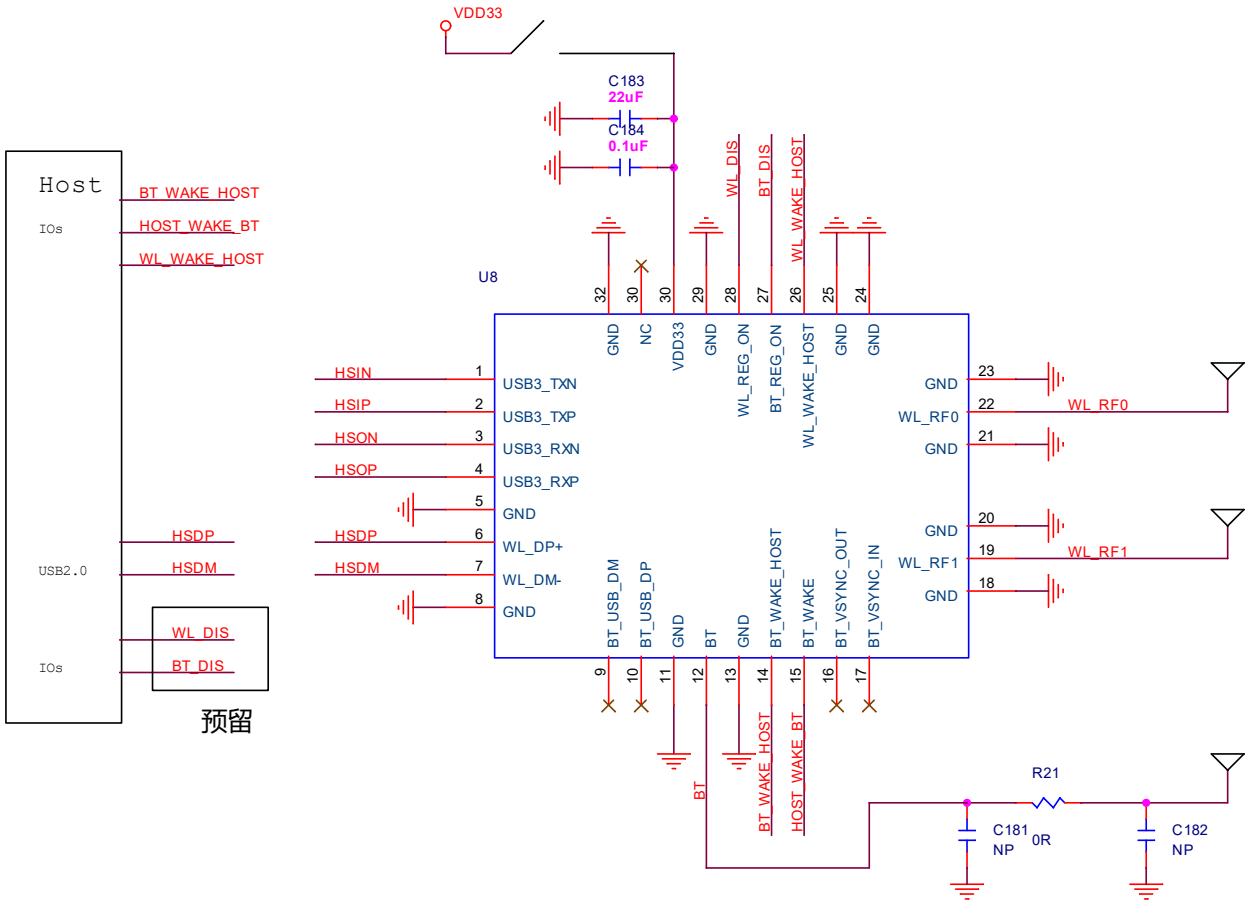
T_{attach}: USB attach state. The duration from resistor attached to USB host starting card detection procedure

T_{xtal}: XTAL starts

The power on flow description:After main 3.3V ramp up, the internal power on reset is released by power ready detection circuit and the power management unit will be enabled. The power management unit enables the internal regulator and clock circuits.The power management unit also enables the USB circuits.USB analog circuits attach resisters to indicate the insertion of the USB device.

	Unit	Min	Typical	Max
T_{on}	ms	0	1.5	5
T_{por}	ms	--	2	20
T_{xtal}	ms	--	1.5	8
T_{attach}	ms	100	250	--
T_{1v2}	ms	-	3	11
V_{on}	V	0	3.3	--

7 Reference Design



8 Ordering Information

Part No.	Description
FG6222DUUX-W1	RTL8822BU, a/b/g/n/ac, Wi-Fi+BLE4.2, 2T2R+BT 3ports, 18X27mm, USB, PCB Version V4.0,邮票孔
FG6222DUUX-W2	RTL8822BU, a/b/g/n/ac, Wi-Fi+BLE4.2, 2T2R+BT 3ports, 18X27mm, USB, PCB Version V4.0, 2 天线座 + BT 邮票孔

9 The Key Material List

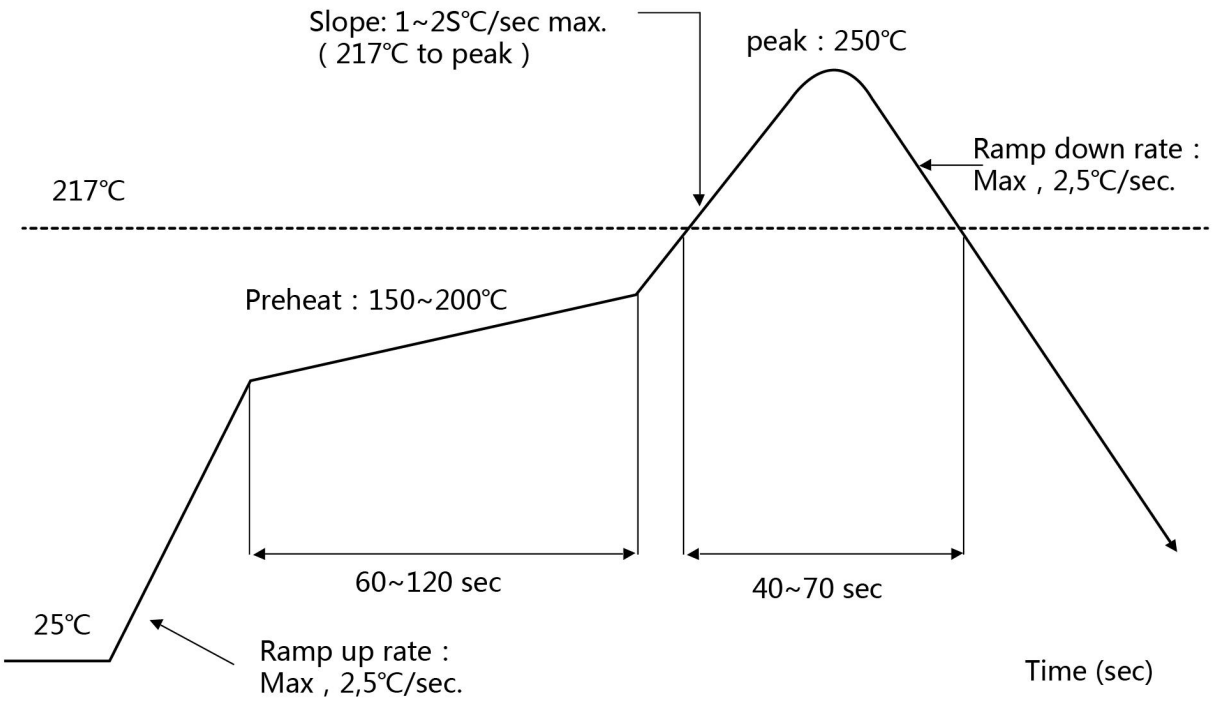
Analog switch	3T,RF switch, QFN-8	卓胜微,RICHWAVE
Shielding cover	6222D-UUB,Shieldingcover,copper,no positioning pin	信太,精力通
Crystal	2520, 40MHZ,15PF,10ppm	TKD,TST,Hosonic,TXC
IPEX	1generationUFLR-MINIPCL,MRFIRECEPTACLE	佳沃，创迪尔
Chipset	RTL8822BU-CG	Realtek
PCB	6222D-UUB PCB 27*18*0.6mm Au>1u’’	Sunlord,kx-pcb,欣强

10 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature: <250°C

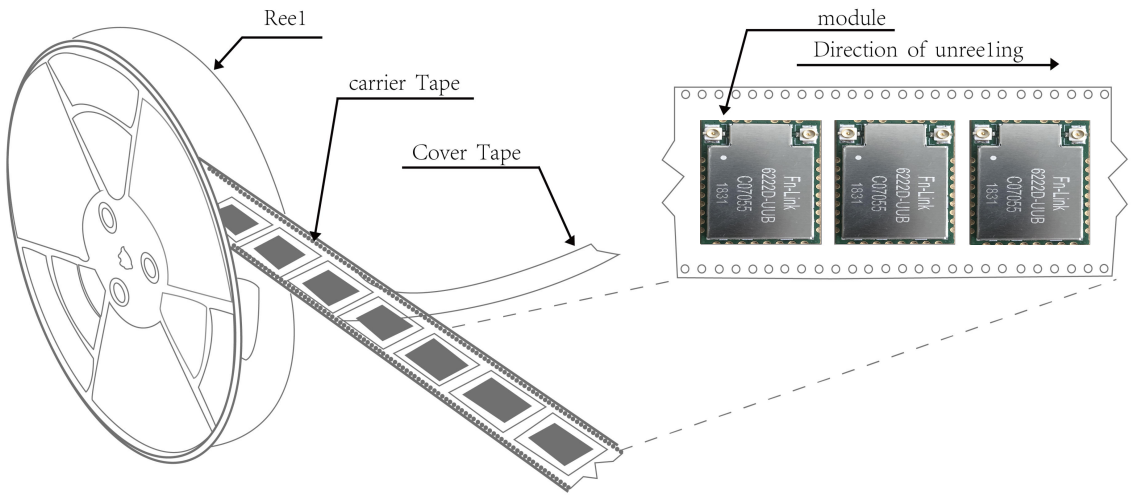
Number of Times: ≤2 times



11 Package Information

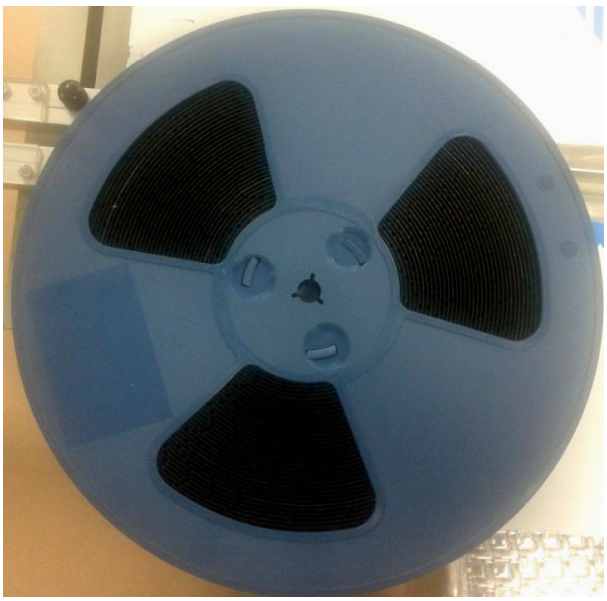
11.1 Reel

A roll of 800pcs



11.2 Packaging Detail

the take-up package



Using self-adhesive tape

Size of black tape:44mm*32.6m the cover tape :37.5mm*32.6m

Color of plastic disc:blue

A roll of 800pcs

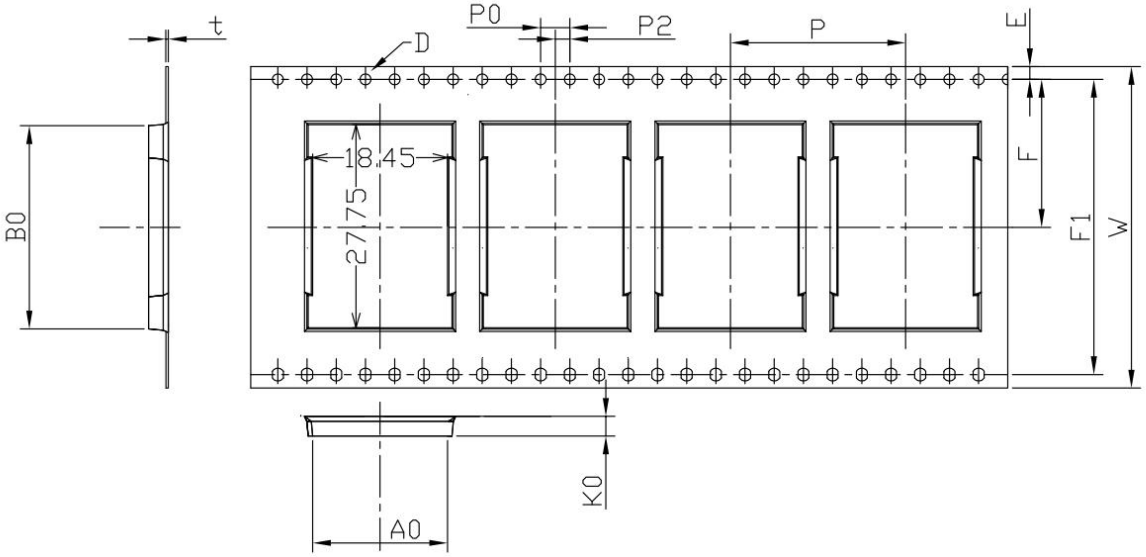
NY bag size:460mm*385mm

size ： 350*350*35mm

The packing case size:350*210*370mm

11.3 Carrier Tape Detail

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	44	18.45	27.75	1.5	1.75	20.2	40.4	2.80	4.0	2.0	24.0	0.30
TOLE	+0.3 −0.3	±0.15	±0.15	+0.1 −0.0	±0.1	±0.15	±0.10	±0.10	±0.1	±0.15	±0.1	±0.05



11.4 Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care
all the relatives requirements for using this kind of components.
Moreover, the customer has to take care of the following conditions:
a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5
c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
b) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected
d) Baking is required if conditions b) or c) are not respected
e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more