

保密等級：機密

SPECIFICATION

產品規格書

SKO.WB822CU.3 A22335

IEEE 802.11 a/b/g/n/ac 2T2R USB Wi-Fi Module

Integrated Bluetooth 2.1/3.0/4.2/5.0

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1. Introduction（簡介）

SKO.WB822CU.3 module is based on Realtek RTL8822CU-VB-CG solution. The Realtek RTL8822CU-VB-CG is a highly integrated single-chip that support 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) USB2.0 network interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The RTL8822CU provides a complete solution for a high-performance integrated wireless and Bluetooth device.

This documentation describes the engineering requirements specification.

SKO.WB822CU.3 模組基於 Realtek RTL8822CU-VB-CG 解決方案。Realtek RTL8822CU-VB-CG 是一款高度集成的晶片，支持雙頻 802.11ac 解決方案，擁有多用戶 MIMO（多輸入、多輸出）和無線 WLAN（WLAN）USB2.0 網路介面控制器，此晶片集成 WLAN MAC、支持 2T2R 的 WLAN 基帶和射頻電路。RTL8822CU 為高性能集成無線和藍牙設備提供了完整的解決方案。

本文檔描述了產品的設計要求規範。

2. Features（特性）

Reserving System 接收制式	IEEE Std. 802.11a
	IEEE Std. 802.11b
	IEEE Std. 802.11g
	IEEE Std. 802.11n
	IEEE Std. 802.11ac
	Bluetooth 2.1/3.0/4.2/5.0
Chip Solution 晶片方案	RTL8822CU-CG
Band 波段	2.4/5GHz
Dimensions 尺寸	70mm×30mm×5.6mm
Antenna 天線	Internal antenna
Installation Mode 安裝方式	外掛
Connector 連接器	9PIN-FCC-0.5mm

注：

板厚 1.6MM，CN5 連接器最大高度 2.2MM,遮罩高度 1.8MM

3. Block Diagram (結構框圖)

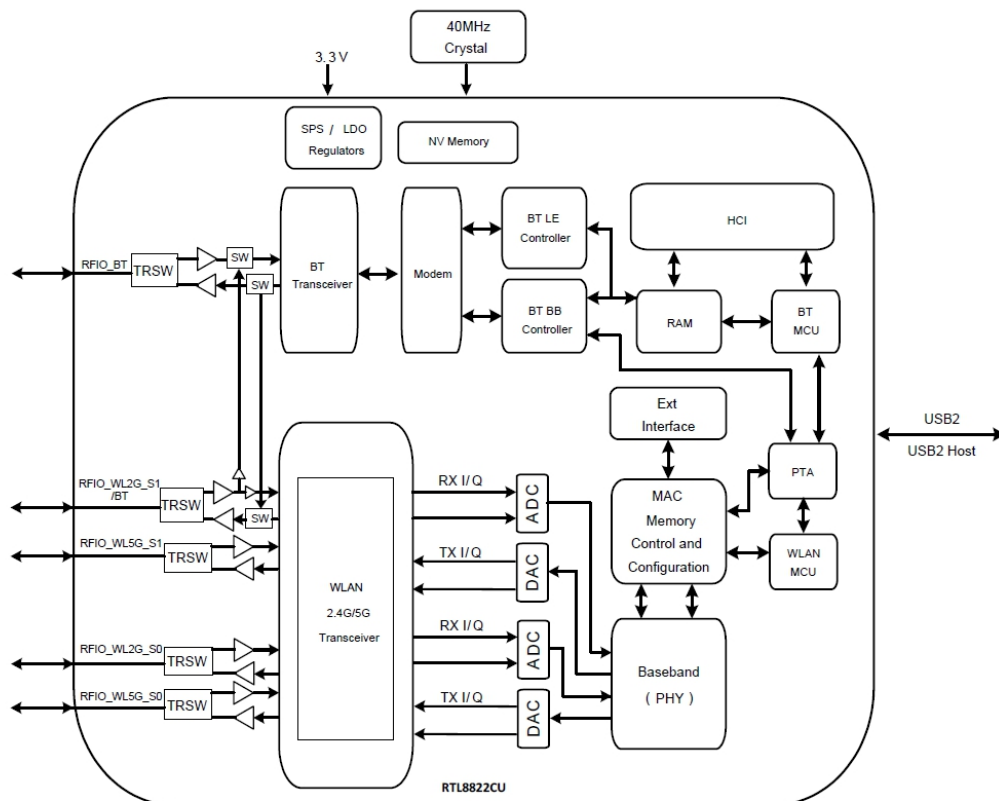
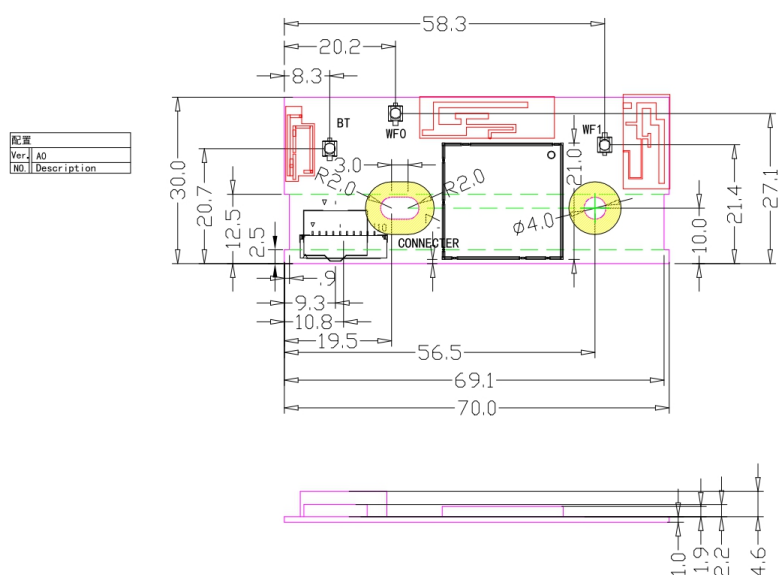


Figure 1. Dual-Band MIMO 2x2 Solution with Integrated Bluetooth Controller Solution

Figure 1 Block Diagram

4. Package Outline and Mounting (外形及安裝尺寸)



NOTE:

1. 除特殊说明区域, 板内顶层器件最高4.56mm, 底层器件最高0mm;
2. 螺丝 (包括螺帽) 选用需与板卡孔位及露铜匹配, 避免出现装配或电气不良。CVTE推荐: 螺帽直径至少为D+3mm (D为螺丝直径)。

5. Pin Definition (引腳定義)



模組正視圖

CONNECTOR	PIN	SYMBOL	DESCRIPTION
CN4 GH-10AWB-P	1	BT_HOST_WAKE	內部有 10K 上拉電阻，默認高電平，低電平有效 低電平藍牙喚醒主控
	2, 3	3.3V	3.3V
	4	DM	USB_DM
	5	DP	USB_DP
	7	Power_EN	內部有 10K 上拉電阻，默認高電平 低電平關閉模組供電
	9	WI_WAKE_H	內部有 10K 上拉電阻，默認高電平，低電平有效 低電平 WIFI 喚醒主控
	6,8,10	GND	GND
CN5 9PIN FFC 插座	1	GND	GND
	2	DP	USB_DP
	3	DM	USB_DM
	4,5,6	3.3V	3.3V
	7	WI_WAKE_H	內部有 10K 上拉電阻，默認高電平，低電平有效 低電平 WIFI 喚醒主控
	8	5V	5V
	9	GND	GND

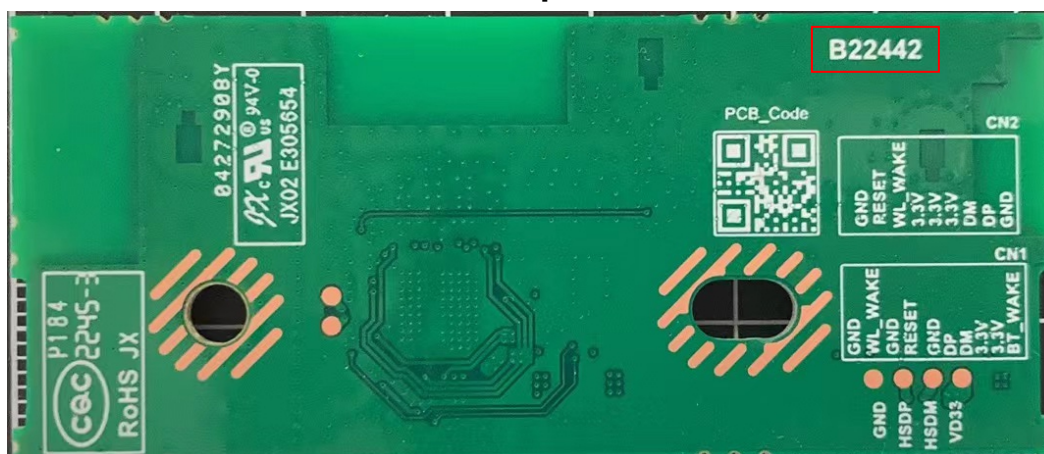
注：

默認配置為上表圖片，連接器為：CN5

6. Product Pictures（參考圖片）



正視圖（top view）



背視圖（bottom view）

絲印說明：

- （1）圖示紅色方框處的字元為產本機型：SKO.WB822CU.3，產品品週期號：B22442；

7. Key Materials（關鍵物料）

序號	關鍵件名稱	型號	規格/材料	備註
1	積體電路	RTL8822CU-VB-CG	QFN56	
2	PCB	SKO.WB822CU.3	FR-4,4LAY	
3	晶體振盪器	MDH 2.3.3.400001208	40MHz	
4	雙工器	SLFD18-5R950G-02T		

8. General Requirements (一般要求)

No.	Feature	Description
1	Operation Voltage 工作電壓範圍	3.3V+/-0.3
2	Current Consumption 最大電流	<1000mA
3	Ripple 紋波*	≤120mV
4	Operation Temperature 工作溫度範圍	0°C to +40°C
5	Antenna Type 天線類型	Internal WiFi antenna 1/ 內置 WIFI 天線 1 Internal WiFi antenna 2/ 內置 WIFI 天線 2 Internal BT antenna/ 內置藍牙天線
6	USB	High Speed USB 2.0 Interface
7	Storage Temperature 存儲溫度	-40°C to +125°C

*紋波：定義是主板給模組供電處的紋波要求

9. Electrical Characteristics (電氣特性)

除非另有說明，電氣規範試驗都在下列條件下進行：

環境條件溫度：25°C ± 5°C；

電源電壓：模組上輸入電壓 3.3V+/-0.3；

The Test for electrical specification was performed under the following condition unless otherwise specified:

Ambient condition Temperature :25°C ± 5°C；

Power supply voltages: 3.3V+/-0.3 input power at the Module；

Note: The channel 12-13 would be disabled when module used in America and Canada.

9.1 IEEE 802.11b Section

Items	Contents				
Specification	IEEE802.11b				
Mode	CCK				
Channel	CH1 to CH13				
Data rate	1, 2, 5.5, 11Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
1) For antenna port	15	17	19	dBm	
2. Spectrum Mask @ target power					
1) fc +/-11MHz to +/-22MHz	-	-	-30	dBr	
2) fc > +/-22MHz	-	-	-50	dBr	
3 Constellation Error(EVM)@ target power					
1) 1Mbps	-	-	-10	dB	
2) 2Mbps	-	-	-10	dB	

3) 5.5Mbps	-	-	-10	dB	
4) 11Mbps	-	-	-10	dB	
4. Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 1Mbps (FER $\leq$ 8%)	-	-	-83	dBm	
2) 2Mbps (FER $\leq$ 8%)	-	-	-80	dBm	
3) 5.5Mbps (FER $\leq$ 8%)	-	-	-79	dBm	
4) 11Mbps (FER $\leq$ 8%)	-	-	-76	dBm	
6 Maximum Input Level (FER $\leq$ 8%)	-10	-	-	dBm	

9.2 IEEE 802.11g Section

Items	Contents				
Specification	IEEE802.11g				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) For antenna port	13	15	17	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-20	dBr	
2) at fc +/-20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-40	dBr	
3 Constellation Error(EVM)@ target power					
1) 6Mbps	-	-	-5	dB	
2) 9Mbps	-	-	-8	dB	
3) 12Mbps	-	-	-10	dB	
4) 18Mbps	-	-	-13	dB	
5) 24Mbps	-	-	-16	dB	
6) 36Mbps	-	-	-19	dB	
7) 48Mbps	-	-	-22	dB	
8) 54Mbps	-	-	-25	dB	
4 Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 6Mbps (PER $\leq$ 10%)	-	-	-85	dBm	
2) 9Mbps (PER $\leq$ 10%)	-	-	-84	dBm	
3) 12Mbps (PER $\leq$ 10%)	-	-	-82	dBm	

4) 18Mbps (PER $\leq 10\%$)	-	-	-80	dBm	
5) 24Mbps (PER $\leq 10\%$)	-	-	-77	dBm	
6) 36Mbps (PER $\leq 10\%$)	-	-	-73	dBm	
7) 48Mbps (PER $\leq 10\%$)	-	-	-69	dBm	
8) 54Mbps (PER $\leq 10\%$)	-	-	-65	dBm	
6 Maximum Input Level (PER $\leq 10\%$)	-20	-	-	dBm	

9.3 IEEE 802.11n HT20 Section

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4GHz				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels					
1) For antenna port	12	14	16	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-20	dBm	
2) at fc +/-20MHz	-	-	-28	dBm	
3) at fc > +/-30MHz	-	-	-45	dBm	
3. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) MCS1	-	-	-10	dB	
3) MCS2	-	-	-13	dB	
4) MCS3	-	-	-16	dB	
5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-	-28	dB	
4. Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity (each chain)					
1) MCS0 (PER $\leq 10\%$)	-	-	-82	dBm	
2) MCS1 (PER $\leq 10\%$)	-	-	-79	dBm	
3) MCS2 (PER $\leq 10\%$)	-	-	-77	dBm	
4) MCS3 (PER $\leq 10\%$)	-	-	-74	dBm	
5) MCS4 (PER $\leq 10\%$)	-	-	-70	dBm	
6) MCS5 (PER $\leq 10\%$)	-	-	-66	dBm	
7) MCS6 (PER $\leq 10\%$)	-	-	-65	dBm	
8) MCS7 (PER $\leq 10\%$)	-	-	-64	dBm	

7. Maximum Input Level (PER $\leq 10\%$)	-20	-	-	dBm	
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9.4 IEEE 802.11n HT40 Section

Items	Contents				
Specification	IEEE802.11n HT40 @ 2.4GHz				
Mode	OFDM				
Channel	CH3 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port	12	14	16	dBm	
2. Spectrum Mask @target power					
1) at fc +/-22MHz	-	-	-20	dBr	
2) at fc +/-40MHz	-	-	-28	dBr	
3) at fc > +/-60MHz	-	-	-45	dBr	
3. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) MCS1	-	-	-10	dB	
3) MCS2	-	-	-13	dB	
4) MCS3	-	-	-16	dB	
5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-	-28	dB	
4. Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity (each chain)					
1) MCS0 (PER $\leq 10\%$)	-	-	-79	dBm	
2) MCS1 (PER $\leq 10\%$)	-	-	-76	dBm	
3) MCS2 (PER $\leq 10\%$)	-	-	-74	dBm	
4) MCS3 (PER $\leq 10\%$)	-	-	-71	dBm	
5) MCS4 (PER $\leq 10\%$)	-	-	-67	dBm	
6) MCS5 (PER $\leq 10\%$)	-	-	-63	dBm	
7) MCS6 (PER $\leq 10\%$)	-	-	-62	dBm	
8) MCS7 (PER $\leq 10\%$)	-	-	-61	dBm	
6. Maximum Input Level (PER $\leq 10\%$)	-20	-	-	dBm	

9.5 IEEE 802.11a Section

Items	Contents				
Specification	IEEE802.11a				
Mode	OFDM				
Channel	CH36 to CH165				
Data rate (MCS index)	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port	13	15	17	dBm	
2. Spectrum Mask @target power					
1) at fc +/-11MHz	-	-	-20	dBr	
2) at fc +/-20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-40	dBr	
3. Constellation Error(EVM)@ target power					
1) 6Mbps	-	-	-5	dB	
2) 9Mbps	-	-	-8	dB	
3) 12Mbps	-	-	-10	dB	
4) 18Mbps	-	-	-13	dB	
5) 24Mbps	-	-	-16	dB	
6) 36Mbps	-	-	-19	dB	
7) 48Mbps	-	-	-22	dB	
8) 54Mbps	-	-	-25	dB	
4 Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 6Mbps (PER ≤10%)	-	-	-82	dBm	
2) 9Mbps (PER ≤10%)	-	-	-81	dBm	
3) 12Mbps (PER ≤10%)	-	-	-79	dBm	
4) 18Mbps (PER ≤10%)	-	-	-77	dBm	
5) 24Mbps (PER ≤10%)	-	-	-74	dBm	
6) 36Mbps (PER ≤10%)	-	-	-70	dBm	
7) 48Mbps (PER ≤10%)	-	-	-66	dBm	
8) 54Mbps (PER ≤10%)	-	-	-65	dBm	
6. Maximum Input Level (PER ≤10%)	-30	-	-	dBm	

9.6 IEEE 802.11n HT20 Section(5GHz)

Items	Contents				
Specification	IEEE802.11n HT20 @ 5GHz				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH36 to CH165				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port	12	14	16	dBm	
2. Spectrum Mask @target power					
1) at fc +/-11MHz	-	-	-20	dBr	
2) at fc +/-20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-45	dBr	
3. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) MCS1	-	-	-10	dB	
3) MCS2	-	-	-13	dB	
4) MCS3	-	-	-16	dB	
5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-	-28	dB	
4. Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
6. Minimum Input Level Sensitivity (each chain)					
1) MCS0 (PER ≤10%)	-	-	-82	dBm	
2) MCS1 (PER ≤10%)	-	-	-79	dBm	
3) MCS2 (PER ≤10%)	-	-	-77	dBm	
4) MCS3 (PER ≤10%)	-	-	-74	dBm	
5) MCS4 (PER ≤10%)	-	-	-70	dBm	
6) MCS5 (PER ≤10%)	-	-	-66	dBm	
7) MCS6 (PER ≤10%)	-	-	-65	dBm	
8) MCS7 (PER ≤10%)	-	-	-64	dBm	
6. Maximum Input Level (PER ≤10%)	-30	-	-	dBm	

9.7 IEEE 802.11n HT40 Section(5GHz)

Items	Contents				
Specification	IEEE802.11n HT40 @ 5GHz				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH38 to CH163				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port	12	14	16	dBm	
2. Spectrum Mask @target power					
1) at fc +/-21MHz	-	-	-20	dBm	
2) at fc +/-40MHz	-	-	-28	dBm	
3) at fc > +/-60MHz	-	-	-45	dBm	
3. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) MCS1	-	-	-10	dB	
3) MCS2	-	-	-13	dB	
4) MCS3	-	-	-16	dB	
5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-	-28	dB	
4. Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
7. Minimum Input Level Sensitivity (each chain)					
1) MCS0 (PER ≤ 10%)	-	-	-79	dBm	
2) MCS1 (PER ≤ 10%)	-	-	-76	dBm	
3) MCS2 (PER ≤ 10%)	-	-	-74	dBm	
4) MCS3 (PER ≤ 10%)	-	-	-71	dBm	
5) MCS4 (PER ≤ 10%)	-	-	-67	dBm	
6) MCS5 (PER ≤ 10%)	-	-	-63	dBm	
7) MCS6 (PER ≤ 10%)	-	-	-62	dBm	
8) MCS7 (PER ≤ 10%)	-	-	-61	dBm	
6. Maximum Input Level (PER ≤ 10%)	-30	-	-	dBm	

9.8 IEEE 802.11ac Section(5GHz)

Items	Contents					
Specification	IEEE802.11ac					
Mode	BPSK, QPSK, 16QAM, 64QAM ,256QAM and OFDM					
Channel	CH36 to CH165 VHT20 CH38 to CH163 VHT40 CH42 to CH157 VHT80					
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9					
	Min.	Typ.	Max.		Unit	Remark
TX Characteristics	Min.	Typ.	Max.		Unit	
1. Power Levels (Calibrated)						
1) For antenna port	12	14	16		dBm	
2. Spectrum Mask @VHT20/VHT40/VHT80 target power						
1) at fc +/-11MHz/21MHz/41MHz	-	-	-20		dBr	
2) at fc +/-20MHz/40MHz/80MHz	-	-	-28		dBr	
3) at fc +/-30MHz/60MHz/120MHz	-	-	-40		dBr	
3. Constellation Error(EVM)@ target power						
1) MCS0	-	-	-5		dB	
2) MCS1	-	-	-10		dB	
3) MCS2	-	-	-13		dB	
4) MCS3	-	-	-16		dB	
5) MCS4	-	-	-19		dB	
6) MCS5	-	-	-22		dB	
7) MCS6	-	-	-25		dB	
8) MCS7	-	-	-27		dB	
9) MCS8	-	-	-30		dB	
10) MCS9	-	-	-32		dB	
4. Frequency Error	-20	-	20		ppm	
RX Characteristics	Min.	Typ.	Max.		Unit	
5.Minimum Input Level Sensitivity (each chain)			VHT 20	VHT 40	VHT 80	
1) MCS0 (PER ≤10%)	-	-	-82	-79	-76	dBm
2) MCS1 (PER ≤10%)	-	-	-79	-76	-73	dBm
3) MCS2 (PER ≤10%)	-	-	-77	-74	-71	dBm
4) MCS3 (PER ≤10%)	-	-	-74	-71	-68	dBm
5) MCS4 (PER ≤10%)	-	-	-70	-67	-64	dBm
6) MCS5 (PER ≤10%)	-	-	-66	-63	-60	dBm
7) MCS6 (PER ≤10%)	-	-	-65	-62	-59	dBm

8) MCS7 (PER $\leq 10\%$)	-	-	-64	-61	-58	dBm	
9) MCS8(PER $\leq 10\%$)	-	-	-59	-56	-53	dBm	
10) MCS9(PER $\leq 10\%$)	-	-	-57	-54	-51	dBm	
6. Maximum Input Level (PER $\leq 10\%$)	-30	-	-			dBm	

9.9 Bluetooth Section

Items	Contents				
Specification	BT2.1+EDR/4.2/5.0				
Mode	FHSS,GFSK,DPSK,DQPSK				
Number of Channel	40 channels; 79 channels				
Frequency Band	2.402 GHz ~2.480GHz				
	Min.	Typ.	Max.	Unit	Remark
1. Output Power		4	-	dBm	
2. Gain step	2	4	8	dB	
3. Receiver sensitivity					
1). Enhanced data rate receiver specifications (BER $\leq 0.1\%$)	-	-86.5	-80	dBm	
2). Basic rate receiver specifications (BER $\leq 0.1\%$)	-	-93.5	-80	dBm	
3). Bluetooth LE receiver specifications (PER < 30.8%)	-	-93.5	-80	dBm	
4. Maximum usable signal (BER $\leq 0.1\%$)	-	-5	-		
5. C/I co-channel (BER<0.1%)	-	4	11	dB	
6. C/I 1MHz (BER<0.1%)	-	-14	0	dB	
7. C/I 2MHz (BER<0.1%)	-	-42	-30	dB	
8. C/I ≥ 3 MHz (BER<0.1%)	-	-49	-40	dB	
9. C/I Image channel (BER<0.1%)	-	-25	-9	dB	
10. C/I Image 1MHz (BER<0.1%)	-	-50	-20	dB	
11. Inter-modulation	-	-13	-	dB	
12. Out-of-band blocking					
1). 30MHz to 2000MHz	-10	-	-	dBm	
2). 2000MHz to 2399MHz	-27	-	-	dBm	
3). 2498MHz to 3000MHz	-27	-	-	dBm	
4). 3000MHz to 12.75GHz	-10	-	-	dBm	
13. Modulation characteristics					
1). Δf_{1avg}	140	157	175	KHz	
2). Δf_{2max} (For at least 99.9% of all Δf_{2max})	115	140	-	KHz	
3). $\Delta f_{1avg} / \Delta f_{2avg}$	0.8	0.98	-	KHz	
14. ICFT	-75	± 20	+75	KHz	
15. Carrier frequency drift					
1). One slot packet (DH1)	-25	± 15	+25	KHz	

2). Two slot packet (DH3)	-40	±15	+40	KHz	
3). Five slot packet (DH5)	-40	±15	+40	KHz	
4). Max drift rate	-	6	20	KHz/50us	
16. TX output spectrum(20dB bandwidth)	-	922	1000	KHz	
17. In-Band spurious emission					
1). ±2MHz offset	-	-45	-20	dBm	
2). ±3MHz offset	-	-48	-40	dBm	
3). >±3MHz offset	-	-48	-40	dBm	

10. Reference Design (參考設計)

10.1 Reference Schematic (參考原理圖)

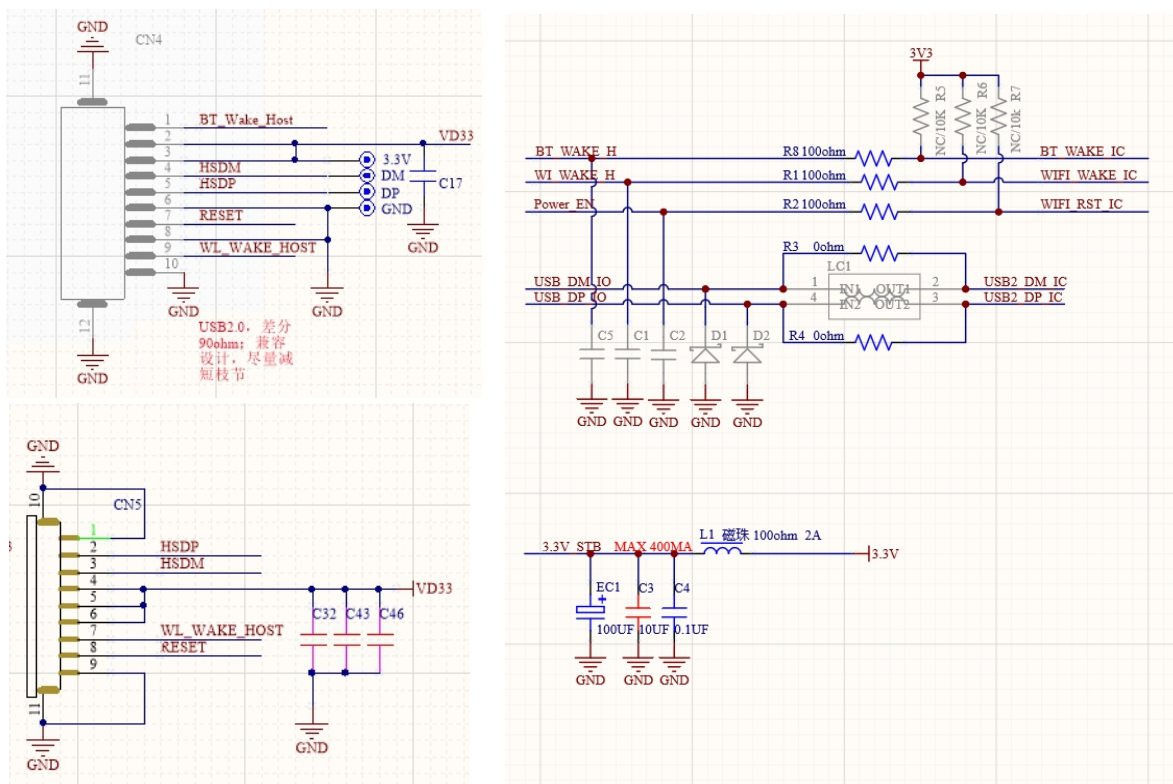


圖 10-1 參考原理圖

設計注意事項:

- 1.BT_WAKE_HOST/WIFI_WAKE_HOST WIFI_RST 內部上拉 10K,外部相容 10K 上拉,根據走線選擇上件。
- 2.USB2_DM/USB2_DP USB2.0 介面模組內部阻抗控 90Ω, 外部相容共模電感 LC1/0Ω設計。
- 3.電容 C1/C2/C5/ TVS D1/D2 0402 封裝兼容設計
- 4.電源電路 L1/EC1/C3/C4 可根據實際紋波情況上件, 雙天線 MIMO 發射, 電流較大。
5. 3.3V 上拉電源使用需要注意, 防止防止模組斷電, 晶片電流倒灌。

11. Mechanical, Environmental and Reliability Tests

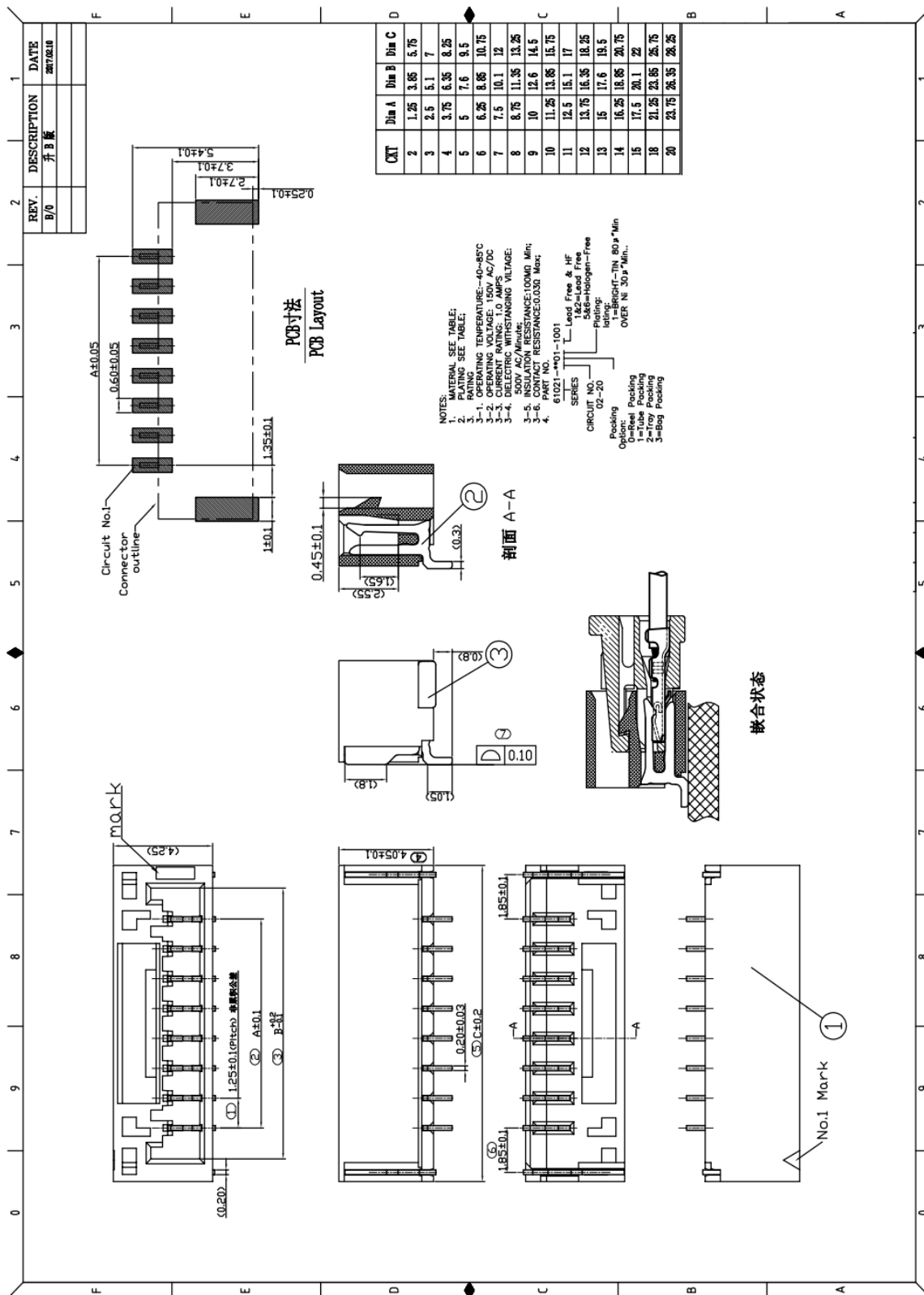
(機械、環境和可靠性測試)

Test Items		Test Conditions	Qty	Criteria Condition
11-1	Drop test	The packed samples was tested at below condition: Drop height: 760mm(0.5~9.5kg) 610mm(9.5~18.5kg) Drop time: 1x corner, 3x edge and 6x face.	1xBox	After test, the outer box and inner box will not been broken by appearance visual inspection, and the products should be ok.
11-2	Vibration test	X-Y-Z direction, first Frequency changing from 10Hz to 30Hz to 10Hz, amplitude 2.0mm, 5 times vibrations, 5x times vibration.	1xBox	After test, the outer box and inner box will not been broken by appearance visual inspection and the products should be ok.
11-3	Soldering ability test (Only for SKI module)	Soldering temperature: 245±5℃ Soldering duration: 3±0.5S	3	1. After soldering, the soldered area must be covered by a smooth bright solder layer, some deficiencies such as a small amount of the pinhole, not wetting are allowed, but the deficiencies can not be in the same place; 2. At least 90% of soldered area shall be covered continuously by the soldering material.
11-4	High Temperature and Humidity Operation Test	Leave samples in 60℃, 90% RH @ 24 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-5	Low Temperature Operation Test	Leave samples in -15℃ @24 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-6	High Temperature and Humidity	Leave samples in 60℃, 90% RH for 4x hours	4	After test, power on and off the samples for 3x tiems, the samples should be able to start normally

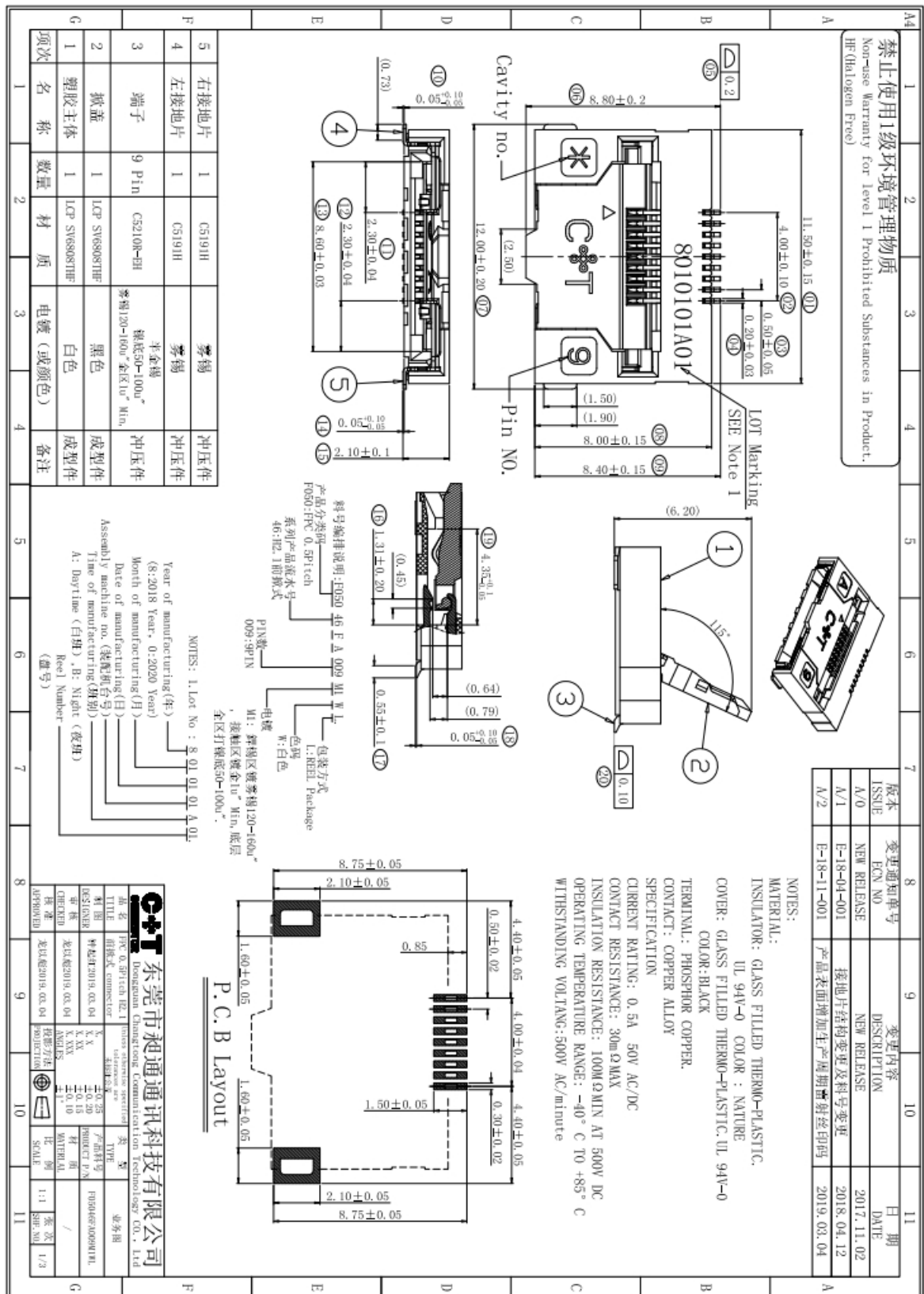
	Start Test			
11-7	Low temperature start test	Leave samples in -15℃ for 4x hours	4	After test, power on and off the samples for 3x tiems, the samples should be able to start normally
11-8	High Temperature and Humidity Storage Test	Leave samples in 85℃, 95% RH @ 48 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-9	Low Temperature Storage Test	Leave samples in -40℃, @48 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-10	Thermal Shock Test	-40~85℃, dwell time: 30min, 50cycles	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-11	Aging Test	60℃, 120Hrs	10	The products at high temperature for a long time can continuous work normally
11-12	Salt spray test	NSS,35C,PH:6.5~7.2, 24H	2	The Sample shall has no minor or major defects, such as physical damage, crack, corrosion, deformation etc;
11-13	ESD	Discharge voltage: 1kV C: 50pF Discharge resistance: 330Ω Positive10 times 1 time for each second	3	The products can recoverable smoothly after ESD test.

12. Connector (连接器)

12.1 CN4 GH-10AWB-P 圖紙

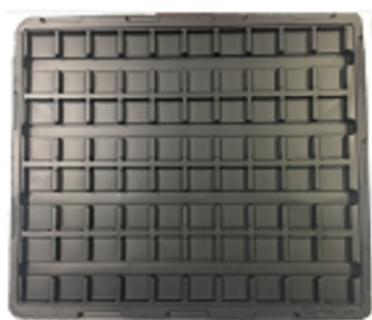
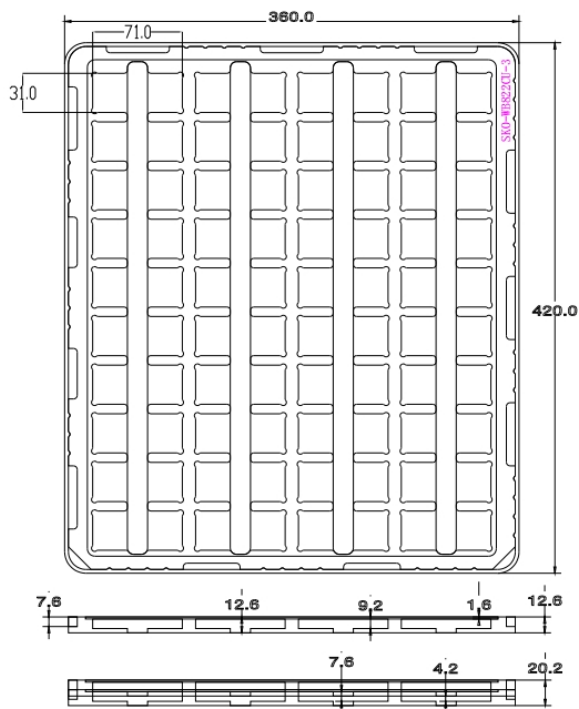


12.2 CN5 9PIN FFC 插座圖紙

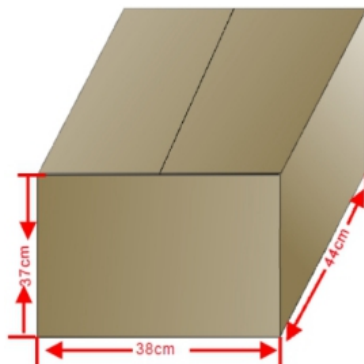


13. Package (包裝)

(1) 託盤或者編帶尺寸示意圖



(2) 外箱尺寸



(3) 包裝數量

40pcs/盤 * 43 盤/箱=1720pcs/箱

本產品的型號核准代碼標識在產品後標牌上

警語：**1. 根據低功率射頻器材技術規範：**

取得審驗證明之低功率射頻器材，非經核准，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。低功率射頻器材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。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材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。

2. 應避免影響附近雷達系統之操作。**3. 高增益指向性天線只得應用於固定式點對點系統。****4. 本模組於取得認證後，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 XXXyyyLPDzzzz-x。****FCC Statement:**

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.

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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

List of applicable FCC rules

This module has been tested and found to comply with part 15 requirements for Modular Approval.

Antenna Placement Within the Host Platform

The module is tested for standalone mobile RF exposure use condition.

(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.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Antenna Type and Gain

The following antennas have been certified for use with this module.

Only antennas of the same type with equal or lower gain may also be used with this module.

Other types of antennas and/or higher gain antennas may require the additional authorization for operation.

Antenna Specification list below:

Antenna Type	Frequency Bands (MHz)	Max. Antenna Gain (dBi)
PCB	2400 ~ 2483.5 (BT)	0.23
PCB	2400 ~ 2483.5 (WiFi)	1.61
PCB	5150 ~ 5850 (WiFi)	2.7

End Product Labeling

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: 2AR82-SKOWB822CU3". The FCC ID can be used only when all FCC compliance requirements are met.

The end product shall bear the following 15.19 statement: 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.

Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) class II permissive change re-evaluation or new certification.

Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Important Note

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

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 host integrator must follow the integration instructions provided in this document and ensure that the composite-system end product complies with the requirements by a technical assessment or evaluation to the rules and to KDB Publication 996369.

The host integrator installing this module into their product must ensure that the final composite product complies with the requirements by a technical assessment or evaluation to the rules, including the transmitter operation and should refer to guidance in KDB 996369.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF

essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment

ISED Statement:

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003.

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

- 1) This device may not cause interference, and
- 2) This device must accept any interference, including interference that may cause undesired operation of the device.

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:

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

RF Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

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.

Déclaration d'exposition aux radiations:

Cet appareil est conforme aux limites d'exposition aux rayonnements définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de XX centimètres entre le radiateur et votre corps.

Le fonctionnement dans la bande 5150-5250 MHz est uniquement destiné à une utilisation en intérieur afin de réduire le potentiel d'interférences nuisibles aux systèmes mobiles par satellite dans le même canal.

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna.

As long as above conditions is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

- 1) Operation shall be limited to indoor use only; and
- 2) Operation on oil platforms, cars, trains, boats and aircraft shall be prohibited except for on large aircraft flying above 10,000 ft.
- 3) This device is limited to under control an indoor access point or an indoor subordinate device and shall not be capable of initiating a network.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

- 1) *Utilisation limitée à l'intérieur seulement;*
- 2) *Utilisation interdite à bord de plateformes de forage pétrolier, de voitures, de trains, de bateaux et d'aéronefs, sauf à bord d'un gros aéronef volant à plus de 10 000 pieds d'altitude.*
- 3) *Ce dispositif est limité à un point d'accès à l'intérieur ou à un dispositif subordonné à l'intérieur et ne doit pas être capable d'initier un réseau.*

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

Required end product labeling:

This transmitter module is authorized only for use in device where the antenna may be installed and operated with greater than 20cm between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: 24728-SKOWB822CU3".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un appareil où l'antenne peut être installée et utilisée à plus de XX cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 24728-SKOWB822CU3".

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 show in this manual.

The following text, or an equivalent notice, that shall be displayed in a conspicuous location, either in the user manual or on the device, or both:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- 1) This device may not cause interference.
- 2) This device must accept any interference, including interference that may cause undesired operation of the device.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

l'énoncé qui suit, ou l'équivalent, à un endroit bien en vue dans le manuel d'utilisation ou sur l'appareil, ou encore aux deux endroits :

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. *L'appareil ne doit pas produire de brouillage;*
2. *L'appareil doit accepter toute interférence, y compris toute interférence pouvant entraîner un fonctionnement indésirable du dispositif.*

Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

This radio transmitter has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna Specification list below:

Antenna Type	Frequency Bands (MHz)	Max. Antenna Gain (dBi)
PCB	2400 ~ 2483.5 (BT)	0.23
PCB	2400 ~ 2483.5 (WiFi)	1.61
PCB	5150 ~ 5850 (WiFi)	2.7

ANTENNE

Les antennes suivantes ont été certifiées pour une utilisation avec ce module; des antennes du même type à gain égal ou inférieur peuvent également être utilisées avec ce module. L'antenne doit être installée de telle sorte que 20 cm puissent être maintenus entre l'antenne et les utilisateurs.

Cet émetteur radio a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous, avec le gain maximal autorisé indiqué. Les types d'antenne non inclus dans cette liste qui ont un gain supérieur au gain maximum indiqué pour tout type répertorié sont strictement interdits pour l'utilisation avec cet appareil.