

保密等级：机密

# SPECIFICATION

## 产品规格书

### SKI.WB800DU1.5

IEEE 802.11b/g/n/ax 1T1R USB Wi-Fi Module

Integrated BT 5.0

Approved by Shikun		
Checked by 审核	Rechecked by 复审	Approved by 批准

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Comments 确认意见	Approved by 批准签字	Company's seal 盖章
Customer's Name:		

## REVISION HISTORY.

VERSION	DATE	BOARD ID	PAGE	DESCRIPTION	AUTHOR
V0.1	2021.5.25	SKI.WB800DU1.5	All	First Issued	
V0.2	2021.6.28	SKI.WB800DU1.5	3	Modify PIN SET	

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## 1. Introduction (简介)

SKI.WB800DU1.5 module is based on AICSEMI AIC8800D solution. SKI.WB800DU1.5 is a Wi-Fi 6 / BT 5.0 combo low-power, high-performance and high-integrated wireless communication module which is designed for meeting the customers' needs of small size and low cost. This module supports both WLAN and BT functions. Its WLAN/BT function supports the USB 2.0 interface, and its BT function supports the USB 2.0/UART interface, and the module meets the requirements of standard protocol IEEE 802.11 b/g/n/ax. Such units as power management, power amplifier and low-noise amplifier are integrated in the main chip of the module. Its WLAN PHY rate is up to 266.8Mbps@TX. The module can be applied in smart sound boxes, set-top boxes, game machines, printers, IP cameras, tachographs, and other smart equipment. This documentation describes the engineering requirements specification.

SKI.WB800DU1.5 模块基于爱科微 AIC8800D 方案。SKI.WB800DU1.5 是一款 Wi-Fi 6 / BT 5.0 组合的低功耗、高性能、高集成度无线通信模块，专为满足客户小尺寸、低成本的需求而设计。该模块支持 WLAN 和 BT 功能。WLAN/BT 功能支持 USB 2.0 接口，BT 功能支持 USB 2.0/UART 接口，满足 IEEE 802.11 b/g/n/ax 标准协议要求。本文档描述了工程要求规范。

## 2. Features (特性)

	IEEE Std. 802.11b
	IEEE Std. 802.11g
	IEEE Std. 802.11n
	IEEE Std. 802.11ax
	BT 5.0
<b>Chip Solution 芯片方案</b>	AIC8800D
<b>Band 波段</b>	2.4GHz
<b>Dimensions 尺寸</b>	13mm×12.3mm×1.95mm

<b>Model 型号</b>	<b>Installation Mode 安装方式</b>	<b>Protocol I 支持标准</b>	<b>Frequency 频段</b>	<b>Antenna 天线</b>	<b>Remark 备注</b>
SKI.WB800DU1.5	SMD	IEEE 802.11b/g/n/ax BT 5.0	2.4GHz	Stamp Hole*2	13mm×12.3mm ×1.95mm

### 3. Block Diagram (结构框图)

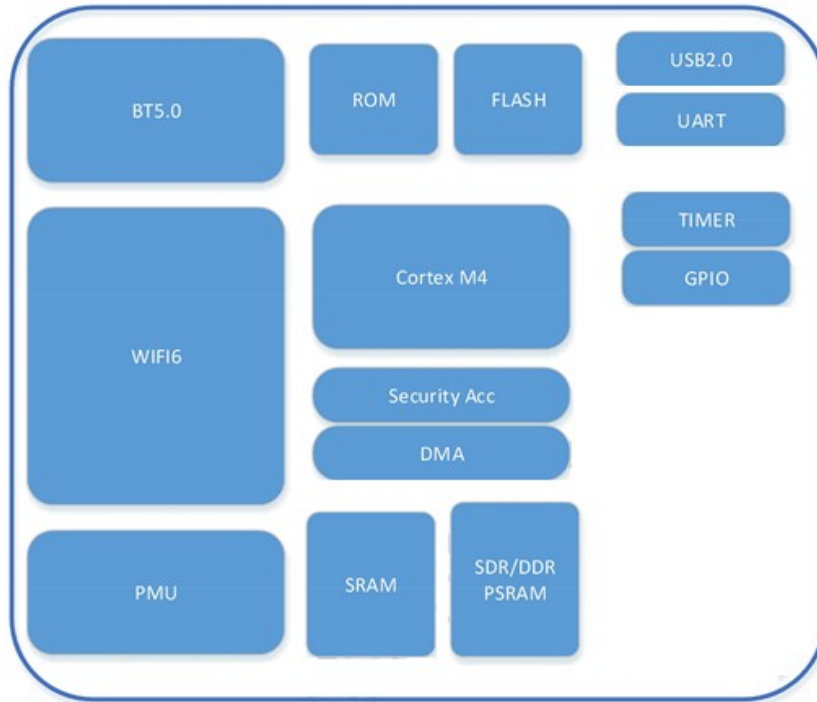
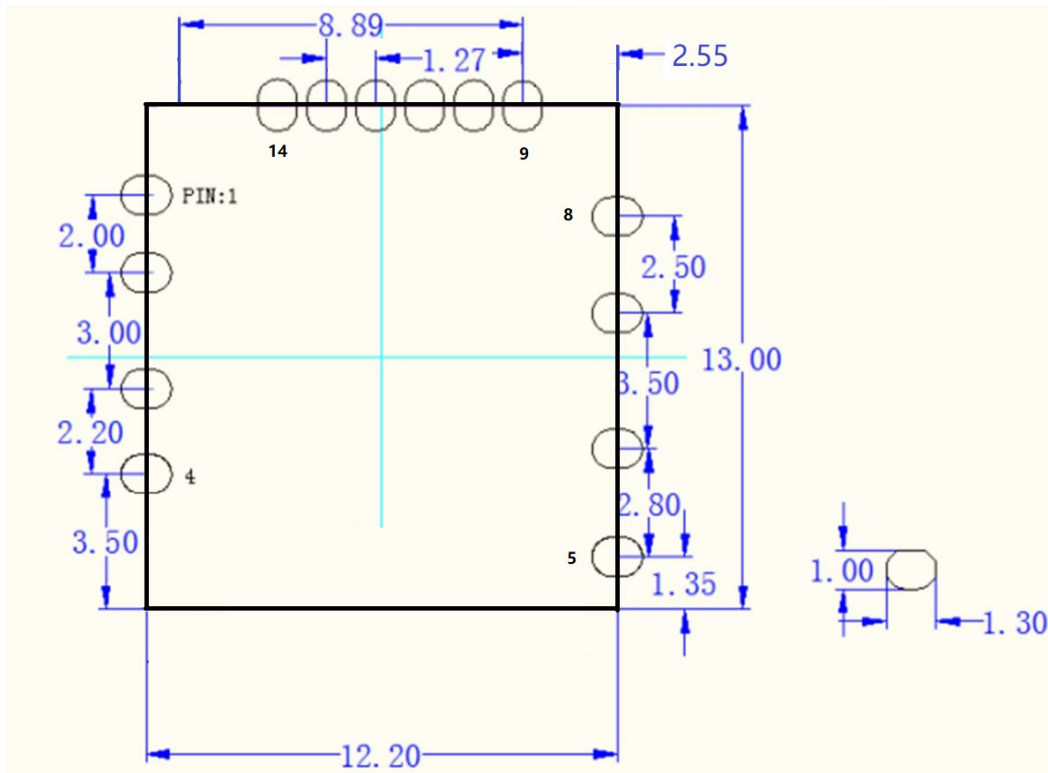


Figure 1 SKI.WB800DU1.5 Block Diagram

### 4. Package Outline and Mounting (外形及安装尺寸)



模组正视图

## 5. Pin Definition (引脚定义)

PIN	SYMBOL	Type	DESCRIPTION
1	GND	G	Grounded
2	MAIN_ANT	RF I/O	WLAN/BT RF I/O Port
3	BT_ANT	RF I/O	BT RF I/O Port
4	GND	G	Grounded
5	3V3	P	Voltage Input of Main Power Supply
6	HSDM	I/O	USB DM Pin
7	HSDP	I/O	USB DP Pin
8	GND	G	Grounded
9	UART0_TX	O	Debug Port
10	UART0_RX	I	Debug Port
11	UART1_RTS	I	BT UART Port
12	UART1_CTS	O	BT UART Port
13	UART1_TX	O	BT UART Port
14	UART1_RX	I	BT UART Port

## 6. Product Pictures (实物图片)

正视图 (top view)

## 7. Key Materials (关键物料)

序号	关键件名称	型号	规格/材料	备注
1	集成电路	AIC8800D	48-QFN	
2	PCB	SKI.WB800DU1.5	FR-4,4LAY	
3	晶体振荡器	CN4026M00012T2115181	26MHz	

## 8. General Requirements (一般要求)

No.	Feature	Description
8-1	Operation Voltage 工作电压范围	3.3V+/-0.3
8-2	Current Consumption 最大电流	TBD
8-3	Ripple 纹波	TBD
8-4	Operation Temperature 工作温度范围	-20°C to +80°C
8-5	Antenna Type 天线类型	External antenna
8-6	SDIO 2.0/USB2.0/UART Interface	SDIO 2.0/USB2.0/UART 接口
8-7	Storage Temperature 存储温度	-40°C to +85°C

## 9. Electrical Characteristics (电气特性)

除非另有说明，电气规范试验都在下列条件下进行：

环境条件温度：25°C ± 5°C；

电源电压：模块输入电压 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；

### 9.1 IEEE 802.11b Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11b				
Mode	DSSS				
Channel	CH1 to CH13				
Data rate	1, 11Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
1) For antenna port (DSSS 11M)		20		dBm	
2. Spectrum Mask @ target power					
1) fc +/-11MHz to +/-22MHz	-	-	-	dBr	
2) fc > +/-22MHz	-	-	-	dBr	
3 Constellation Error(EVM)@ target power					
1) 1Mbps	-	-	-9.11	dB	
2) 11Mbps	-	-	-9.11	dB	
4. Frequency Error	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 1Mbps (FER ≤8%)	-	-98	-	dBm	
4) 11Mbps (FER ≤8%)	-	-90	-	dBm	
6 Maximum Input Level (FER ≤8%)	-	-	-	dBm	

## 9.2 IEEE 802.11g Section(2.4GHz)

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 (54M)		18		dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-	dBr	
2) at fc +/-20MHz	-	-	-	dBr	
3) at fc > +/-30MHz	-	-	-	dBr	
3 Constellation Error(EVM)@ target power					
1) 6Mbps	-	-	-5	dB	
2) 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%)	-	-94	-	dBm	
8) 54Mbps (PER ≤10%)	-	-76.5	-	dBm	
6 Maximum Input Level (PER ≤10%)	-	-	-	dBm	



### 9.3 IEEE 802.11n HT20 Section(2.4GHz)

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 (MCS7)		18		dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-	dBr	
2) at fc +/-20MHz	-	-	-	dBr	
3) at fc > +/-30MHz	-	-	-	dBr	
3. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) 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%)	-	-	-93.5	dBm	
2) MCS7 (PER $\leq$ 10%)	-	-	-74.5	dBm	
7. Maximum Input Level (PER $\leq$ 10%)	-20	-	-	dBm	

## 9.4 IEEE 802.11n HT40 Section(2.4GHZ)

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 (MCS7)		18		dBm	
2. Spectrum Mask @target power					
1) at fc +/-22MHz	-	-	-	dB	
2) at fc +/-40MHz	-	-	-	dB	
3) at fc > +/-60MHz	-	-	-	dB	
3. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) MCS3	-	-	-16	dB	
3) 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%)	-	-	-90	dBm	
2) MCS3 (PER $\leq$ 10%)	-	-	-71	dBm	
3) MCS7 (PER $\leq$ 10%)	-	-	-65	dBm	
6. Maximum Input Level (PER $\leq$ 10%)	-20	-	-	dBm	

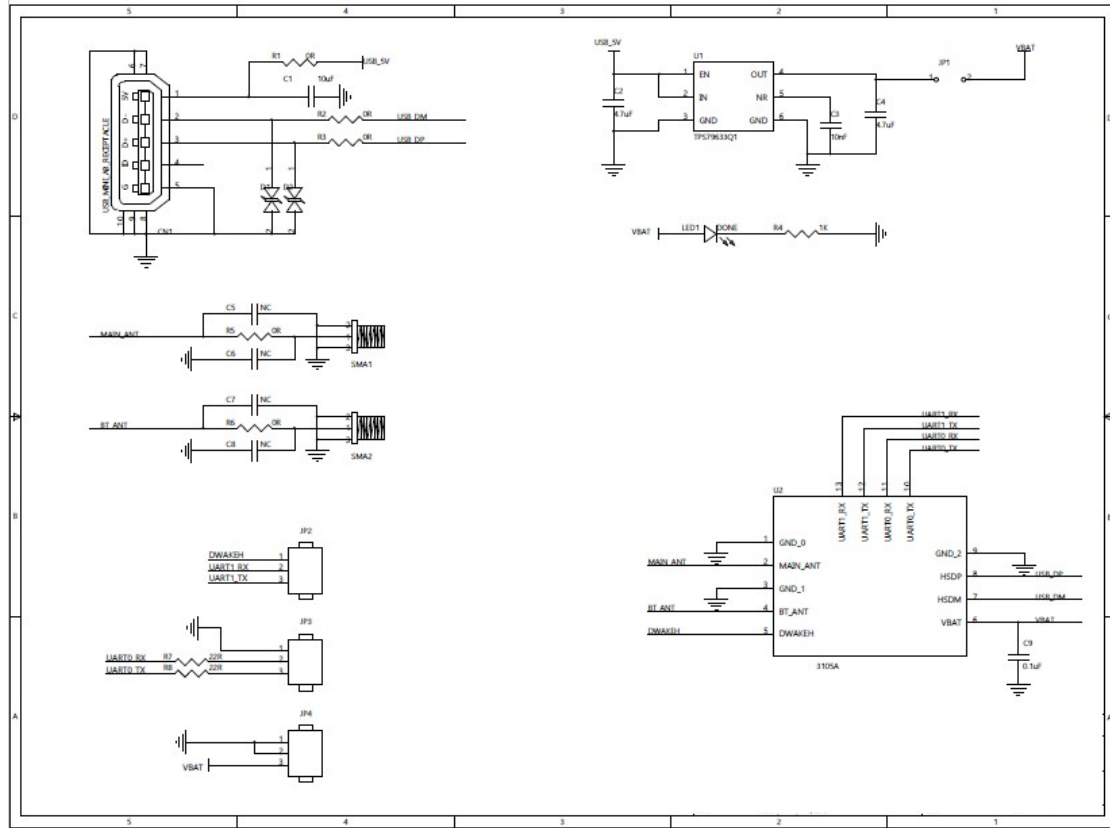
## 9.5 IEEE 802.11ax Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11ax				
Mode	BPSK, QPSK, 16QAM, 64QAM,256QAM, 1024QAM and OFDMA				
Channel	HE20: CH1 to CH13 HE40: CH3 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11				
TX Characteristics	Min.	Typ.	Max.		Unit
1. Power Levels (Calibrated)					
1) For antenna port (MCS11)		12			dBm
2. Spectrum Mask @VHT20/VHT40/VHT80 target power					
1) at fc +/-11MHz/21MHz/41MHz	-	-	-		dBr
2) at fc +/-20MHz/40MHz/80MHz	-	-	-		dBr
3) at fc +/-30MHz/60MHz/120MHz	-	-	-		dBr
3. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5		dB
2) MCS7	-	-	-28		dB
3) MCS8	-	-	-30		dB
4) MCS9	-	-	-32		dB
4. Frequency Error	-20	-	20		ppm
RX Characteristics	Min.	Typ.	Max.		Unit
5. Minimum Input Level Sensitivity (each chain)			HE20	HE40	
1) MCS0 (PER ≤10%)	-	-	-93.5	-91	dBm
2) MCS7 (PER ≤10%)	-	-	-74.5	-73.5	dBm
3) MCS8(PER ≤10%)	-	-	-70.5	-68.5	dBm
4) MCS9(PER ≤10%)	-	-	-68.5	-65.5	dBm
6. Maximum Input Level (PER ≤10%)	-30	-	-		dBm

## 9.6 Bluetooth Section

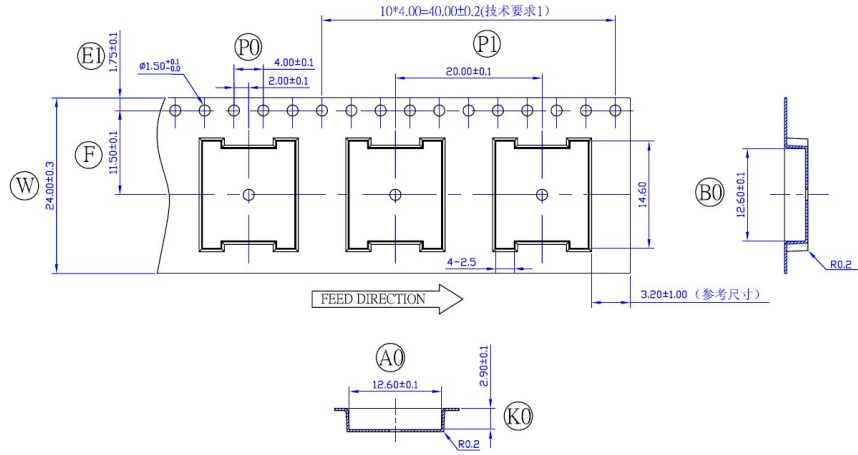
Items	Contents				
Specification	BT2.1+EDR/4.2/5.0 with BLE				
Mode	FHSS,GFSK,DPSK,DQPSK				
Number of Channel	79 Channels				
Frequency Band	2.402 GHz ~2.480GHz				
	Min.	Typ.	Max.	Unit	Remark
1. Output Power	-	13	-	dBm	
2. Gain step	-	1	-	dB	
3. Receiver sensitivity (BER $\cong$ 0.1%)	-107	-	-88	dBm	
4. Maximum usable signal (BER $\cong$ 0.1%)	-	-	-		
5. C/I co-channel (BER<0.1%)	-	-	-	dB	
6. C/I 1MHz (BER<0.1%)	-	-	-	dB	
7. C/I 2MHz (BER<0.1%)	-	-	-	dB	
8. C/I $\geq$ 3MHz (BER<0.1%)	-	-	-	dB	
9. C/I Image channel (BER<0.1%)	-	-	-	dB	
10. C/I Image 1MHz (BER<0.1%)	-	-	-	dB	
11. Inter-modulation	-	-	-	dB	
12. Out-of-band blocking					
1). 30MHz to 2000MHz	-	-	-	dBm	
2). 2000MHz to 2399MHz	-	-	-	dBm	
3). 2498MHz to 3000MHz	-	-	-	dBm	
4). 3000MHz to 12.75GHz	-	-	-	dBm	
13. Modulation characteristics					
1). $\Delta f_{1avg}$			-	KHz	
2). $\Delta f_{2max}$ (For at least 99.9% of all $\Delta f_{2max}$ )			-	KHz	
3). $\Delta f_{1avg} / \Delta f_{2avg}$			-	KHz	
14. ICFT				KHz	
15. Carrier frequency drift					
1). One slot packet (DH1)				KHz	
2). Two slot packet (DH3)				KHz	
3). Five slot packet (DH5)				KHz	
4). Max drift rate				KHz/50us	
16. TX output spectrum(20dB bandwidth)				KHz	
17. In-Band spurious emission					
1). $\pm 2$ MHz offset				dBm	
2). $\pm 3$ MHz offset				dBm	
3). $> \pm 3$ MHz offset				dBm	

## 10. Reference Design (参考设计)

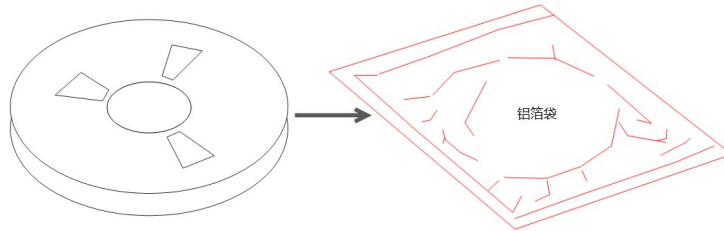


## 11. Package (包装)

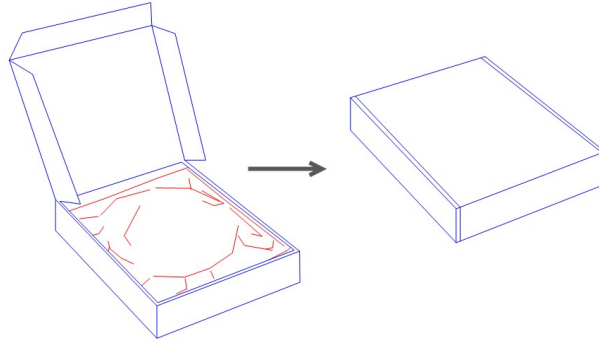
(1) 编带包装



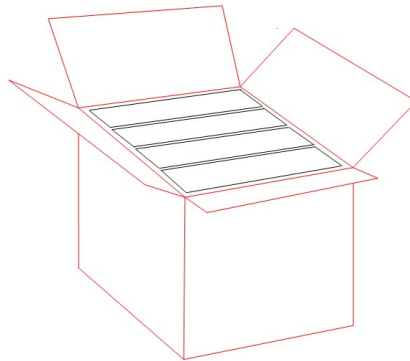
(2) 胶带包装



(3) 内盒包装



(4) 外箱包装 354\*250\*362mm



(5) 最小包装量 1000PCS/盘\*4 盘/箱=4000PCS/箱