保密等级：机密

SPECIFICATION

产品规格书

SKI.WB800DS1.2

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

Integrated BT 5.0

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

Please send the original back to us after you have approved and signed.

客户承认签章后敬请寄回正本一份。

Approved by customer		
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	2021.4.25	SKI.WB800DS1.2	All	First Issued	
V0.2	2021.5.28	SKI.WB800DS1.2	All	Update Pin Description	

Content

1. Introduction（简介）

SKI.WB800DS1.2 module is based on AICSEMI AIC8800M solution.SKI.WB800DS1.2 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 / SDIO 2.0 interface, and its BT function supports the UART/PCM 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.WB800DS1.2 模块基于爱科微 AIC8800M 方案。SKI.WB800DS1.2 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 / SDIO 2.0 接口，BT 功能支持 UART/PCM 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
Chip Solution 芯片方案	AIC8800D
Band 波段	2.4GHz
Dimensions　尺寸	12mm×12mm×1.8mm

Model **型号**	**Installation Mode** **安装方式**	**Protocol l** **支持标准**	**Frequency** **频段**	**Antenna** **天线**	**Remark** **备注**
SKI.WB800DS1.2	SMD	IEEE 802.11b/g/n/ax BT 5.0	2.4GHz	Stamp Hole*1	12mm×12mm×1.8mm

3. Block Diagram（结构框图）

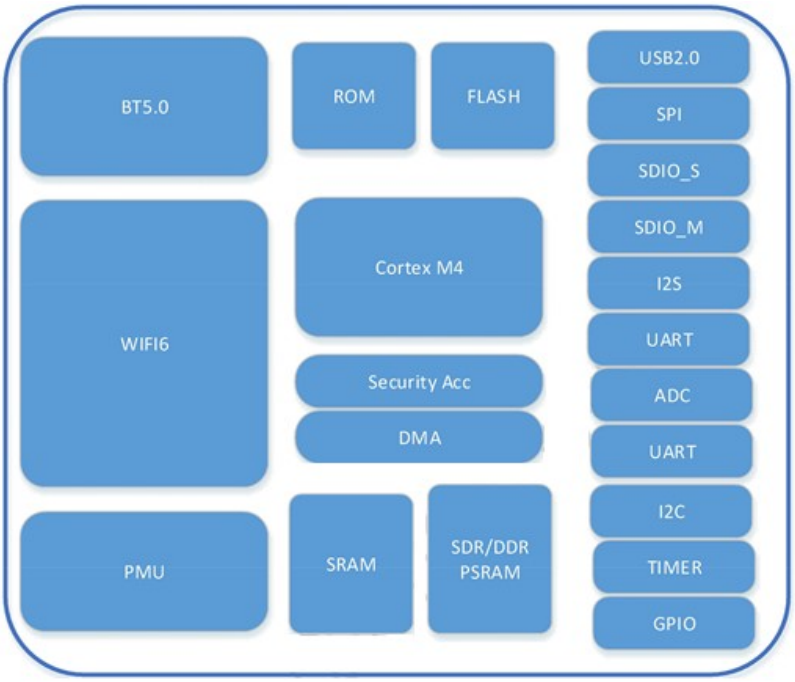
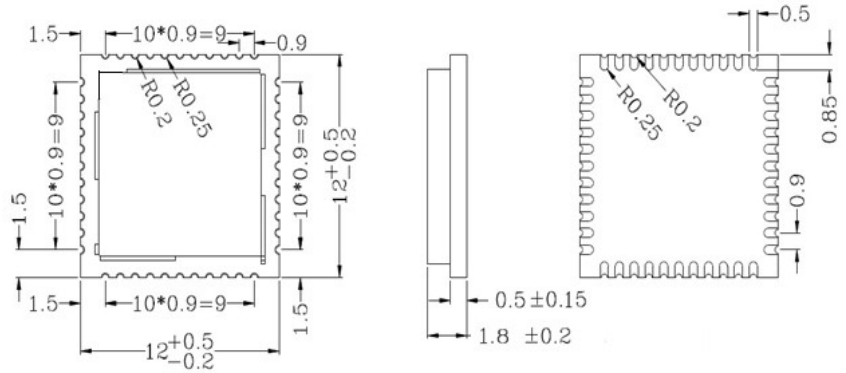
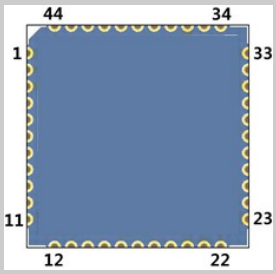


Figure 1 SKI.WB800DS1.2 Block Diagram

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



5. Pin Definition（引脚定义）

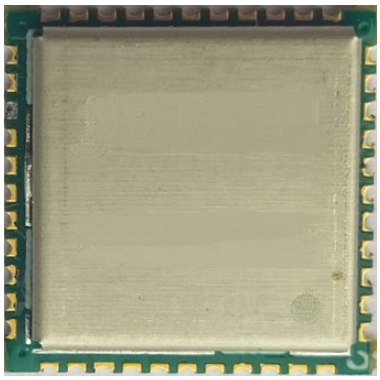


模组正视图

PIN	SYMBOL	Type	DESCRIPTION
1	GND	G	Grounded
2	WLAN_BT_ANT	RF	WLAN/BT RF I/O Port
3	GND	G	Grounded
4	BT_ANT	RF	BT RF I/O Port
5	GND	G	Grounded
6	GPIOB5	I/O	GPIOB5 PIN
7	GPIOB3	I/O	GPIOB3 PIN
8	NC	-	-
9	VBAT	P	Voltage Input of Main Power Supply
10	USB_DM	I/O	Wi-Fi USB DM Pin
11	USB_DP	I/O	Wi-Fi USB DP Pin
12	PWR_KEY	I	Power Enabling/Disabling
13	D_WAKE_H	I/O	Wi-Fi Wake Up Host
14	SDIO_D2	I/O	Wi-Fi SDIO Port
15	SDIO_D3	I/O	Wi-Fi SDIO Port
16	SDIO_CMD	I/O	Wi-Fi SDIO Port
17	SDIO_CLK	I/O	Wi-Fi SDIO Port
18	SDIO_D0	I/O	Wi-Fi SDIO Port
19	SDIO_D1	I/O	Wi-Fi SDIO Port
20	GND	G	Ground
21	NC	-	-
22	VIO	P	VDDIO
23	GPIOB4	I/O	GPIOB4 PIN
24	NC	-	-
25	PCM_DOUT	I/O	BT PCM Port
26	PCM_CLK	I/O	BT PCM Port
27	PCM_DIN	I/O	BT PCM Port

28	PCM_SYNC	I/O	BT PCM Port
29	UART0_TX	O	UART0 TX (Test/Download Use)
30	UART0_RX	I	UART0 RX (Test/Download Use)
31	GND	G	Ground
32	NC	-	-
33	GND	G	Ground
34	GPIOB7	I/O	GPIOB7 PIN
35	GPIOB6	I/O	GPIOB6 PIN
36	GND	G	Ground
37	NC	-	-
38	NC	-	-
39	NC	-	-
40	NC	-	-
41	UART1 RTS	I/O	BT UART1 RTS
42	UART1 TX	I/O	BT UART1 TX
43	UART1 RX	I/O	BT UART1 RX
44	UART1 CTS	I/O	BT UART1 CTS

6. Product Pictures（实物图片）



正视图（top view）

背视图（bottom 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	AIC8800M	48-QFN	
2	PCB	SKI.WB800DS1.2	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℃±5℃；

电源电压：模块输上入电压 3.3V+/-0.3；

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

Ambient condition Temperature :25℃ ± 5℃;

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 ≦10%)	-	-	-93.5	dBm	
2) MCS7 (PER ≦10%)	-	-	-74.5	dBm	
7. Maximum Input Level (PER ≦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	-	-	-	dBr	
2) at fc +/-40MHz	-	-	-	dBr	
3) at fc > +/-60MHz	-	-	-	dBr	
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 ≦10%)	-	-	-90	dBm	
2) MCS3 (PER ≦10%)	-	-	-71	dBm	
3) MCS7 (PER ≦10%)	-	-	-65	dBm	
6. Maximum Input Level (PER ≦10%)	-20	-	-	dBm	

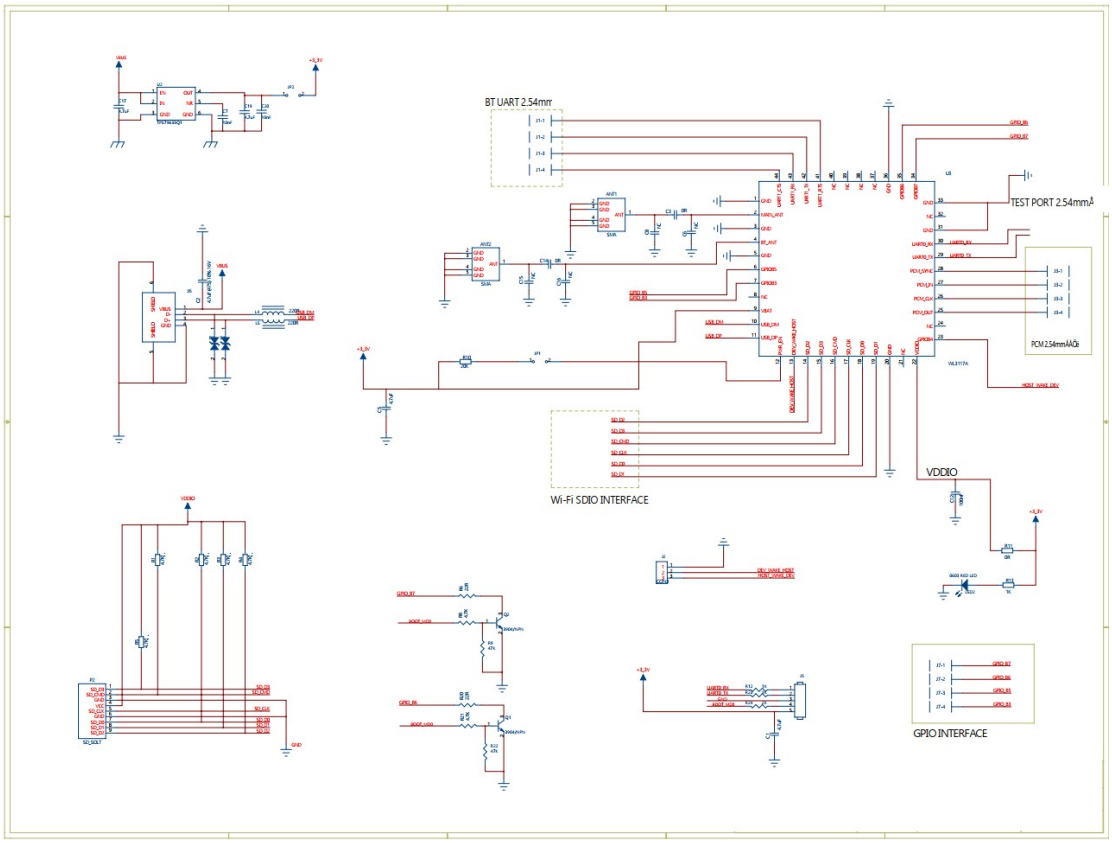
9.5 IEEE 802.11ax Section(2.4GHz)

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

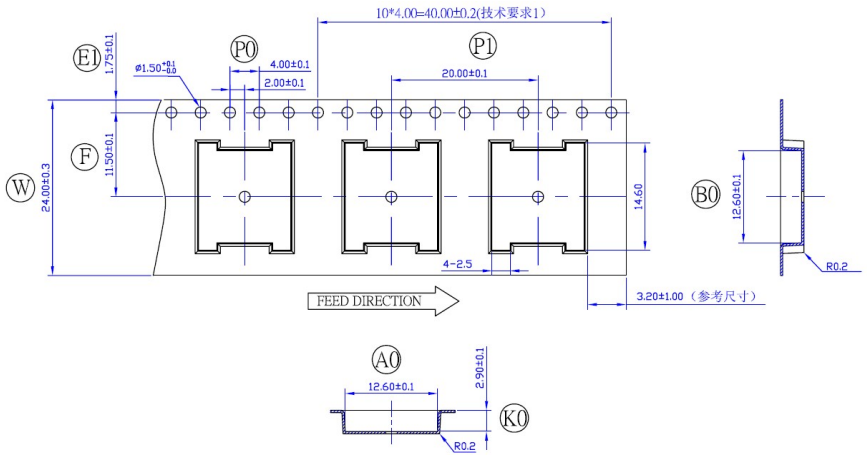
Items	Contents				
Specification	BT2.1+EDR/4.2/5.0 with BLE				
Mode	FHSS,GFSK,DPSK,DQPSK				
Number of Channel	79 Channels				
Frequency Band	2.402 GHz ~2.480GHz				
	Min.	Typ.	Max.	Unit	Remark
1. Output Power	-	13	-	dBm	
2. Gain step	-	1	-	dB	
3. Receiver sensitivity (BER ≦0.1%)	-107	-	-88	dBm	
4. Maximum usable signal (BER ≦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≥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). Δf1avg			-	KHz	
2). Δf2max (For at least 99.9% of all Δf2max)			-	KHz	
3). Δf1avg /Δf2avg			-	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). ±2MHz offset				dBm	
2). ±3MHz offset				dBm	
3). >±3MHz offset				dBm	

10. Reference Design（参考设计）

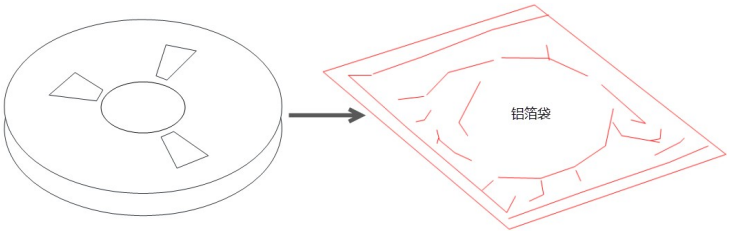


11. Package（包装）

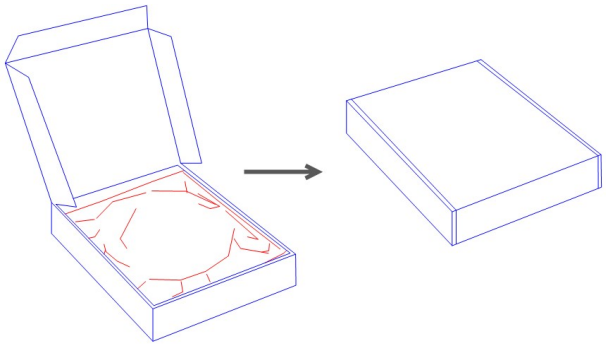
（1）编带包装



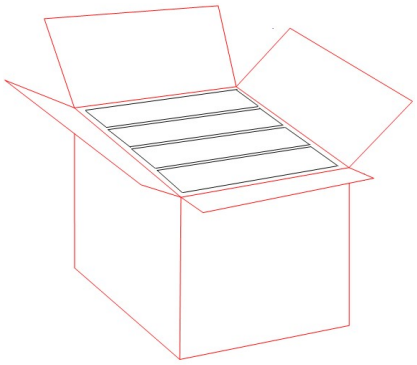
（2）胶带包装



（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