

保密等级：机密

SPECIFICATION

产品规格书

SKO.W618U.1_638BUE**IEEE 802.11a/b/g/n 2T2R USB Wi-Fi Module****Integrated BT 2.1+EDR/4.2/5.0**

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

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REVISION HISTORY

VERSION	DATE	BOARD ID	PAGE	DESCRIPTION	AUTHOR
V0	2020.11.30	SKO.W618U.1_638BU E20451	All	First release	Yve

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1. Introduction (简介)

SKO.W618U.1_638BUE module is based on MEDIATEK MT7638BUN solution. MT7618BUN is a highly integrated single chip which features a low power 2x2 11a/b/g/n dual-band Wi-Fi subsystem. The Wi-Fi subsystem contains the 802.11a/b/g/n radio, baseband, and MAC that are designed to meet both the low power and high throughput application. This documentation describes the engineering requirements specification.

SKO.W618U.1_638BUE 模块基于 MEDIATEK MT7638BUN 解决方案。MT7638BUN 是一款高度集成的芯片，具有低功耗 2x2 11a/b/g/n 双频 Wi-Fi 子系统。Wi-Fi 子系统包含 802.11a/b/g/n 射频、基带和 MAC，旨在满足低功耗和高吞吐量应用。本文件描述了工程需求规范。

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
Chip Solution 芯片方案	MT7638BUN
Band 波段	2.4/5GHz
Dimensions 尺寸	70.00mm×25.05mm×3.20mm

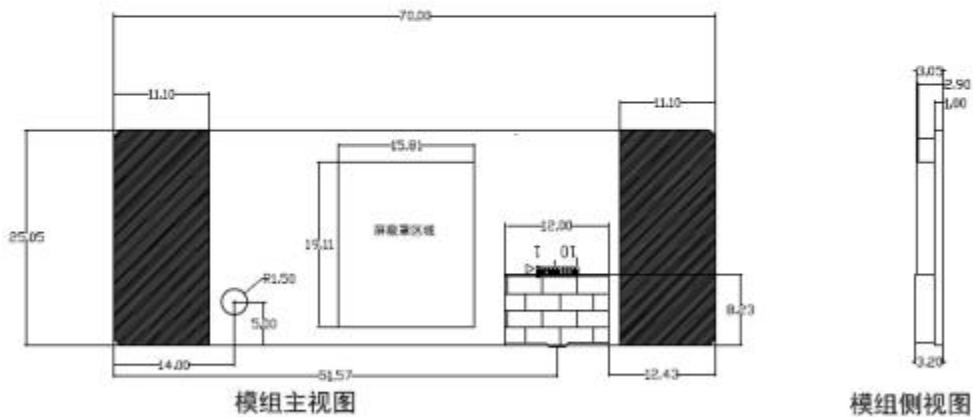
Model 型号	Installation Mode 安装方式	Protocol 支持标准	Frequency 频段	Antenna 天线	Remark 备注
SKO.W618 U.1_638BU	外挂 Ext-WIFI	IEEE 802.11a/ b/g/n	2.4/5GHz	板载天线 On-board Antenna BT: Ipex	70.00mm×25.05mm× 3.20mm

3. Block Diagram (结构框图)

SKO.W618U.1_638BU Block Diagram

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

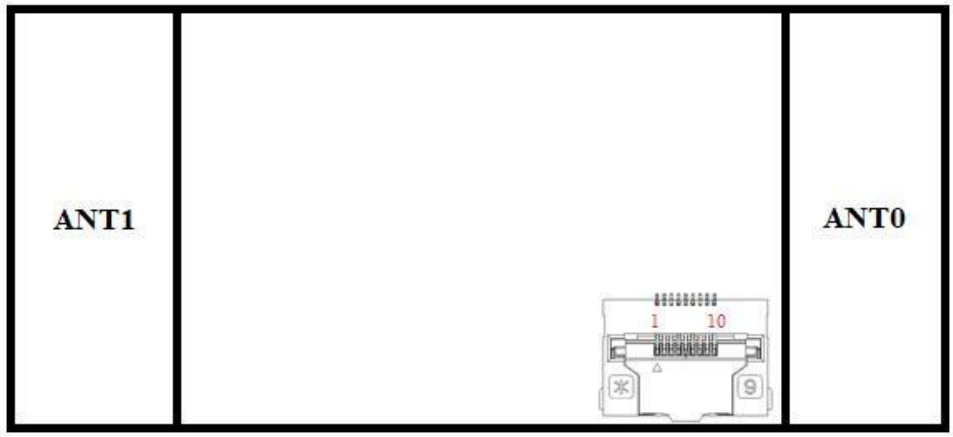
序号	图示	限高说明
1	■	天线净空区 (限高20mm)
2	▤	座子 (限高8.5mm)
3	□	其他区域 (限高4.5mm)



注意：1单位为mm

2模组外形尺寸公差为0.2mm，板厚以及未标注公差为0.1mm

Pin Definition (引脚定义)

		
TOP VIEW		
PIN	SYMBOL	DESCRIPTION
1	VDD_5V	5V Input \ 5V 输入
2	VDD_5V	5V Input \ 5V 输入
3	NC	NC
4	GND	Ground \ 地
5	GND	Ground \ 地
6	USB_DM	USB2.0 DM Signal \ USB2.0 差分负电压信号
7	USB_DP	USB2.0 DP Signal \ USB2.0 差分正电压信号
8	GND	Ground \ 地
9	WOW	WIFI WAKE HOST \ WIFI 唤醒主机, 模组 4.7Kohm 上拉到 3.3V, 唤醒时模组输出低电平
10	RESET	RESET \ 复位, 正常工作为高电平, 模组内部上拉, 输入低电平时模组复位

5. Product Pictures (实物图片)



正视图 (top view)



背视图 (bottom view)

6. 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	MT7638BUN	76-QFN	
2	PCB	SKO.W618U.1_638BUE	FR-4,4LAY	
3	晶体振荡器	2.3.3.400001535	40MHz	
4	双工器	SLFD18-2R450G-13T		
5	双工器 (IPD)	RFDIP201507ALM6T68		

7. General Requirements (一般要求)

No.	Feature	Description
7-1	Operation Voltage 工作电压范围	5.0V+/-0.5
7-2	Current Consumption 最大电流	800mA
7-3	Ripple 纹波	≤250Vp-p
7-4	Operation Temperature 工作温度范围	0°C to +40°C
7-5	Antenna Type 天线类型	Internal antenna
7-6	USB	High Speed USB 2.0 Interface
7-7	Storage Temperature 存储温度	-40°C to +85°C

8. Electrical Characteristics (电气特性)

除非另有说明，电气规范试验是在下列条件下进行，环境条件温度：25°C ± 5°C；电源电压：模块输入电压 5.0V (±10%)；

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

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

Power supply voltages: 5.0V (±10%) input power at the Module.

8.1 IEEE 802.11b Section

Items	Contents				
Specification	IEEE802.11b				
Mode	DBPSK, DQPSK and CCK and DSSS				
Channel	CH1 to CH11				
Data rate	1, 2, 5.5, 11Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
1) For Each 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	-25	-	25	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 1Mbps (FER ≤8%)	-	-	-83	dBm	
2) 2Mbps (FER ≤8%)	-	-	-80	dBm	
3) 5.5Mbps (FER ≤8%)	-	-	-79	dBm	
4) 11Mbps (FER ≤8%)	-	-	-76	dBm	
6 Maximum Input Level (FER ≤8%)	-10	-	-	dBm	

8.2 IEEE 802.11g Section

Items	Contents				
Specification	IEEE802.11g				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH11				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) For Each 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	-25	-	25	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	

8.3 IEEE 802.11n HT20 Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4GHz				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels					
1) For Each antenna port	12	14	16	dBm	
2. Spectrum Mask @ target power					
1) at $f_c \pm 11\text{MHz}$	-	-	-20	dBm	
2) at $f_c \pm 20\text{MHz}$	-	-	-28	dBm	
3) at $f_c > \pm 30\text{MHz}$	-	-	-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	-25	-	25	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	
6. Maximum Input Level (PER $\leq 10\%$)	-20	-	-	dBm	

8.4 IEEE 802.11n HT40 Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11n HT40 @ 2.4GHz				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH3 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For Each 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	-25	-	25	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	

8.5 IEEE 802.11a Section

Items	Contents				
Specification	IEEE802.11a				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH36 to CH165				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) For Each 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	-	-	-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 $\leq 10\%$)	-	-	-82	dBm	
2) 9Mbps (PER $\leq 10\%$)	-	-	-81	dBm	
3) 12Mbps (PER $\leq 10\%$)	-	-	-79	dBm	
4) 18Mbps (PER $\leq 10\%$)	-	-	-77	dBm	
5) 24Mbps (PER $\leq 10\%$)	-	-	-74	dBm	

6) 36Mbps (PER $\leq 10\%$)	-	-	-70	dBm	
7) 48Mbps (PER $\leq 10\%$)	-	-	-66	dBm	
8) 54Mbps (PER $\leq 10\%$)	-	-	-65	dBm	
6 Maximum Input Level (PER $\leq 10\%$)	-30	-	-	dBm	

8.6 IEEE 802.11n HT20 Section(5GHz)

Items	Contents				
Specification	EEE802.11n 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					
1) For Each antenna port	11	13	15	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-20	dB	
2) at fc +/-20MHz	-	-	-28	dB	
3) at fc > +/-30MHz	-	-	-45	dB	
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	
6. Maximum Input Level (PER $\leq 10\%$)	-30	-	-	dBm	

8.7 IEEE 802.11n HT40 Section(5GHz)

Items	Contents				
Specification	IEEE802.11n HT40 @ 5GHz				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH38 to CH159				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For Each antenna port	11	13	15	dBm	
2. Spectrum Mask @target power					
1) at fc +/-21MHz	-	-	-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 ≤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	

8.8 Bluetooth Section

Items	Contents				
Specification	BT2.1+EDR/4.2/5.0				
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		4	-	dBm	
2. Gain step	2	4	8	dB	
3. Receiver sensitivity (BER $\leq 0.1\%$)	-	-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). ± 2 MHz offset	-	-45	-20	dBm	
2). ± 3 MHz offset	-	-48	-40	dBm	
3). $> \pm 3$ MHz offset	-	-48	-40	dBm	

9. Mechanical, Environmental and Reliability Tests

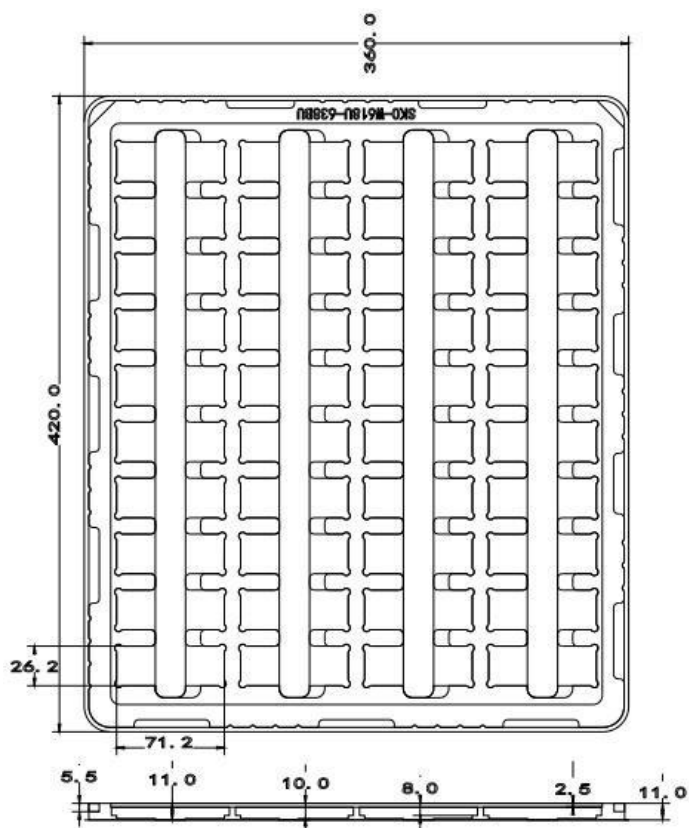
(机械、环境和可靠性测试)

Test Items		Test Conditions	Qty	Criteria Condition
9-1	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.
9-2	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.
9-3	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.
9-4	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.
9-5	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.
9-6	High Temperature and Humidity Start Test	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

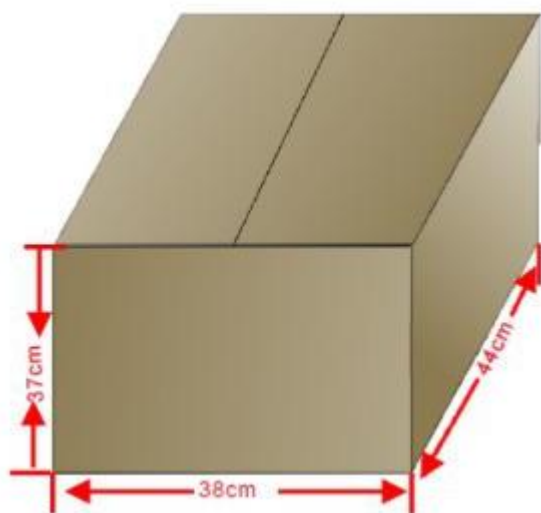
9-7	Low temperature start test	Leave samples in -15℃ for 4x hours	4	After test, power on and off the samples for 3x tiems, the samples should be able to start normally
9-8	High Temperature and Humidity Storage Test	Leave samples in 85℃, 95% RH @ 48 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
9-9	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.
9-10	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.
9-11	Aging Test	60℃, 120Hrs	10	The products at high temperature for a long time can continuous work normally
9-12	Salt spray test	NSS,35℃,PH:6.5~7.2,	2	The Sample shall has no minor or major defects, such as physical damage, crack, corrosion, deformation etc;
9-13	ESD	Discharge voltage: 1kV C: 150pF Discharge resistance: 330Ω Positive10 times 1 time for each second	3	The products can recoverable smoothly after ESD test.

10. Package (包装)

(1) 包装托盘



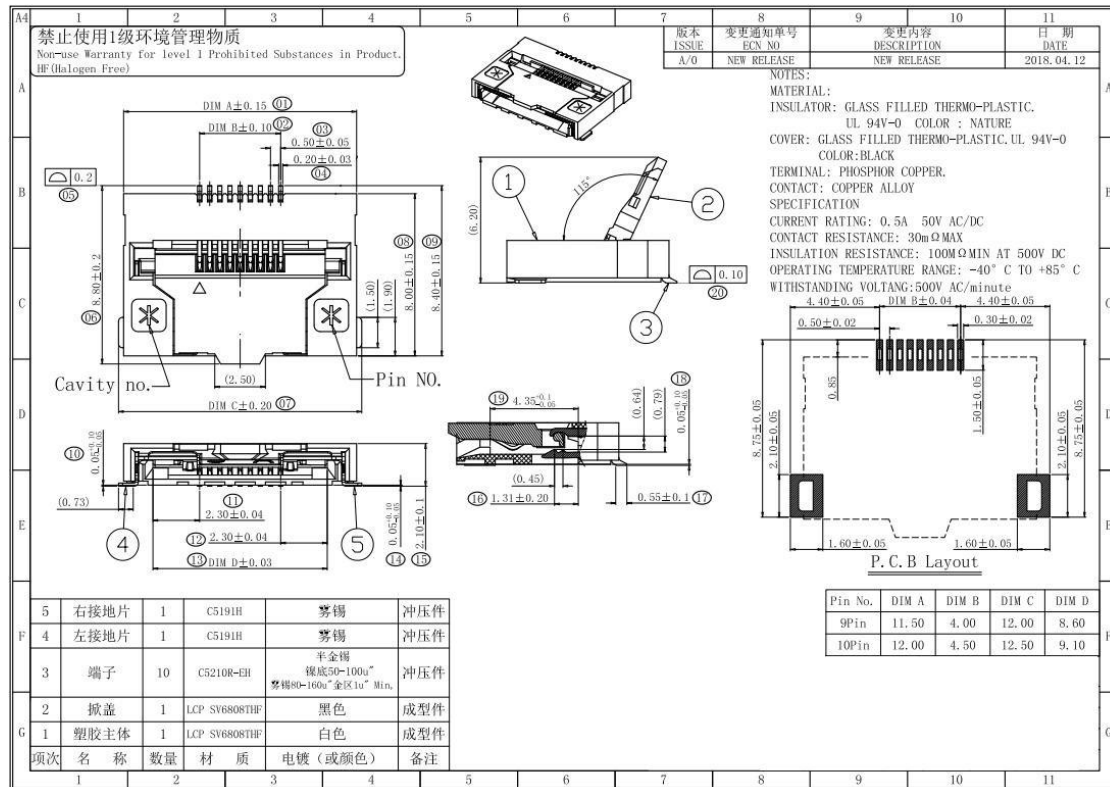
(2) 外箱图纸



(3) 包装要求

每盘包装 40 片 (4*10) , 每箱装 55 盘, 每箱数量=40*55=2200 PCS

11. Socket Specification (插座规格)



12. Software Requirements (软件要求)

The driver supports the following operating systems: Microsoft Windows XP, Vista and Win7.

驱动程序支持以下操作系统: 微软 Windows XP, Vista 和 win7。