

S-83-GESNB

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

Features :

❖ Supporting Standard

IEEE Std. 802.11b

IEEE Std. 802.11g

IEEE Std. 802.11n

❖ Chip Solution

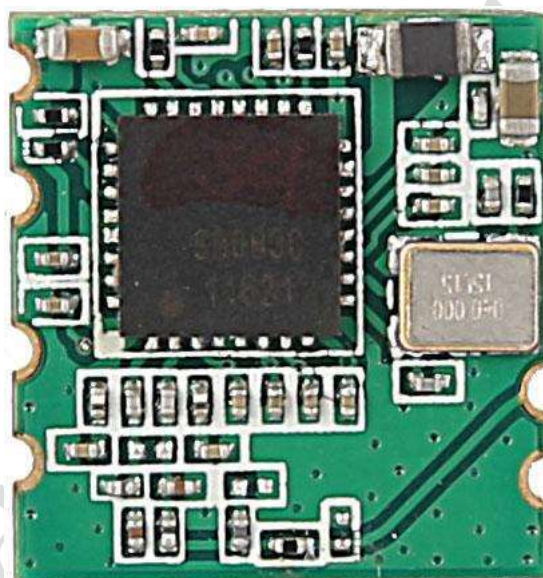
S9083C

❖ Band

2.4G

❖ Size

12.2mm x 13.0 mm



Module	Installation	Supporting Standard	bandwidth	Frequency band	Interface	Remarks
S-83-GESNB	SMD	802.11b/g/n	150Mbps	2.4 GHz	Stamp hole	

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1. Introduction

S-83-GESNB is a WIFI wireless module based on SCI S9083C chip. The module operates in the 2.412GHz ~ 2.484GHz frequency band and supports 802.11b / g / n protocol. This document describes the features and usage of the module.

1.1 Module architecture

S-83-GESNB is a wireless LAN (WLAN) module based on SCI S9082C wireless chip development. S9083C is a highly integrated wireless LAN SOC chip, supports USB2.0 interface, supports 802.11b / g / n protocol standard. S9083C integrates a MAC, a 1T1R baseband and RF link, which provides a complete, high-speed wireless LAN single-chip solution. S9083C hardware block diagram shown in Figure 1:

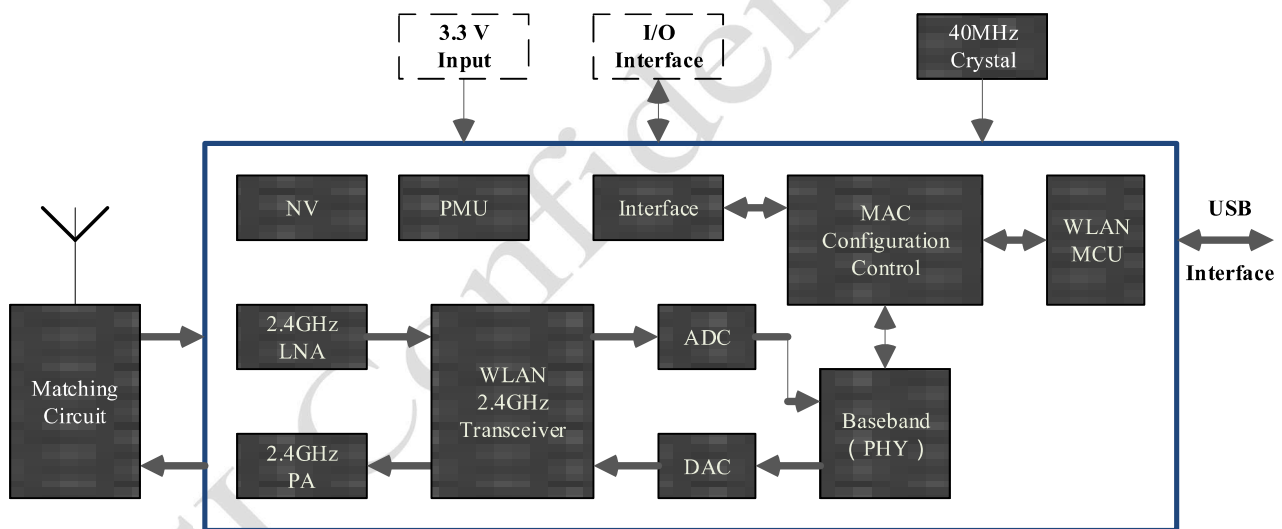


Figure 1.S9083C block diagram

1.2 Supporting Standard

The S-83-GESNB module supports the following protocols:

IEEE Std. 802.11b

IEEE Std. 802.11g

IEEE Std. 802.11n

1.3 Basic characteristics

The basic indicators are as follows:

Operating Frequency	2.412~2.484GHz
WiFi Standard	802.11b/g/n(1x1)
Modulation	11b: DBPSK, DQPSK and CCK and DSSS 11g: BPSK, QPSK, 16QAM, 64QAM and OFDM 11n: MCS0~7 OFDM
Data rates	11b:1, 2, 5.5 and 11Mbps 11g:6, 9, 12, 18, 24, 36, 48 and 54 Mbps 11n: MCS0~7, up to 150Mbps
Form factor	6pin
Host Interface	USB 2.0
PCB Stack	4-layers design
Dimension	Typical, 12.2mm*13.0mm
Operation Temperature	-20°Cto +70°C
Storage Temperature	-40°Cto +85°C
Operation Voltage	3.3V +/-10% (Ripple: ≤30mVp-p)
Max Current	370mA @15dBm@54Mbps TX mode

2. Mechanical

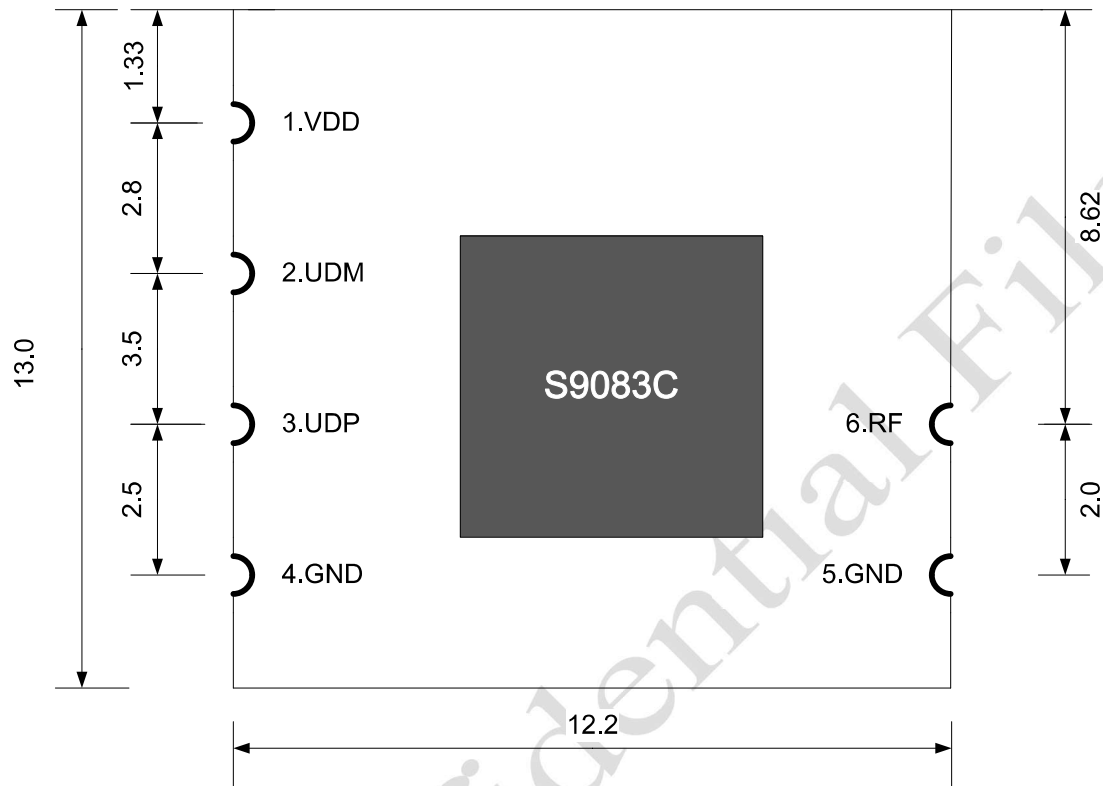


Figure 2 Specifications (Top View)

NOTE1: General tolerance $\pm 0.15\text{mm}$ unless otherwise stated

NOTE2: Unit mm

Pin	Function
1	3.3V Power
2	USB DP
3	USB DM
4	GND
5	GND
6	ANT

3. RF specifications

All parameters are based on the test results of the module DUT, and the test ambient temperature is + 25 ° C.

3.1 802.11b Mode

Specification	IEEE802.11b				
Mode	DSSS / CCK				
Channel	CH1-CH11				
Data rate	1, 2, 5.5, 11Mbps				
TX Characteristics	Min.	Typ.	Max	Unit	
1. Power Levels(Calibrated)					
1) Target	9.2	19.0	19.5	dBm	
2. Spectrum Mask @ target power					
1) fc +/-11MHz to +/-22MHz	Pass				
2) fc > +/-22MHz	Pass				
3. Frequency Error			4.8	KHz	
RX Characteristics	Min.	Typ.	Max.	Unit	
4 Minimum Input Level Sensitivity					
1) 1Mbps (FER $\leq$ 8%)	-96		-90	dBm	
2) 2Mbps (FER $\leq$ 8%)	-94		-88	dBm	
3) 5.5Mbps (FER $\leq$ 8%)	-90		-86	dBm	
4) 11Mbps (FER $\leq$ 8%)	-88		-84	dBm	
5 Maximum Input Level (FER $\leq$ 8%)	-8		-5	dBm	

3.2 802.11g Mode

Specification	IEEE802.11g
Mode	OFDM

Channel	CH1-CH11				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels					
1) Target	3.5	16.5	17.0	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	Pass				
2) at fc +/-20MHz	pass				
3) at fc > +/-30MHz	pass				
3 Constellation Error(EVM)@ target power					
1) 6Mbps		-31.2		dB	
2) 9Mbps		-30.8		dB	
3) 12Mbps		-31.0		dB	
4) 18Mbps		-30.7		dB	
5) 24Mbps		-30.9		dB	
6) 36Mbps		-30.6		dB	
7) 48Mbps		-30.5		dB	
8) 54Mbps		-30.4		dB	
4 Frequency Error			4.8	KHz	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity					
1) 6Mbps (PER ≤ 10%)	-91		-87	dBm	
2) 9Mbps (PER ≤ 10%)	-89		-85	dBm	
3) 12Mbps (PER ≤ 10%)	-86		-82	dBm	
4) 18Mbps (PER ≤ 10%)	-84		-80	dBm	
5) 24Mbps (PER ≤ 10%)	-81		-77	dBm	
6) 36Mbps (PER ≤ 10%)	-79		-75	dBm	
7) 48Mbps (PER ≤ 10%)	-76		-72	dBm	
8) 54Mbps (PER ≤ 10%)	-74		-70	dBm	

6 Maximum Input Level (PER $\leq$ 10%)	-8		-5	dBm	
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3.3 802.11n HT20 Mode

Specification	IEEE802.11n HT20 @ 2.4GHz				
Mode	OFDM				
Channel	CH1-CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels					
1) Target	3.5	13.0	13.5	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	Pass				
2) at fc +/-20MHz	Pass				
3) at fc > +/-30MHz	Pass				
3. Constellation Error(EVM)@ target power					
1) MCS0		-33.2		dB	
2) MCS1		-33.1		dB	
3) MCS2		-32.9		dB	
4) MCS3		-33.5		dB	
5) MCS4		-33.1		dB	
6) MCS5		-33.8		dB	
7) MCS6		-33.6		dB	
8) MCS7		-33.1		dB	
4. Frequency Error			4.8	KHz	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity					
1) MCS0 (PER ≤ 10%)	-90		-87	dBm	
2) MCS1 (PER ≤ 10%)	-86		-83	dBm	

3) MCS2 (PER $\leq$ 10%)	-84		-81	dBm	
4) MCS3 (PER $\leq$ 10%)	-79		-76	dBm	
5) MCS4 (PER $\leq$ 10%)	-77		-74	dBm	
6) MCS5 (PER $\leq$ 10%)	-74		-71	dBm	
7) MCS6 (PER $\leq$ 10%)	-73		-70	dBm	
8) MCS7 (PER $\leq$ 10%)	-72		-69	dBm	
6. Maximum Input Level (PER $\leq$ 10%)	-8		-5	dBm	

3.4 802.11n HT40 Mode

Specification	IEEE802.11n HT40 @ 2.4GHz				
Mode	OFDM				
Channel	CH3-CH9				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) 13dBm Target	5.5	16.0	16.5	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-22MHz	Pass				
2) at fc +/-40MHz	Pass				
3) at fc > +/-60MHz	Pass				
3. Constellation Error(EVM)@target power					
1) MCS0		-34.1		dB	
2) MCS1		-33.7		dB	
3) MCS2		-33.4		dB	
4) MCS3		-33.5		dB	
5) MCS4		-33.2		dB	
6) MCS5		-34.2		dB	
7) MCS6		-33.8		dB	

8) MCS7		-33.6		dB	
4. Frequency Error			4.8	KHz	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity					
1) MCS0 (PER $\leq$ 10%)	-88		-84	dBm	
2) MCS1 (PER $\leq$ 10%)	-84		-80	dBm	
3) MCS2 (PER $\leq$ 10%)	-81		-77	dBm	
4) MCS3 (PER $\leq$ 10%)	-77		-73	dBm	
5) MCS4 (PER $\leq$ 10%)	-74		-70	dBm	
6) MCS5 (PER $\leq$ 10%)	-70		-66	dBm	
7) MCS6 (PER $\leq$ 10%)	-69		-65	dBm	
8) MCS7 (PER $\leq$ 10%)	-68		-64	dBm	
6. Maximum Input Level(PER $\leq$ 10%)	-8		-5	dBm	

4. Power

Item	Content			
Standard	IEEE802.11b			
Mode	DSSS/CCK			
Frequence	2412~2484MHz			
Rate	1, 2, 5.5, 11Mbps			
DC Characteristics	Min	Type	Max	Unit
TX Mode（LDO， @17dBm）		333		mA
TX Mode（DCDC， @17dBm）		273		
RX Mode（LDO）		135		
RX Mode（DCDC）		68		
Standard	IEEE802.11g			
Mode	OFDM			

Frequence	2412~2484MHz			
Rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
DC Characteristics	Min	Type	Max	Unit
TX Mode (LDO, @15dBm)		315		mA
TX Mode (DCDC, @15dBm)		250		
RX Mode (LDO)		140		
RX Mode (DCDC)		70		
Standard	IEEE802.11n			
Mode	OFDM			
Frequence	2412~2484MHz			
Rate	6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps			
DC Characteristics	Min	Type	Max	Unit
TX Mode (LDO, @13dBm)		310		mA
TX Mode (DCDC, @13dBm)		240		
RX Mode (LDO)		145		
RX Mode (DCDC)		72		

Mode	Requirement	Min	Type	Max	Unit
Powerdown	Power down		36		uA
Sleep	DTM1, LDO		21		mA
	DTM3, LDO		7.4		
	DTM1, DCDC		18.5		
	DTM3, DCDC		6.2		
Idle	Connected state, no data is transmitted LDO,DCDC		133		mA
	Connected state, no data is		66		

	transmitted,DCDC				
Work	Connection status, transmit small amounts of data,LDO		138		mA
	Connection status, transmit small amounts of data,DCDC		74		

5. Antenna matching

PIN6 RF antenna connection, please refer to the specific needs of the project design.

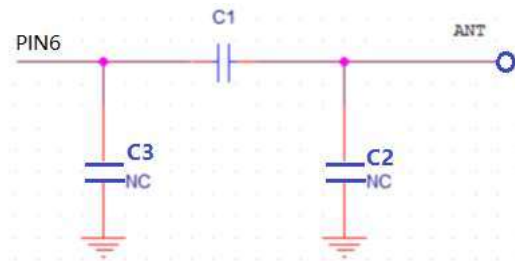


Figure 3.Antenna matching

Module and the antenna are away from noise sources claim, and the antenna module to require as a whole.

PIN6 to WIFI module RF interface between the antenna and cabling requirements coplanar impedance of 50Ω, recommend the use of arcs and lines, as short as possible.

C1, C2, C3 composed of π-type matching network and close to the antenna interface design, the specific adjustments based on the measured effects and recommended antenna layout design.

C1 = 10pF

Caution:

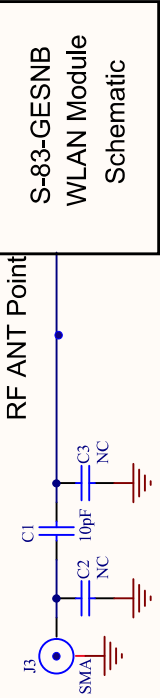
All platforms must follow this antenna design when using this module. If not follow completely, the FCC authorization is no longer considered valid.

A

B

C

D



Title

Size

A4

Date:

F

Number

Revision

Sheet of

By

4

3

2

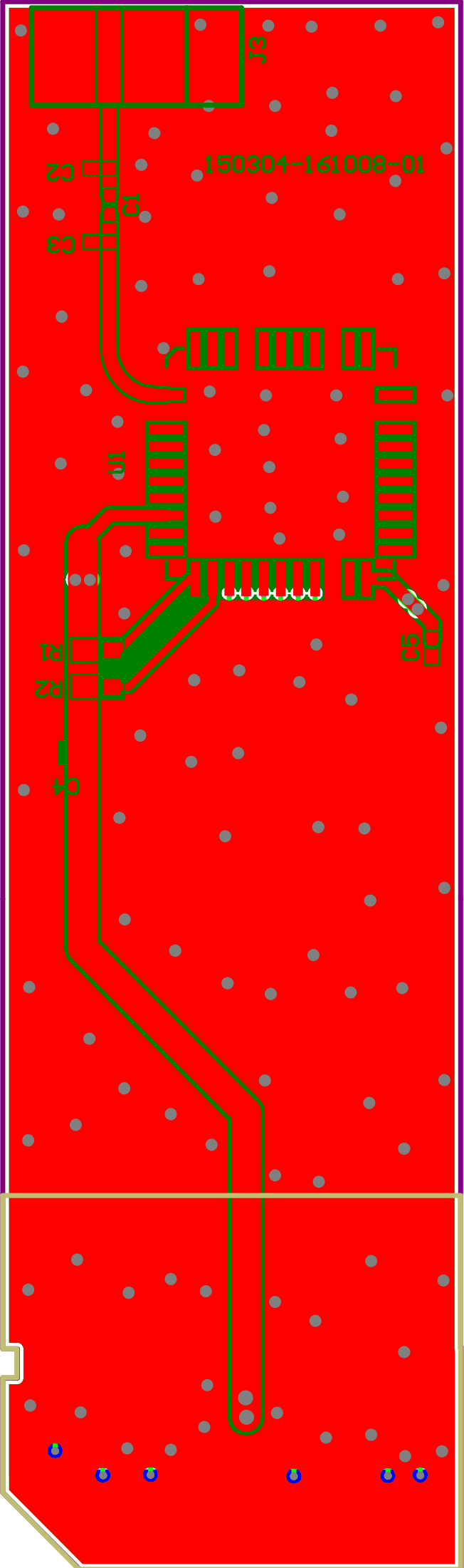
1

A

B

C

D



6. Welding conditions

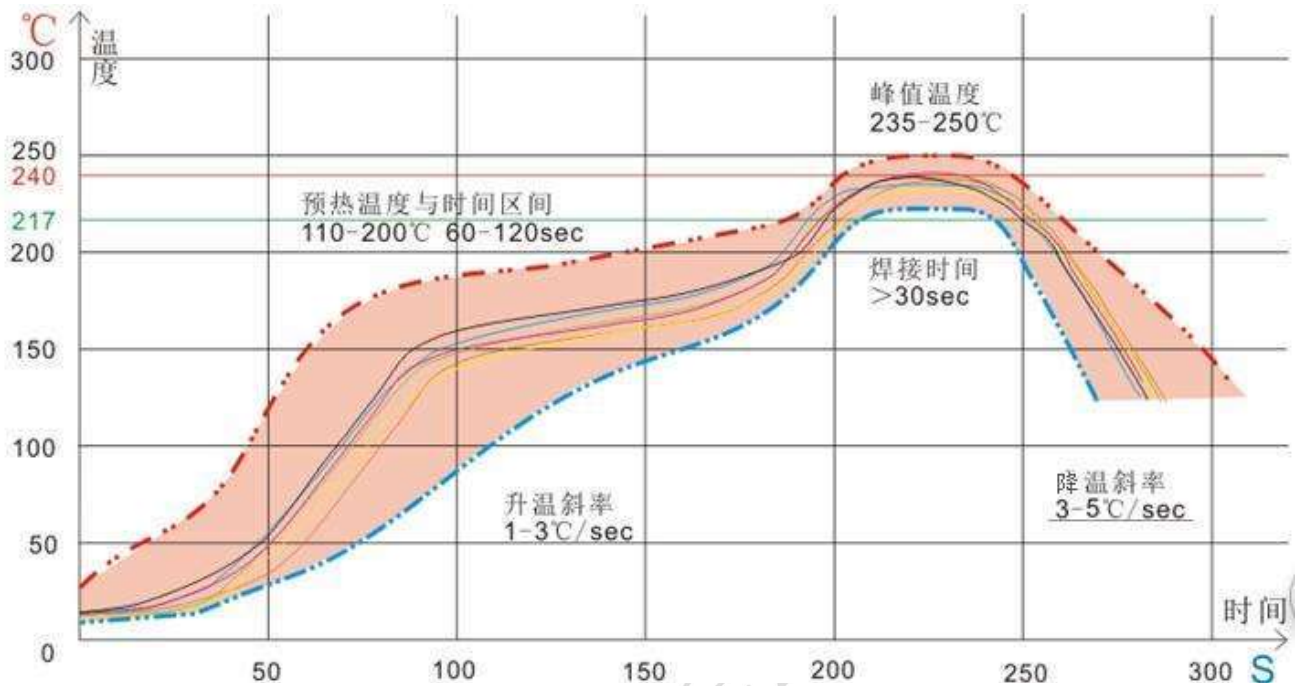


Figure 7. Welding temperature curve

1. Temperature range: temperature: $<150^{\circ}\text{C}$, time: 60 ~ 90 seconds, slope control in the $1 \sim 3^{\circ}\text{C} / \text{S}$ between.
 2. Preheat temperature zone: temperature: $150^{\circ}\text{C} \sim 200^{\circ}\text{C}$, time: 60-120 seconds, the slope between 0.3-0.8.
 3. Reflow soldering area: peak temperature $235^{\circ}\text{C} \sim 250^{\circ}\text{C}$ (recommended peak temperature $<245^{\circ}\text{C}$), time 30-70 seconds.
 4. Cooling zone: temperature: $217^{\circ}\text{C} \sim 170^{\circ}\text{C}$, the slope of $3 \sim 5^{\circ}\text{C} / \text{S}$ between.
 5. The solder is Sn / Ag & Cu Lead-free solder (SAC305) for tin-silver-copper alloy lead-free solder.
- NOTE: The reflow profile should seek to balance the quality of the solder joints without compromising the board and components.

7 Version

Date	Version	Update
2016-06-06	1.0	Document Draft
2016-06-08	1.1	Initial documents
2016-06-09	1.2	Increasing the RF characteristics of the test data
2016-07-09	1.3	Update RF characteristics of the test data
2016-07-15	1.4	Increase the power consumption test data
2016-09-01	1.5	Update power test data

Compliance Information

FCC Compliance 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 device must accept any interference received, including interference that may cause undesired operation. Product that is a radio transmitter is labeled with FCC ID.

FCC Caution:

- (1) Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.
- (2) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.
- (3) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- (4) Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

RF exposure warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment

The equipment must not be co-located or operating in conjunction with any other antenna or transmitter.

IMPORTANT NOTE: 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.

The antenna gain which being use as below:

Antenna Type	Manufacturer	M/N	Max Peak Gain
Dipole Antenna	Cortec Technology Inc.	AN2400-1761BRS	3dBi

General OEM integration instructions:

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

The antenna must be installed such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmit or antenna. The module shall be only used with the dipole antenna(s) that has been originally tested and certified with this module. As long as 3 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 requirement with this module installed (for example, digital device emission, PC peripheral requirements, etc.)

Additional OEM integration instructions Requirement:

a) Trace layout and dimensions including specific designs for each type:

- 1) Layout of trace design, parts, antenna, connectors, and isolation requirements;
- 2) Boundary limits of size, thickness, length, width, shape(s), dielectric constant, and impedance must be clearly described for each type of antenna;
- 3) Different antenna length and shapes affect radiated emissions, and each design shall be considered a different type; e.g., antenna length in multiple(s) of frequency wavelength and antenna shape (traces in phase) can affect antenna gain and must be considered;
- 4) The above data is to be provided by a Gerber file (or equivalent) for PC layout.

b) Appropriate parts by manufacturer and specifications.

c) Test procedures for design verification.

If you have some technology problem, please contact with us.

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End product labeling:

This transmitter module is authorization only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:

“Contains Transmitter Module FCC ID: 2AKCE-S83GESNB or Contains FCC ID: 2AKCE-S83GESNB”

Information that must be placed in the end user manual:

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.

Caution:

The module is only restricted on this product (Detail information show as below)

Manufacturer: 深圳创盈芯科技有限公司

Product name: NEXBOX

Product Model Number: A95X-B7N



SCI Confidential File