



# W82

# Hardware Design

WIFI Module

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# Contents

<b>1</b>	<b>Introduction.....</b>	<b>8</b>
1.1	Product Outline.....	8
1.2	WCN and BT Key features.....	8
1.3	Hardware Interface Overview.....	9
1.4	Hardware Block Diagram.....	9
1.5	Feature Overview.....	10
1.6	W82 and SIM8260 Series Connect Diagram.....	11
<b>2</b>	<b>Package Information.....</b>	<b>13</b>
2.1	Pin Assignment Overview.....	13
2.2	Pin Description.....	14
2.3	Mechanical Dimensions.....	16
<b>3</b>	<b>Interface Application.....</b>	<b>18</b>
3.1	Power Supply.....	18
3.2	I2S Interface*.....	20
3.3	Clock Interface.....	21
3.4	BT function.....	21
3.5	PCIe Interface.....	22
3.6	Antenna Interface.....	23
3.6.1	Frequency band.....	23
3.6.2	Reference design for RF.....	23
3.6.3	Requirement for antenna installation.....	24
<b>4</b>	<b>Electrical Specifications.....</b>	<b>25</b>
4.1	Absolute Maximum Ratings.....	25
4.2	Operating Conditions.....	25
4.3	RF Characteristics.....	26
4.4	ESD.....	28
<b>5</b>	<b>Manufacturing.....</b>	<b>29</b>
5.1	TOP and Bottom View of W82.....	29
5.2	Label Description Information.....	29
5.3	Recommended PCB Footprint.....	30
5.4	Recommended SMT Stencil.....	32
5.5	Recommended SMT Reflow Profile.....	33
5.6	Moisture Sensitivity Level (MSL).....	33
5.7	Baking Requirements.....	34
<b>6</b>	<b>Packaging.....</b>	<b>35</b>
<b>7</b>	<b>Appendix.....</b>	<b>37</b>

7.1	Related Documents.....	37
7.2	Terms and Abbreviations.....	37
7.3	Safety Caution.....	38

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## Table Index

Table 1: Key features.....	10
Table 2: Pin description.....	14
Table 3: Power electronic characteristics.....	18
Table 4: Power on timing and electronic characteristic.....	19
Table 5: Power on timing and electronic characteristic.....	20
Table 6: Sleep clock.....	21
Table 7: BT UART.....	22
Table 8: PCIe Interface.....	22
Table 9: Frequency band.....	23
Table 10: Requirement for antenna installation.....	24
Table 11: Absolute maximum ratings.....	25
Table 12: Power recommended operating ratings.....	25
Table 13: 1.8V digital I/O characteristics.....	25
Table 14: Transmit power per chain.....	26
Table 15: Receive Sensitivity at 2.4G for 1X1 configuration.....	27
Table 16: Receive Sensitivity at 5G for 1X1 configuration.....	27
Table 17: Receive Sensitivity at 6G for 1X1 configuration.....	28
Table 18: The ESD performance measurement table (Temperature: 25°C, humidity: 45%).....	28
Table 19: Label description of module information.....	30
Table 20: MSL ratings summary.....	33
Table 21: Baking requirements.....	34
Table 22: Tray size.....	36
Table 23: Small carton size.....	36
Table 24: Big carton size.....	36
Table 25: Related documents.....	37
Table 26: Terms and abbreviations.....	37
Table 27: Safety caution.....	38

## Figure Index

Figure 1: W82 hardware block diagram.....	9
Figure 2: W82 and SIM8260 Series connect diagram.....	12
Figure 3: Pin assignment.....	13
Figure 4: Dimensions of W82 (Unit: mm).....	17
Figure 5: Timing of power on.....	19
Figure 6: Timing of power off.....	20
Figure 7: Timing of 32KHz.....	21
Figure 8: BT UART reference circuit.....	21
Figure 9: PCIe interface reference circuit.....	22
Figure 10: Reference design of RF.....	23
Figure 11: Top and bottom view of W82.....	29
Figure 12: Label description of module.....	29
Figure 13: Recommended PCB footprint.....	31
Figure 14: Recommended SMT stenci.....	32
Figure 15: The ramp-soak-spike reflow profile of module.....	33
Figure 16: Packaging diagram.....	35
Figure 17: Tray drawing.....	35
Figure 18: Small carton drawing.....	36
Figure 19: Big carton drawing.....	36

# 1 Introduction

This document describes the electronic specifications, RF specifications, interfaces, mechanical characteristics and testing results of the W82 module. With the help of this document, in combination with our application manual and user guide, customers can quickly apply W82 module into wireless applications.

## 1.1 Product Outline

The W82 is a small, low-power, low-cost Wi-Fi and Bluetooth module based on Qualcomm WCN6856 chipset. The module can be used in car networking, wireless routing, and other wireless terminals. The module is designed to be used together with SIMCom SIM8260 Series modules to establish WLAN and Bluetooth connections.

## 1.2 WCN and BT Key features

### WCN Key features

- Compliant with IEEE 802.11a/b/g/n/ac/ax
- Supports 2x2 Multi-User Multiple-Input Multiple-Output (MU-MIMO)
- Dual Band Simultaneous (DBS), up to 3.6 Gbps data rate (2x2+2x2 11ax DBS)
- Tri-band 2.4 GHz/5 GHz/6 GHz support
- 20 MHz/40 MHz channel bandwidth for 2.4 GHz and 20 MHz/40 MHz/80 MHz/160 MHz channel bandwidth for 5 GHz/6 GHz
- Seamless antenna sharing with Bluetooth, LTE, LTE-U, and 5G
- Dynamic Frequency Selection (DFS, radar detection)
- Offloading traffic for minimal host utilization at 802.11ac/ax speeds
- Low-power PCIe (with L1 substate) interface
- Integrated close-loop power detector

### BT Key features

- Compliant with Bluetooth Milan
- Supports 2 Mbps Bluetooth Low Energy (BLE), BLE Long Range
- Split ACL support for A2DP true stereo (earbuds)
- Dedicated Bluetooth antenna, sharing Bluetooth antenna with WLAN, and concurrent with 5G WLAN
- Dual eSCO and dual A2DP streams



- Support BT V5.2 and backward-compatible with previous Bluetooth standards
- Flexible interface PCM/I2S for Bluetooth audio

### 1.3 Hardware Interface Overview

W82 support the following interfaces:

- Power supply
- One I2S interface
- One PCIe \*1 lane interface
- One COEX\_UART interface
- One 32KHz clock input interface
- One BT\_UART interface
- Two WLAN/BT antenna interfaces
- LAA/N79 control interfaces
- GPIOs

#### NOTE

1. If unused I2S feature, please keep open.

### 1.4 Hardware Block Diagram

The following figure shows the hardware block diagram of W82:

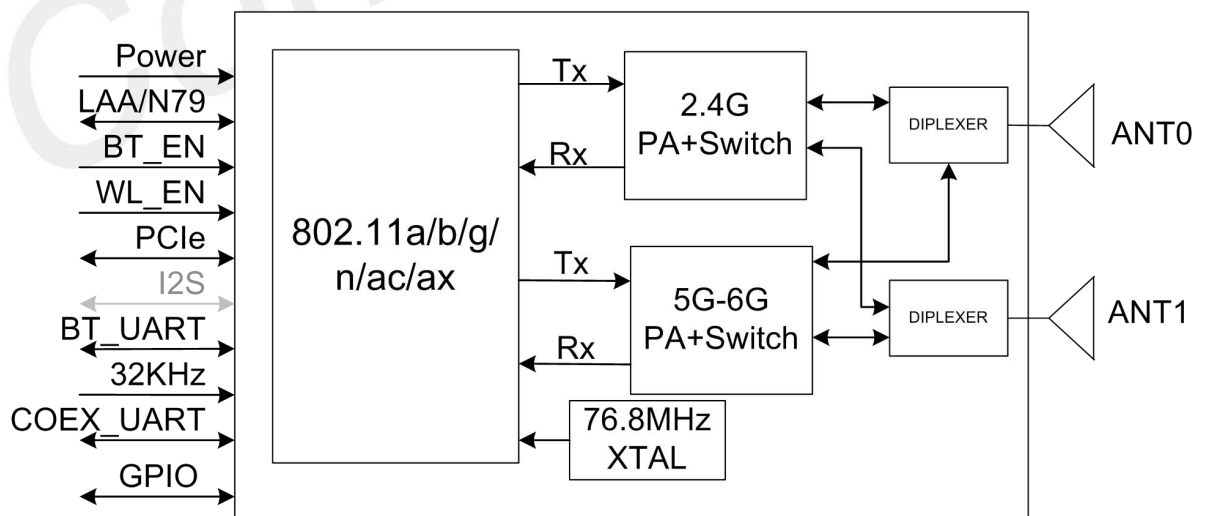


Figure 1: W82 hardware block diagram

## 1.5 Feature Overview

Table 1: Key features

Feature	Implementation
Power Supply	VPH : 3.3~4.4 V VREG_1P224: 1.22~1.42 V VREG_0P824: 0.82~1.0 V VREG_1P924: 1.8~2.1 V VDD_IO : 1.71~2.0 V
Date Rate	802.11b: 1,2,5.5,11Mbps 802.11g/a: 6,9,12,18,24,36,48,54Mbps 802.11n_HT20: MCS0~MCS7 802.11n_HT40: MCS0~MCS7 802.11n_HT80: MCS0~MCS7 802.11ac_HT20: MCS0~MCS8 802.11ac_HT40: MCS0~MCS9 802.11ac_HT80: MCS0~MCS9 802.11ax_HT20: MCS0~MCS11 802.11ax_HT40: MCS0~MCS11 802.11ax_HT80: MCS0~MCS11 802.11ax_HT160:MCS0~MCS13
Transmitting power	802.11b/11Mbps: 17dBm 802.11a/g/54Mbps: 13dBm 802.11n_HT20/MCS7: 13dBm 802.11n_HT40/MCS7: 13dBm 802.11n_HT80/MCS7: 13dBm 802.11ac_HT20/MCS8: 12dBm 802.11ac_HT40/MCS9: 11dBm 802.11ac_HT80/MCS9: 11dBm 802.11ax_HT20/MCS11: 9dBm 802.11ax_HT40/MCS11: 9dBm 802.11ax_HT80/MCS11: 9dBm 802.11ax_HT160/MCS13: 8dBm
WLAN Standard	IEEE 802.11a/b/g/n/ac/ax
Modulation Method	DSSS (1/2Mbps), CCK(1/2/5.5/11Mbps), OFDM (6/9/12/18/24/36/48/54Mbps), OFDM technology combined with BPSK, QPSK, 16-qam, 64-qam, 256-qam, 1024-qam; 4k-qam 802.11b adopts CCK and DSSS modulation technology
PCIe Interface	One lane PCIe interface, support PCIe Gen 3.0
UART Interface	● One UART interface

	<ul style="list-style-type: none"> <li>● Data rate up to 3.2 Mbps</li> </ul>
I2S Interface	One I2S interface, the I2S also can be configured as PCM
Antenna Interface	2X2+2X2
Physical characteristics	Size: 24.0mm*17.0mm*2.6mm Weight: 2.1g
Temperature range	Normal operation: -30°C ~ +70°C Storage temperature: -40°C ~ +90°C

#### NOTE

1. Transmitting power is not the final data and will be update after test
2. I2S Interface default software does not support

## 1.6 W82 and SIM8260 Series Connect Diagram

The following figure shows the connect diagram of W82 and SIM8260 Series, the details please refer the SIM8260 Series reference design.

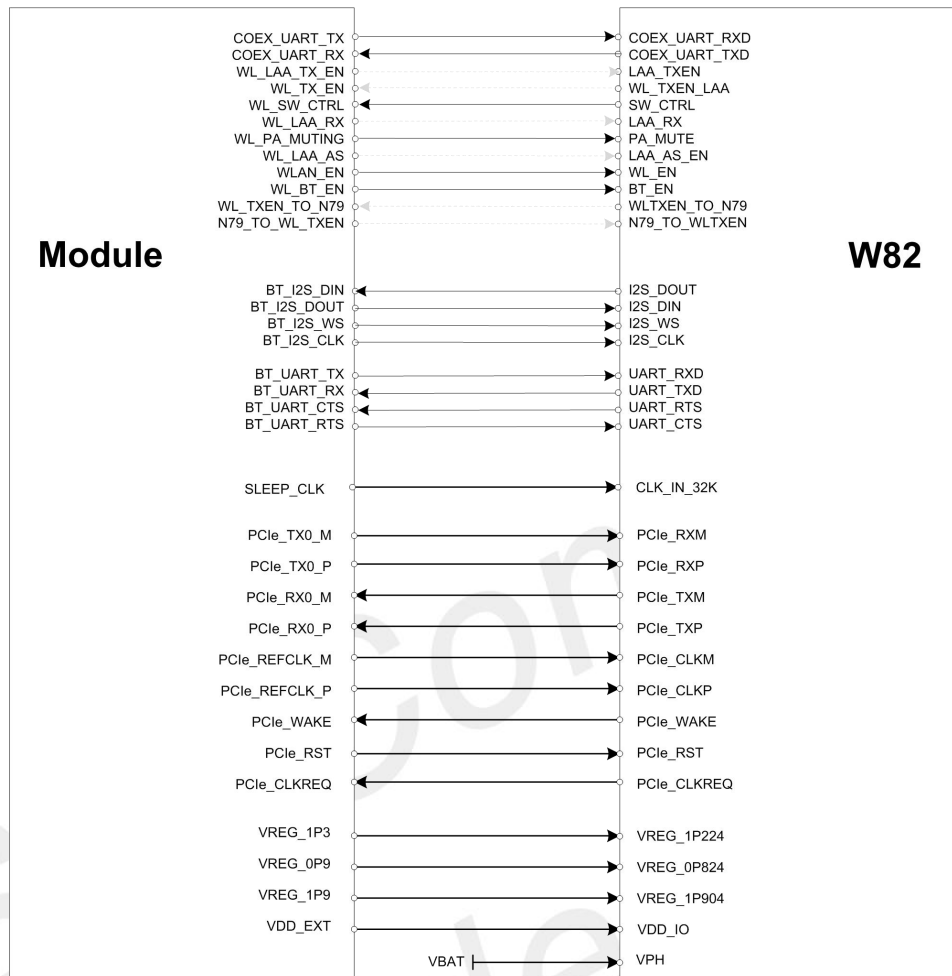


Figure 2: W82 and SIM8260 Series connect diagram

**NOTE**

1. Gray network to be confirmed after debugging

## 2 Package Information

### 2.1 Pin Assignment Overview

All functions of the W82 will be provided through 90 pins that will be connected to the customer's platform. The following figure the pin assignment of the W82.

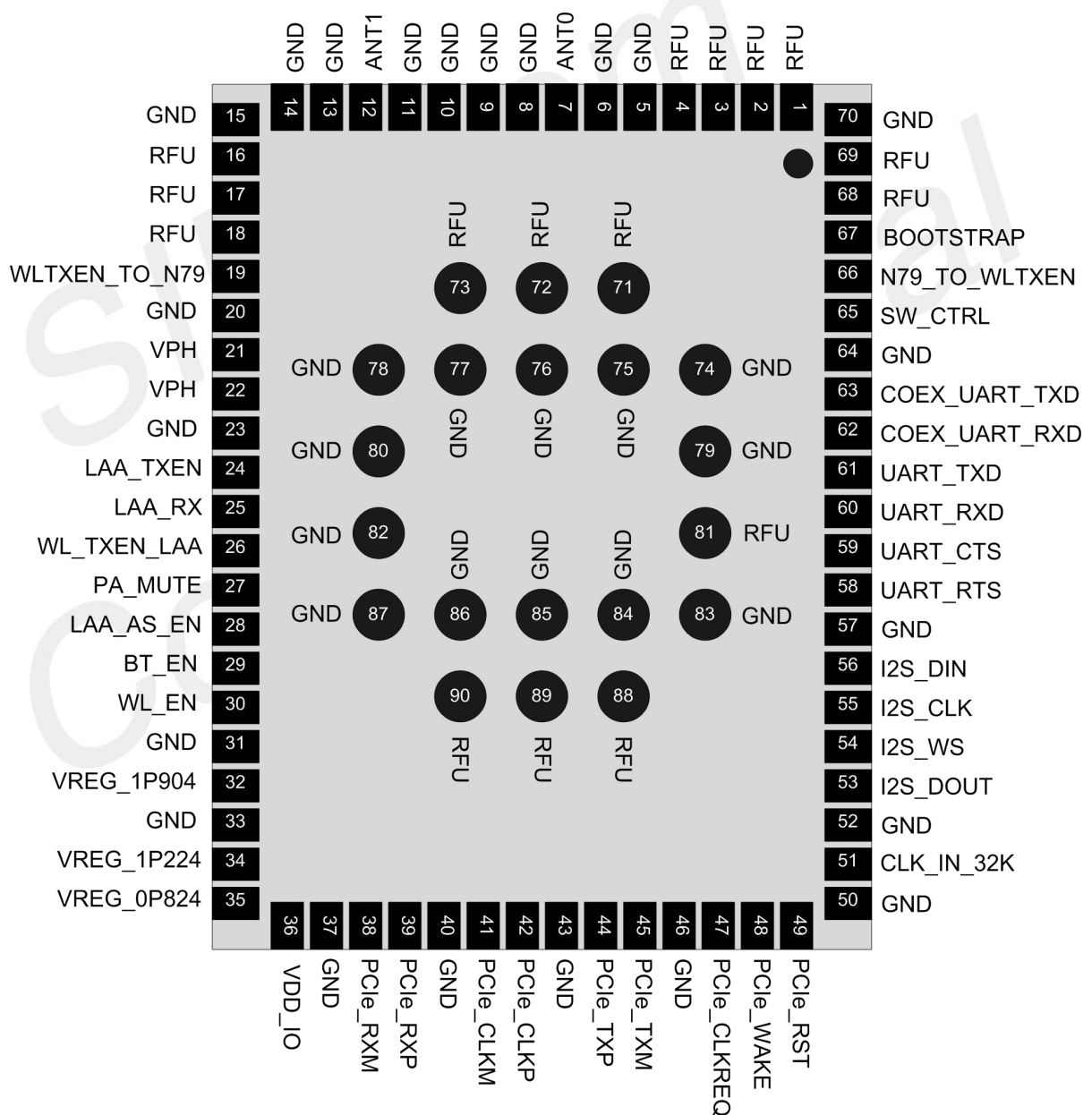


Figure 3: Pin assignment

## 2.2 Pin Description

Table 2: Pin description

Pin name	Pin number	I/O	Description	Comment
<b>Power supply</b>				
VPH	21, 22	PI	Power for PA	
VREG_1P224	34	PI	Power for PCIe and RFA	
VREG_0P824	35	PI	Power for RFA\CX\MX and others	
VREG_1P904	32	PI	Power for PCIe and RFA	
VDD_IO	36	PI	Power for IO	
GND	5,6,8,9,10,11,13,14,15,20,23,31,33,37,40,43,46,50,52,57,64,70,74,75,76,77,78,79,80,82,83,84,85,86,87			Ground
<b>LAA control</b>				
LAA_TXEN	24	DI	When LAA transmits at 10 dBm or higher, the SIM8260 Series asserts this GPIO to high state and W82 places the 5 GHz receiver in a protected state. This pin is monitored even in sleep mode, as long as the 0.8 V AON domain is powered.	If unused, please keep open
WL_TXEN_LAA	26	DO	When either 5 GHz chain 0 or chain 1 is set to transmit at power greater than 10 dBm, the W82 asserts this GPIO to high state and the LAA receivers is placed in a protected state.	
LAA_RX	25	DI	It allows the SIM8260 Series to control the 5 GHz xLNAs. When this GPIO goes high, the W82 sets the 5G xLNA to high gain to allow LAA to receive on the WLAN antennas. If W82 is sleeping or disabled, the LAA_AS_EN must also be set high to power on the AON domain.	If unused, please 10K PD to GND
LAA_AS_EN	28	DI	An active high allows WAN to power on WCN6856 0.8 V AON domain, when WCN6856 is sleeping or disabled.	
<b>N79 control</b>				

N79_TO_WLTXEN	66	DI	This GPIO is set high by SIM8260 Series when N79 transmits above a prescribed RF power.	If unused, please keep open
WLTXEN_TO_N79	19	DO	The W82 asserts this GPIO to high state when the 5 GHz or 6 GHz chains are transmitting about certain power.	

### Module control

PA_MUTE	27	DI	When GPIO goes high, 2.4G chain 1 PA is turned off.	If unused, please keep open
BT_EN	29	DI	active high to enable Bluetooth operation	If unused, please 10K PD to GND
WL_EN	30	DI	active high to enable WLAN operation.	
SW_CTRL	65	DO	Switch request to external PMU between active and sleep mode.	If unused, please keep open
BOOTSTRAP	67	DI	WIFI clock configuration bootstrap pull-up by module GPIO, reduced leakage current 100uA compared with using VDD_IO 1.8V supply. High during operation	If unused, please keep open

### PCIe interface

PCIe_RXM	38	-	PCIe receive minus	Required 85Ω differential impedance
PCIe_RXP	39	-	PCIe receive plus	
PCIe_CLKM	41	-	PCIe reference clock minus	
PCIe_CLKP	42	-	PCIe reference clock plus	
PCIe_TXM	45	-	PCIe transmit minus	
PCIe_TXP	44	-	PCIe transmit plus	
PCIe_RST	49	DI	PCIe reset.	
PCIe_CLKREQ	47	B	PCIe clock request.	These pins have been pulled up 10K to 1.8V internally
PCIe_WAKE	48	DO	PCIe wake-up	

### I2S interface

I2S_DIN	56	DI	BT I2S serial data Input 0 for audio	If unused, please keep open
I2S_CLK	55	DI	BT I2S continuous serial clock 0 for audio	
I2S_WS	54	DI	BT I2S word select 0 for audio	
I2S_DOUT	53	DO	BT I2S serial data output 0 for audio	

### UART interface

COEX_UART_TXD	63	DO	LTE coexistence UART TXD	If unused, please pull down to GND by a 100K resistor externally.
COEX_UART_RXD	62	DI	LTE coexistence UART RXD	If unused, please

				connect to GND
UART_TXD	61	DO	BT UART transmit data	The baud rate is 115.2 k as default, and can be configured up to 3.125 Mbps.
UART_RXD	60	DI	BT UART receive data	
UART_CTS	59	DI	BT UART clear to send	
UART_RTS	58	DO	BT UART request to send	
<b>Clock interface</b>				
CLK_IN_32K	51	AI	Sleep clock input	
<b>ANT interface</b>				
ANT0	7	AIO	WLAN/BT antenna0 interface	
ANT1	12	AIO	WLAN antenna1 interface	
<b>RFU interface</b>				
RFU	1,2,3,4,16,17,18, 68,69,71,72, 73,81,88,89,90			Reserved for future use Please keep open

**NOTE**

1. Unused and RFU pins should keep open.
2. All Power and GND pins should be connected to the customer's main PCB.
3. All control signals, PCIe interface, I2S interface, UART interface and Clock interface work in 1.8V voltage domain.

## 2.3 Mechanical Dimensions

The following figure shows the mechanical dimensions of W82.



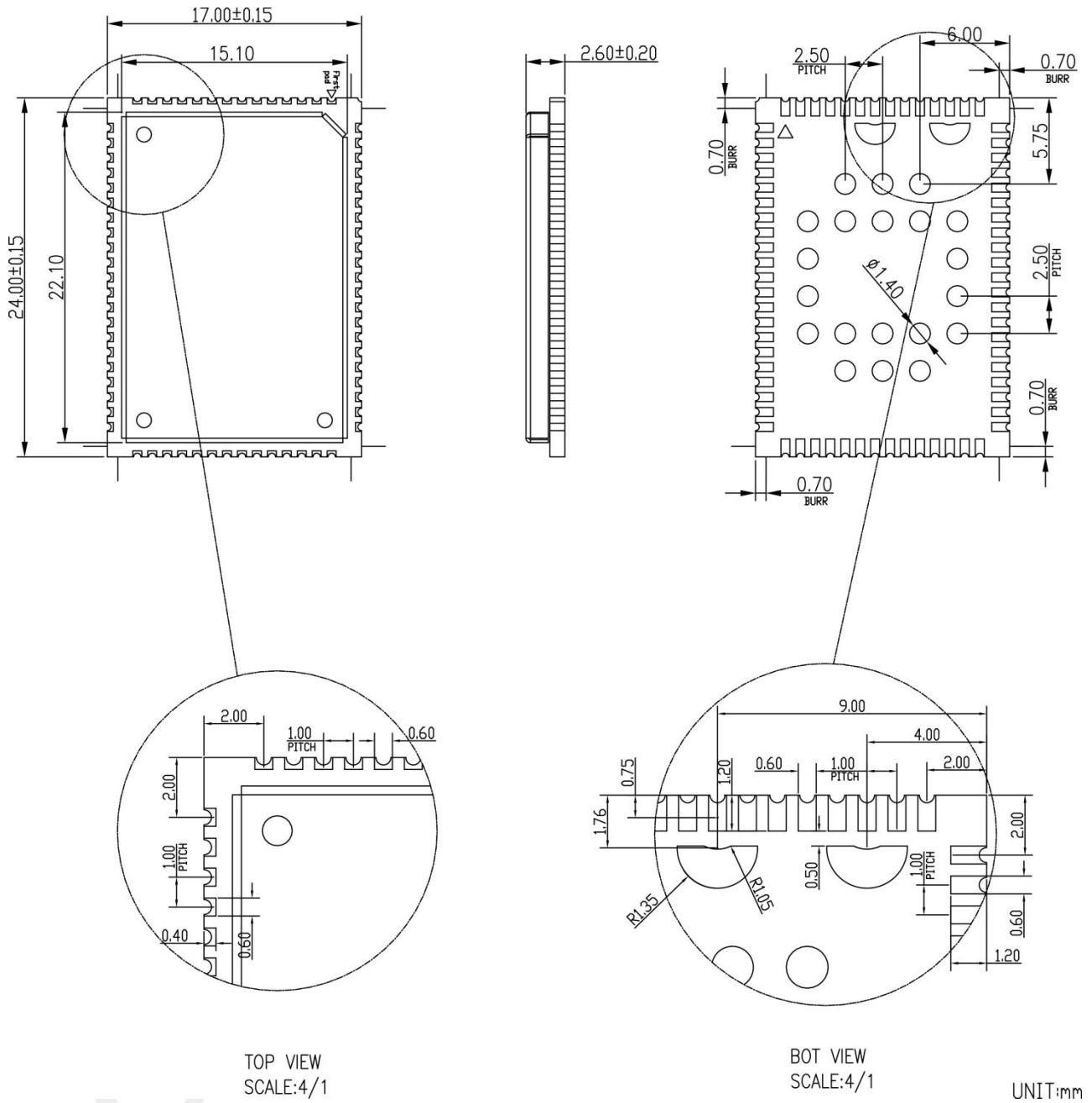


Figure 4: Dimensions of W82 (Unit: mm)

## 3 Interface Application

### 3.1 Power Supply

Ensure the module works properly, all power and GND pins should be connected; when all powers are supplied W82 will work well together with SIM8260 Series series modules.

When W82 and SIM8260 Series series modules are actually used together, the following current consumption data in Table 3 is measured:

**Table 3: Power electronic characteristics**

Symbol	Description	Min.	Typ.	Max.	Unit
VPH	Module VPH power supply voltage.	3.3	3.8	4.4	V
	Module VPH peak current.	-		1.2	A
VREG_1P224	Module VREG_1P224 power supply voltage.	1.22	1.28	1.42	V
	Module VREG_1P224 peak current.	-	-	0.6	A
VREG_0P824	Module VREG_0P824 power supply voltage.	0.82	0.88	1.0	V
	Module VREG_0P824 peak current.	-	-	1.7	A
VREG_1P904	Module VREG_1P904 power supply voltage.	1.8	1.88	2.1	V
	Module VREG_1P904 peak current.	-	-	0.6	A
VDD_IO	Module VDD_IO power supply voltage.	1.71	1.8	2.0	V
	Module VDD_IO peak current.	-	-	10	mA

#### NOTE

Test conditions:

1. The mounting capacitance on the VPH network is 10uF+100nF+33pF.
2. The mounting capacitance on the VREG\_1P224 network is 10uF+1uF +100nF.
3. The mounting capacitance on the VREG\_0P824 network is 10uF+1uF +100nF.
4. The mounting capacitance on the VREG\_1P904 network is 10uF+1uF+100nF.
5. The mounting capacitance on the VDD\_IO network is 1uF +100nF.
6. VREG\_0P824 layout PCB ESR<5mΩ

Timing of power on :

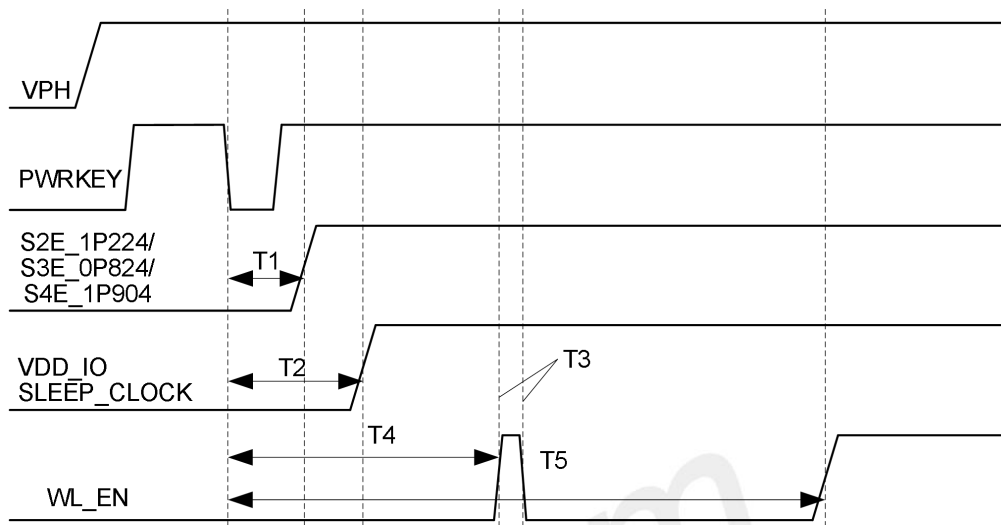


Figure 5: Timing of power on

Table 4: Power on timing and electronic characteristic

Symbol	Parameter	Min.	Typ.	Max.	Unit
T <sub>1</sub>	The time from power-on action to VREG_1P904, VREG_0P824, VREG_1P224 ready.	-	10	-	ms
T <sub>2</sub>	The time from power-on action to VDD_IO, SLEEP_CLOCK ready.	-	12	-	ms
T <sub>3</sub>	The time of W82 initialize.	-	13	-	ms
T <sub>4</sub>	The time from power-on action to W82 initialize.	-	6.6	-	s
T <sub>5</sub>	The time from power-on action to WLAN enable.	-	7.3	-	s

**NOTE**

The PWRKEY is the control signal of SIM8260 Series series modules.

Timing of power off :

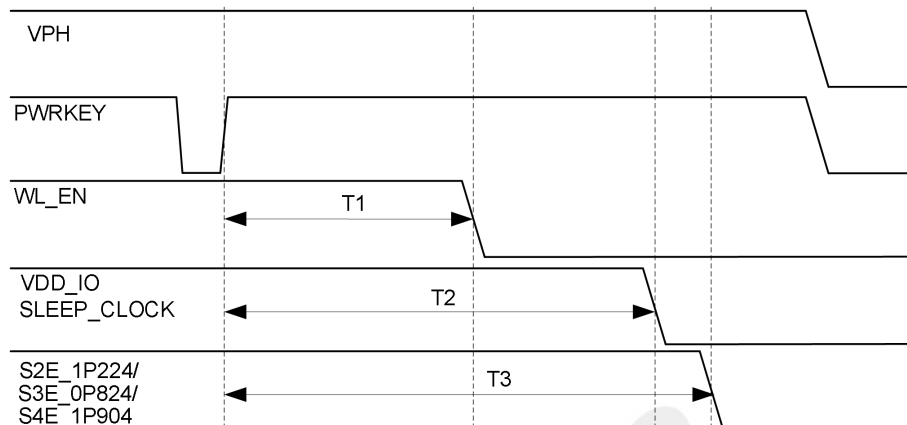


Figure 6: Timing of power off

Table 5: Power off timing and electronic characteristic

Symbol	Parameter	Min.	Typ.	Max.	Unit
T <sub>1</sub>	The time from power-off action to W82 disable.	-	3.5	-	s
T <sub>2</sub>	The time from power-off action to VDD_IO, SLEEP_CLOCK close.	-	6	-	s
T <sub>3</sub>	The time from power-off action to VREG_1P904, VREG_0P824, VREG_1P224 close.	-	6.2	-	s

**NOTE**

The PWRKEY is the control of SIM8260 Series series modules.

### 3.2 I2S Interface\*

I2S is for audio feature with BT function, under developing now.

**NOTE**

1. "\*" means under development.
2. If unused, please keep open.

### 3.3 Clock Interface

The 32KHz clock is for sleep mode of Bluetooth, the routing line of it should be as short as possible and also need GND protection.

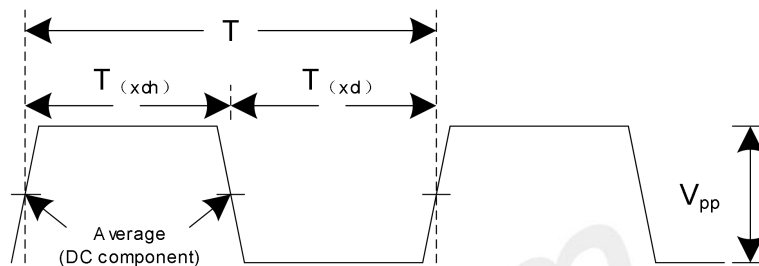


Figure 7: Timing of 32KHz

Table 6: Sleep clock

Symbol	Parameter	Min.	Typ.	Max.	Unit
T(xoh)	Sleep clock logic high	-	15.3	-	us
T(xol)	Sleep clock logic low	-	15.3	-	us
T	Sleep clock period	-	30.6	-	us
F	Sleep clock frequency	-	32.7641	-	KHz
Vpp	Peak-to-peak voltage	-	1.8	-	V

### 3.4 BT function

BT\_UART is for communication with SIM8260 Series modules, it is used to communicate between W82 and SIM8260 Series modules, so when you want to use BT function, be sure to connect it to SIM8260 Series modules.

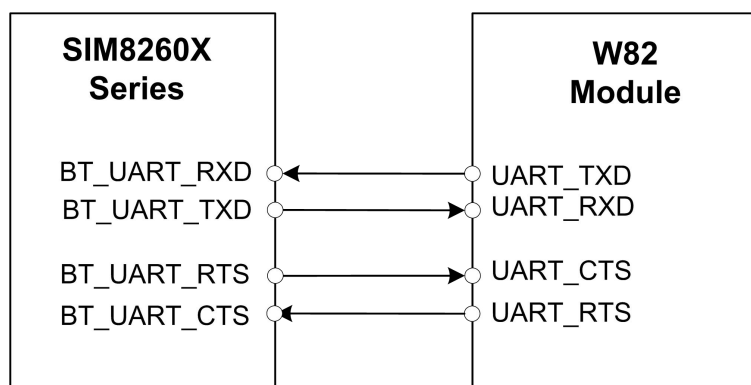


Figure 8: BT UART reference circuit

Table 7: BT UART

Pin name	Pin number	I/O	Description	Comment
UART_TXD	61	DO	BT UART transmit data for HCI messaging	
UART_RXD	60	DI	BT UART receive data for HCI messaging	
UART_CTS	59	DI	BT UART clear to send for HCI messaging	
UART_RTS	58	DO	BT UART request to send for HCI messaging	

**NOTE**

When using the BT function, please make sure that PCIe is connect.

### 3.5 PCIe Interface

PCIe is for communication with SIM8260 Series modules, which required differential trace impedance is  $85\pm 10\% \Omega$ , and the following figure is the PCIe reference circuit:

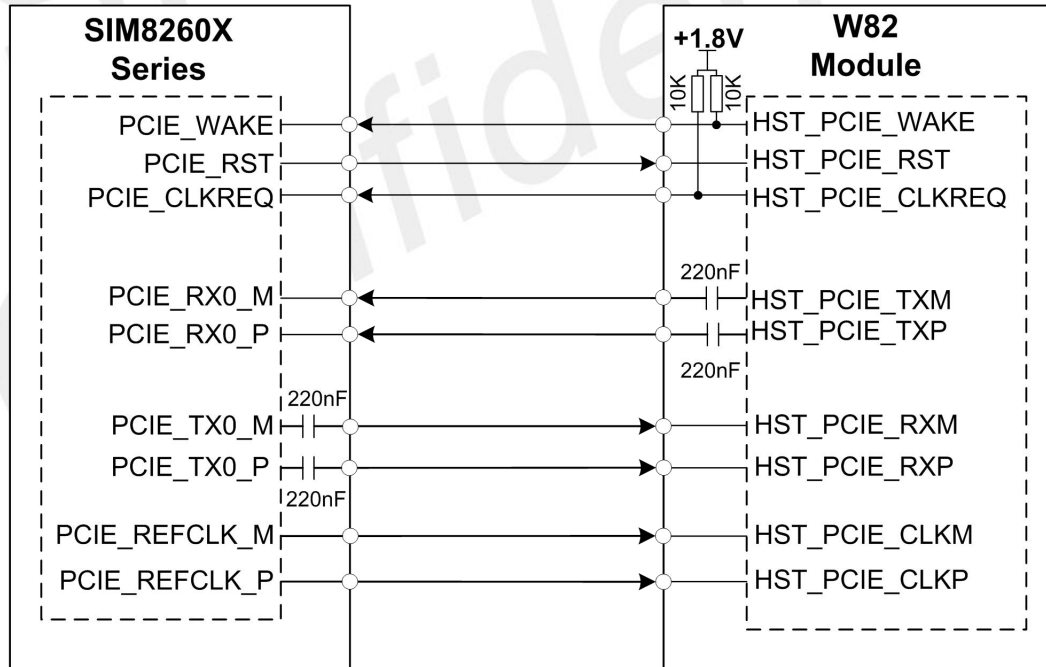


Figure 9: PCIe interface reference circuit

Table 8: PCIe Interface

Pin name	Pin number	I/O	Description	Comment
----------	------------	-----	-------------	---------

PCle_RXM	38	-	PCle receive minus	Required 85Ω differential impedance
PCle_RXP	39	-	PCle receive plus	
PCle_CLKM	41	-	PCle reference clock minus	
PCle_CLKP	42	-	PCle reference clock plus	
PCle_TXM	44	-	PCle transmit minus	
PCle_TXP	45	-	PCle transmit plus	
PCle_RST	49	DI	PCle reset.	
PCle_CLKREQ	47	DO	PCle clock request.	These pins have been pulled up to 1.8V internally
PCle_WAKE	48	DO	PCle wake-up	

### 3.6 Antenna Interface

Pin7 and pin12 are for antenna, the characteristic impedance is 50Ω.

#### 3.6.1 Frequency band

Table 9: Frequency band

Parameter	Value	Unit
Frequency range	2400~2496	MHz
	4900~7125	MHz

#### 3.6.2 Reference design for RF

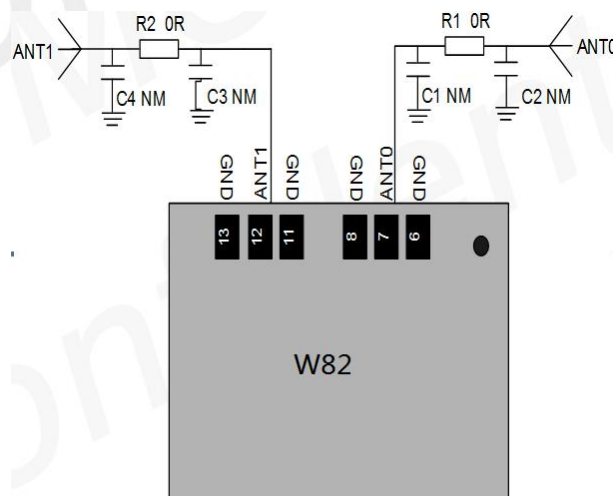


Figure 10: Reference design of RF

W82 provides two RF welding disc interfaces for connecting external antennas. The RF wiring connected to the module RF antenna welding disc is made with a micro-strip line or other type impedance line. The impedance must be controlled at about 50 ohms, and the routing line is as short as possible. In order to obtain better RF performance, two GND pads on each side of the RF interface are needed.

### 3.6.3 Requirement for antenna installation

Table 10: Requirement for antenna installation

Parameter	Requirement
Frequency range	2400~2496MHz 4900~7125MHz
SWR	≤2:1
Line loss	<1dB
Gain (dBi)	>1
Input impedance (Ω)	50
Direction	Vertical



## 4 Electrical Specifications

### 4.1 Absolute Maximum Ratings

Table 11: Absolute maximum ratings

Parameter	Description	Min	Type	Max	Unit
VPH	Power for PA	-	-	4.8	V
VREG_1P224	Power for PCIe and RFA	-	-	1.5	V
VREG_0P824	Power for RFA and others	-	-	1.1	V
VREG_1P904	Power for PCIe and RFA	-	-	2.1	V
VDD_IO	Power for IO	-	-	2.0	V

### 4.2 Operating Conditions

Table 12: Power recommended operating ratings

Parameter	Description	Min	Type	Max	Unit
VPH	Power for PA	3.3	3.8	4.4	V
VREG_1P224	Power for PCIe and RFA	1.22	1.28	1.42	V
VREG_0P824	Power for RFA and others	0.82	0.88	1.0	V
VREG_1P904	Power for PCIe and RFA	1.8	1.88	2.1	V
VDD_IO	Power for IO	1.71	1.8	2.0	V

Table 13: 1.8V digital I/O characteristics

Parameter	Description	Min	Type	Max	Unit
VIH	Input high level	1.26	-	2.1	V
VIL	Input low level	0	-	0.54	V
VOH	Output high level	1.35	-	1.8	V
VOL	Output low level	0	-	0.45	V

### 4.3 RF Characteristics

Table 14: Transmit power per chain

Data	Type	Unit
2.4G 802.11b @11Mbps	TBD	dBm
2.4G 802.11g @6Mbps	TBD	dBm
2.4G 802.11g @54Mbps	TBD	dBm
2.4G 802.11n, HT20 @MCS0	TBD	dBm
2.4G 802.11n, HT40 @MCS0	TBD	dBm
2.4G 802.11n, HT20 @MCS7	TBD	dBm
2.4G 802.11n, HT40 @MCS7	TBD	dBm
2.4G 802.11ac, VHT20 @MCS9	TBD	dBm
2.4G 802.11ac, VHT40 @MCS9	TBD	dBm
2.4G 802.11ax, HE20 @MCS11	TBD	dBm
2.4G 802.11ax, HE40 @MCS11	TBD	dBm
5G 802.11a @6Mbps	TBD	dBm
5G 802.11a @54Mbps	TBD	dBm
5G 802.11n, HT20 @MCS0	TBD	dBm
5G 802.11n, HT40 @MCS0	TBD	dBm
5G 802.11n, HT80 @MCS0	TBD	dBm
5G 802.11n, HT20 @MCS7	TBD	dBm
5G 802.11n, HT40 @MCS7	TBD	dBm
5G 802.11n, HT80 @MCS7	TBD	dBm
5G 802.11ac, VHT20 @MCS9	TBD	dBm
5G 802.11ac, VHT40 @MCS9	TBD	dBm
5G 802.11ac, VHT80 @MCS9	TBD	dBm
5G 802.11ax, HE20 @MCS11	TBD	dBm
5G 802.11ax, HE40 @MCS11	TBD	dBm
5G 802.11ax, HE80 @MCS11	TBD	dBm
5G 802.11ax, HE160 @MCS11	TBD	dBm
6G 802.11a @6Mbps	TBD	dBm
6G 802.11a @54Mbps	TBD	dBm
6G 802.11ax, HE20 @MCS11	TBD	dBm
6G 802.11ax, HE40 @MCS11	TBD	dBm
6G 802.11ax, HE80 @MCS11	TBD	dBm
6G 802.11ax, HE160 @MCS11	TBD	dBm

**Table 15: Receive Sensitivity at 2.4G for 1X1 configuration**

Band	Type	Unit
2.4G 11b@1Mbps	TBD	dBm
2.4G 11b@11 Mbps	TBD	dBm
2.4G 11g@6Mbps	TBD	dBm
2.4G 11g@54Mbps	TBD	dBm
2.4G 11n/ac@HT20-MCS0	TBD	dBm
2.4G 11n/ac@HT20-MCS7	TBD	dBm
2.4G 11n/ac@HT40-MCS0	TBD	dBm
2.4G 11n/ac@HT40-MCS7	TBD	dBm
2.4G 11ac@VHT20-MCS9	TBD	dBm
2.4G 11ac@VHT40-MCS9	TBD	dBm
2.4G 11ax@HE20-MCS0	TBD	dBm
2.4G 11ax@HE20-MCS11	TBD	dBm
2.4G 11ax@HE40-MCS0	TBD	dBm
2.4G 11ax@HE40-MCS11	TBD	dBm

**Table 16: Receive Sensitivity at 5G for 1X1 configuration**

Band	Type	Unit
5G 11a@6Mbps	TBD	dBm
5G 11a@54Mbps	TBD	dBm
5G 11n/ac@HT20-MCS0	TBD	dBm
5G 11n/ac@HT20-MCS7	TBD	dBm
5G 11n/ac@HT40-MCS0	TBD	dBm
5G 11n/ac@HT40-MCS7	TBD	dBm
5G 11n/ac@HT80-MCS0	TBD	dBm
5G 11n/ac@HT80-MCS7	TBD	dBm
5G 11ac@VHT20-MCS9	TBD	dBm
5G 11ac@VHT40-MCS9	TBD	dBm
5G 11ac@VHT80-MCS9	TBD	dBm
5G 11ax@HE20-MCS0	TBD	dBm
5G 11ax@HE20-MCS11	TBD	dBm
5G 11ax@HE40-MCS0	TBD	dBm
5G 11ax@HE40-MCS11	TBD	dBm
5G 11ax@HE80-MCS0	TBD	dBm
5G 11ax@HE80-MCS11	TBD	dBm
5G 11ax@HE160-MCS0	TBD	dBm
5G 11ax@HE160-MCS11	TBD	dBm

**Table 17: Receive Sensitivity at 6G for 1X1 configuration**

Band	Type	Unit
6G 11a@6Mbps	TBD	dBm
6G 11a@54Mbps	TBD	dBm
6G 11ax@HE20-MCS0	TBD	dBm
6G 11ax@HE20-MCS11	TBD	dBm
6G 11ax@HE40-MCS0	TBD	dBm
6G 11ax@HE40-MCS11	TBD	dBm
6G 11ax@HE80-MCS0	TBD	dBm
6G 11ax@HE80-MCS11	TBD	dBm
6G 11ax@HE160-MCS0	TBD	dBm
6G 11ax@HE160-MCS11	TBD	dBm

## 4.4 ESD

Module is sensitive to ESD in the process of storage, transporting, and assembling. When Module is mounted on the customers' main board, the ESD components should be placed beside the connectors which human body may touch, such as switches, USB interface, etc. The following table shows the Module ESD measurement performance.

**Table 18: The ESD performance measurement table (Temperature: 25°C, humidity: 45%)**

Parameter	Connect ( $\pm$ kv)	Air ( $\pm$ kv)
GND	$\pm 3$	$\pm 6$
Power	$\pm 2$	$\pm 5$
Antenna	$\pm 2$	$\pm 5$
PCIe	$\pm 2$	$\pm 4$
I2S	$\pm 2$	$\pm 4$
UART	$\pm 2$	$\pm 4$
Other PADS	$\pm 2$	$\pm 4$

### NOTE

Test conditions:

1. Test conditions: the external of the module has surge protection diodes and ESD protection diodes
2. The data in Table 18 were tested using SIMCom EVB.

## 5 Manufacturing

### 5.1 Top and Bottom View of W82

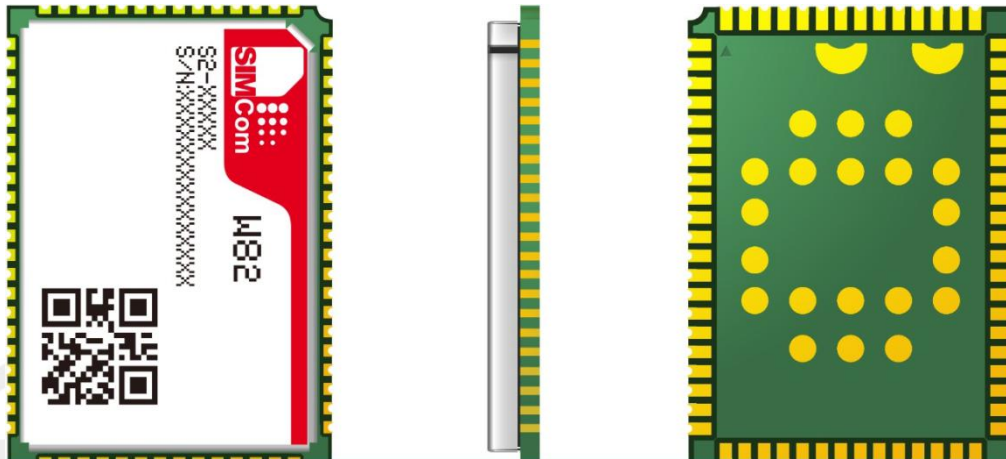


Figure 11: Top and bottom view of W82

### 5.2 Label Description Information

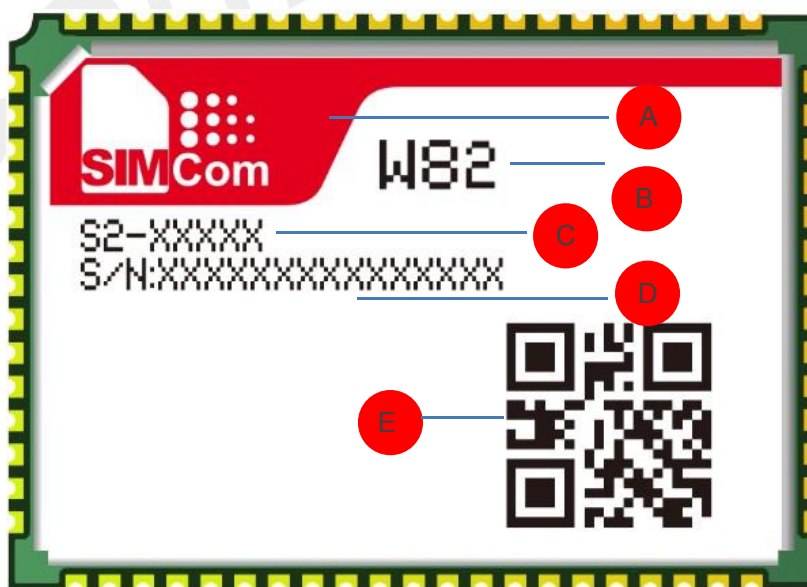


Figure 12: Label description of module

**Table 19: Label description of module information**

No.	Description
A	LOGO
B	Project name
C	Product code
D	Serial number
E	QR code

**NOTE**

Figure 11 and Figure 12 are the effect diagrams of the module, for reference only. Please refer to the actual product for appearance.

### 5.3 Recommended PCB Footprint

The following figure shows the PCB footprint of W82.

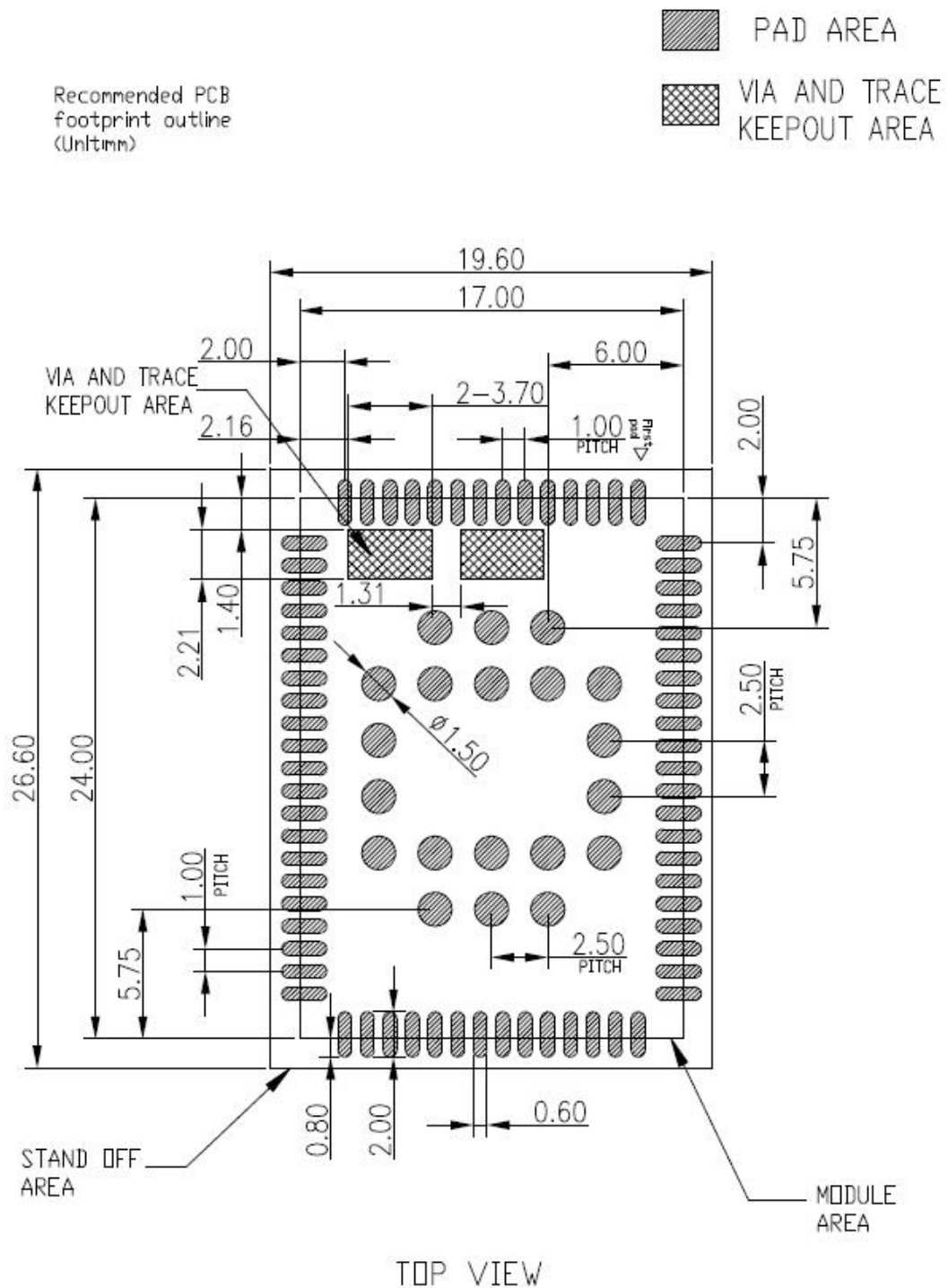


Figure 13: Recommended PCB footprint

**NOTE**

FDRBIDDEN AREA requires that the TOP layer cannot be layout. See W82 module recommended package for details

## 5.4 Recommended SMT Stencil

The following figure shows the SMT stencil of W82.

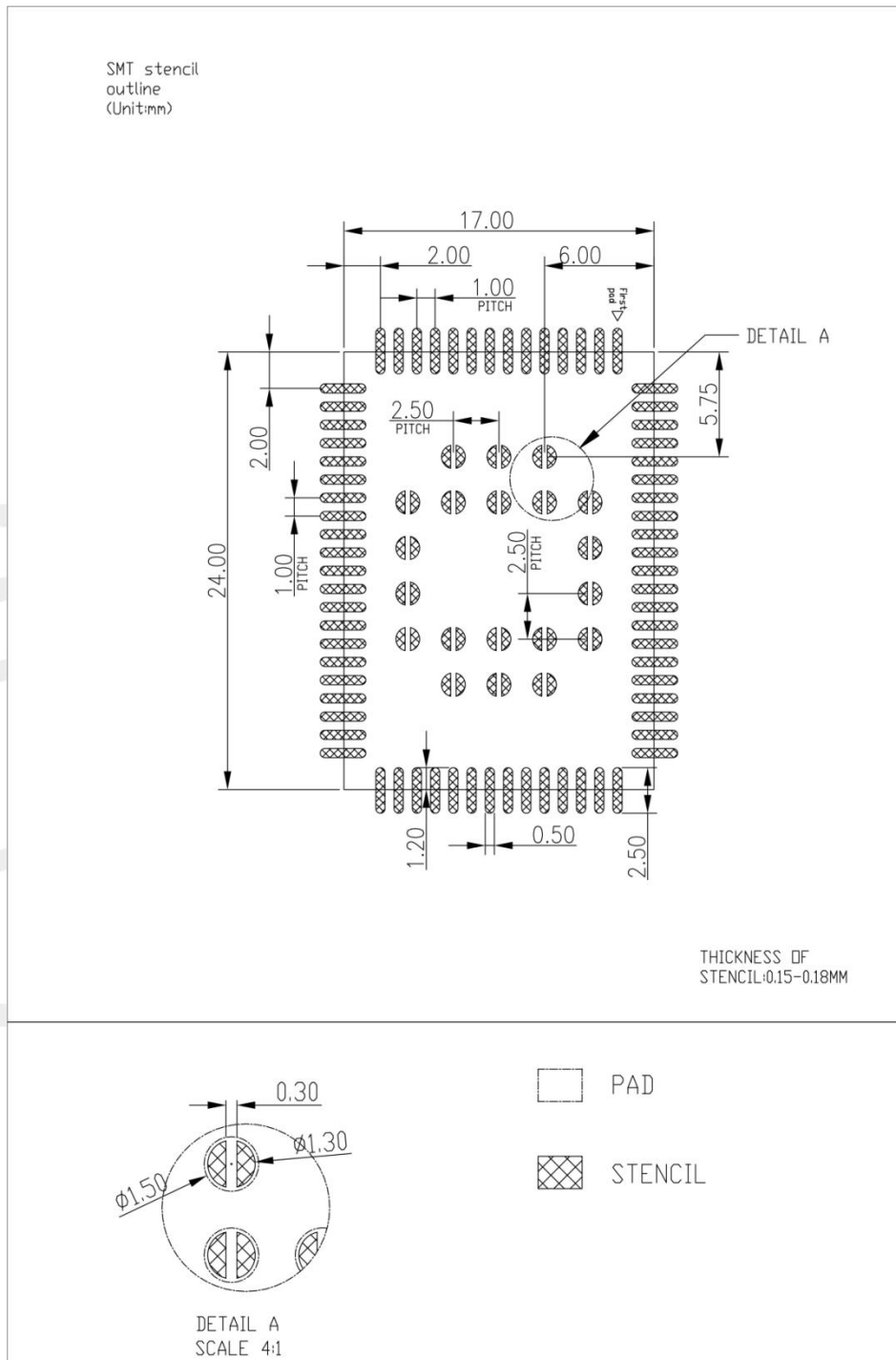


Figure 14: Recommended SMT stenci



## 5.5 Recommended SMT Reflow Profile

SIMCom provides a typical soldering profile. Therefore, the soldering profile shown below is only a generic recommendation and should be adjusted to the specific application and manufacturing constraints.

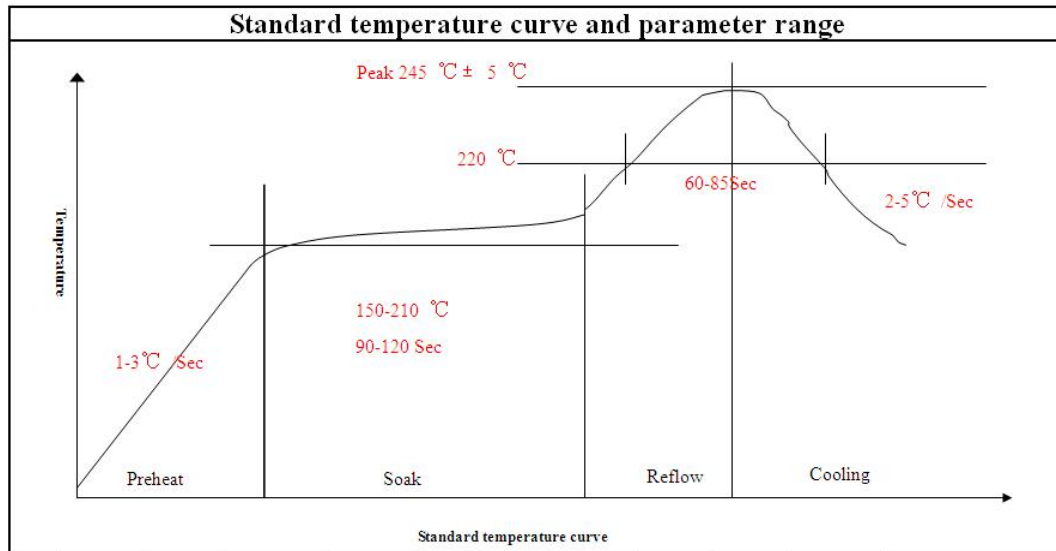


Figure 15: The ramp-soak-spike reflow profile of module

## 5.6 Moisture Sensitivity Level (MSL)

Module is susceptible to damage induced by absorbed moisture and high temperature. A package's moisture-sensitivity level (MSL) indicates its ability to withstand exposure after it is removed from its shipment bag, while it is on the factory floor awaiting PCB installation. A low MSL rating is better than a high rating; a low MSL device can be exposed on the factory floor longer than a high MSL device. All pertinent MSL ratings are summarized in Table 22.

Table 20: MSL ratings summary

MSL	Out-of-bag floor life	Comments
1	Unlimited	≤+30°C/85% RH
2	1 year	≤+30°C/60% RH
2a	4 weeks	≤+30°C/60% RH
3	168 hours	≤+30°C/60% RH
4	72 hours	≤+30°C/60% RH
5	48 hours	≤+30°C/60% RH
5a	24 hours	≤+30°C/60% RH

6

Mandatory bake before use. After bake, it must be reflowed within the time limit specified on the label.

$\leq +30^{\circ}\text{C}/60\% \text{ RH}$

Module is qualified to Moisture Sensitivity Level (MSL) 3 in accordance with JEDEC J-STD-033. If the prescribed time limit is exceeded, users should bake module for 192 hours in drying equipment (<5% RH) at  $40+5/-0^{\circ}\text{C}$ , or 72 hours at  $85+5/-5^{\circ}\text{C}$ . Note that plastic tray is not heat-resistant, and only can be baked at  $45^{\circ}\text{C}$ .

**NOTE**

IPC / JEDEC J-STD-033 standard must be followed for production and storage.

## 5.7 Baking Requirements

It is necessary to bake modules if the prescribed time limit has been exceeded. The baking conditions are specified in Table 23. Note that if baking is required, the devices must be transferred into trays that can be baked to at least  $125^{\circ}\text{C}$ .

Table 21: Baking requirements

Baking conditions options	Duration
$40^{\circ}\text{C}\pm 5^{\circ}\text{C}$ , <5% RH	192 hours
$120^{\circ}\text{C}\pm 5^{\circ}\text{C}$ , <5% RH	4 hours

## 6 Packaging

Module support tray packaging. The packaging process is shown in the following figures.

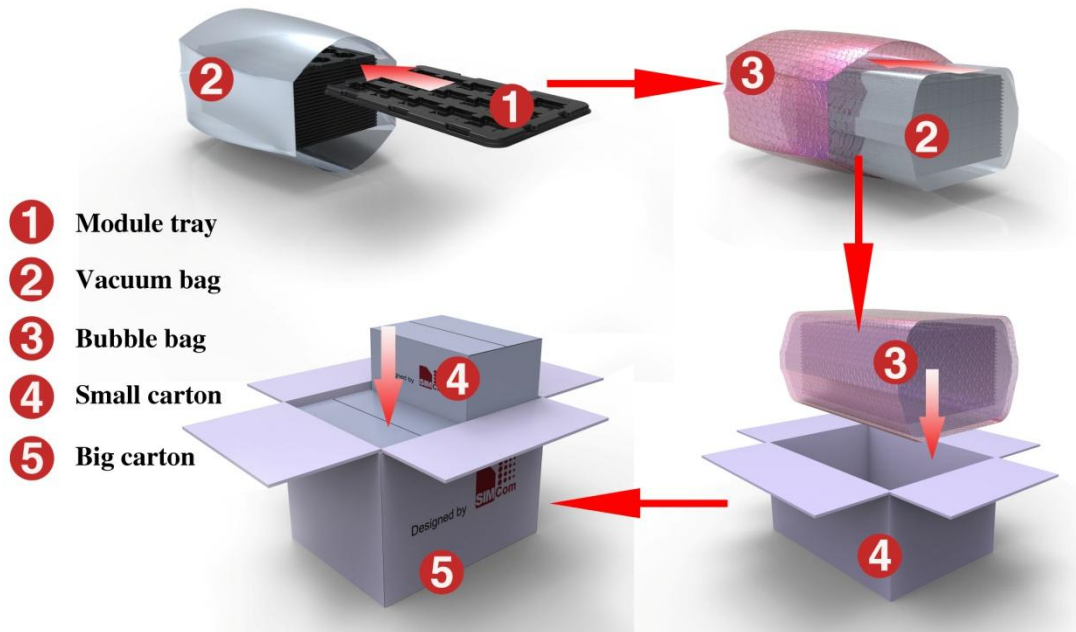


Figure 16: Packaging diagram

Module tray drawing:

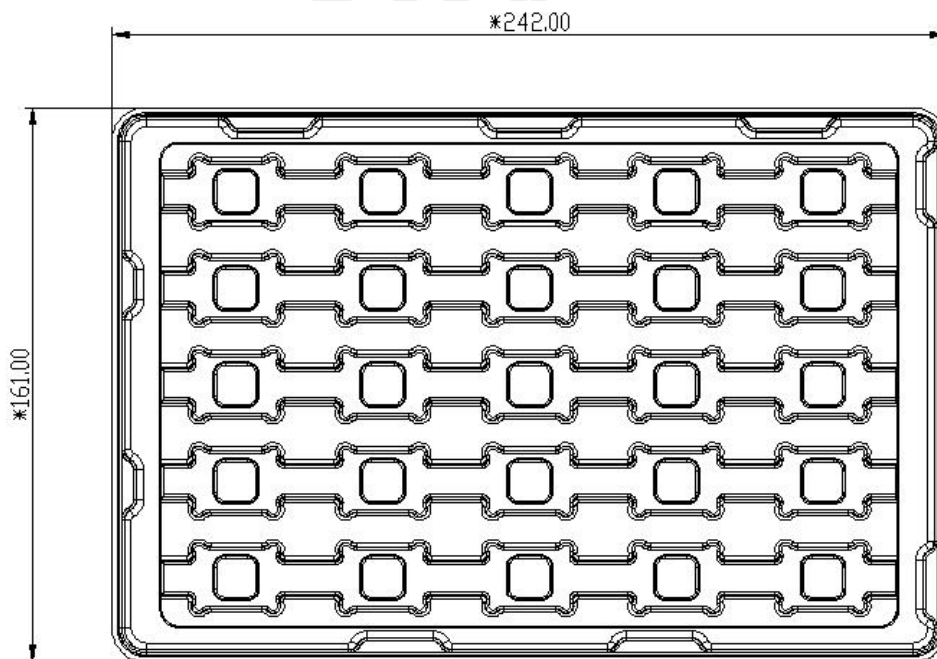


Figure 17: Tray drawing

**Table 22: Tray size**

Length ( $\pm 3\text{mm}$ )	Width ( $\pm 3\text{mm}$ )	Number
242.0	161.0	25

Small carton drawing:

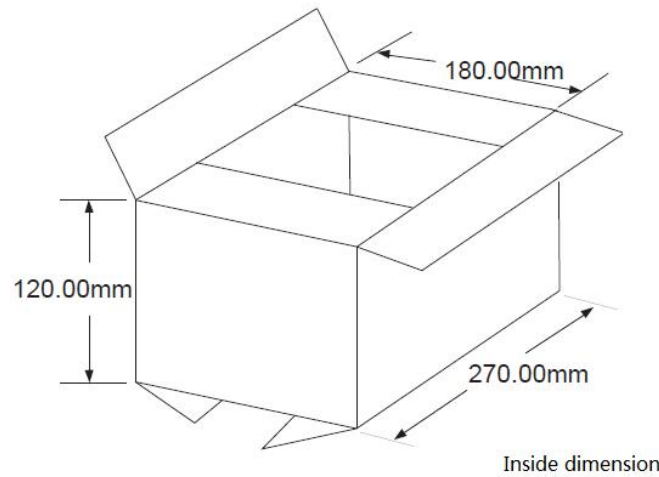


Figure 18: Small carton drawing

**Table 23: Small carton size**

Length ( $\pm 10\text{mm}$ )	Width ( $\pm 10\text{mm}$ )	Height ( $\pm 10\text{mm}$ )	Number
270	180	120	25*20=500

Big carton drawing:

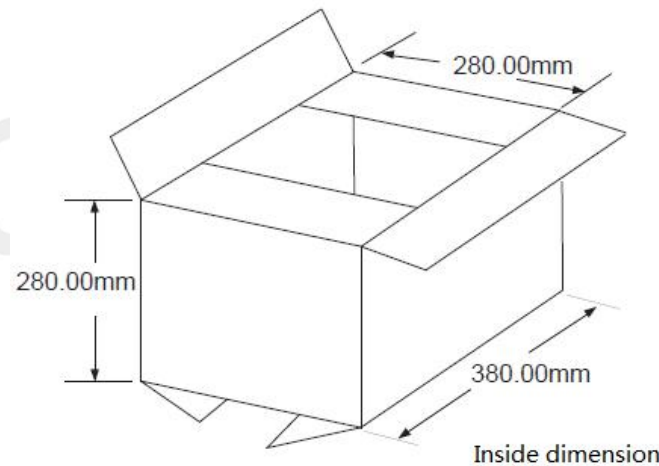


Figure 19: Big carton drawing

**Table 24: Big carton size**

Length ( $\pm 10\text{mm}$ )	Width ( $\pm 10\text{mm}$ )	Height ( $\pm 10\text{mm}$ )	Number
380	280	280	500*4=2000

## 7 Appendix

### 7.1 Related Documents

Table 25: Related documents

NO	Title	Description
[1]	SIM8260 Series-LGA_KDL	W82 and SIM8260 Series reference design

### 7.2 Terms and Abbreviations







Table 26: Terms and abbreviations

Abbreviation	Description
BPSK	Binary Phase Shift Keying
B	Bidirectional digital input
CCK	Complementary Code Keying
DSSS	Direct Sequence Spread Spectrum
NC	Not connect
ESD	Electrostatic Discharge
I/O	Input/Output
LTE	Long Term Evolution
Mbps	Million Bits Per Second
MCS	Modulation and Coding Scheme
OFDM	Orthogonal Frequency Division Multiplexing
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RF	Radio Frequency
RX	Receive Direction
TX	Transmitting Direction
VSWR	Voltage Standing Wave Ratio
WLAN	Wireless Local Area Networks
LAA	Limited Access Authorization

MIMO	Multiple Input Multiple Output
I2S	Inter-IC Sound
LTE	Long Term Evolution
PCIe	Peripheral Component Interface Express
UART	Universal Asynchronous Receiver Transmitter

## 7.3 Safety Caution

Table 27: Safety caution

Marks	Requirements
	When in a hospital or other health care facility, observe the restrictions about the use of mobiles. Switch the cellular terminal or mobile off, medical equipment may be sensitive and not operate normally due to RF energy interference.
	Switch off the cellular terminal or mobile before boarding an aircraft. Make sure it is switched off. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. Forgetting to think much of these instructions may impact the flight safety, or offend local legal action, or both.
	Do not operate the cellular terminal or mobile in the presence of flammable gases or fumes. Switch off the cellular terminal when you are near petrol stations, fuel depots, chemical plants or where blasting operations are in progress. Operation of any electrical equipment in potentially explosive atmospheres can constitute a safety hazard.
	Your cellular terminal or mobile receives and transmits radio frequency energy while switched on. RF interference can occur if it is used close to TV sets, radios, computers or other electric equipment.
	Road safety comes first! Do not use a hand-held cellular terminal or mobile when driving a vehicle, unless it is securely mounted in a holder for hands free operation. Before making a call with a hand-held terminal or mobile, park the vehicle.
	GSM cellular terminals or mobiles operate over radio frequency signals and cellular networks and cannot be guaranteed to connect in all conditions, especially with a mobile fee or an invalid SIM card. While you are in this condition and need emergent help, please remember to use emergency calls. In order to make or receive calls, the cellular terminal or mobile must be switched on and in a service area with adequate cellular signal strength. Some networks do not allow for emergency call if certain network services or phone features are in use (e.g. lock functions, fixed dialing etc.). You may have to deactivate those features before you can make an emergency call. Also, some networks require that a valid SIM card be properly inserted in the cellular terminal or mobile.