

# SIM5320J User Manual

## 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.

(5) the modules FCC ID is not visible when installed in the host, or

(6) if the host is marketed so that end users do not have straight forward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: Contains Transmitter Module FCC ID: UDV-1703022017008 or Contains FCC ID: UDV-1703022017008 must be used.

## 1. SIM5320J Description

### 1.1. Summarize

Designed for global market, SIM5320J is a dual-band GSM/GPRS/EDGE and dual-band UMTS /HSDPA that works on frequencies of EGSM 900 MHz, DCS 1800 MHz and WCDMA 2100/850MHz. The SIM5320J support HSDPA. User can choose the module based on the wireless network configuration.

With a tiny configuration of 30\*30\*2.9 mm and integrated functions, SIM5320J can meet almost any space requirement in users' application, such as Smart phone, PDA phone, industrial handhelds, machine-to-machine, vehicle applications, etc..

There are 80 pins on SIM5320J, which provide most application interfaces for customers' board.

## 1.2. Feature

Dual-Band UMTS/HSDPA 850/2100MHz

Dual-Band GSM/GPRS/EDGE 900/1800MHz

GPRS multi-slot class 12

EDGE multi-slot class 12

Output power

- UMTS 850/2100: 0.25W

- GSM900: 2W

- DCS1800: 1W

Control Via AT Commands

Supply voltage range: 3.4~ 4.2V

Extended operation temperature: -40 to +85

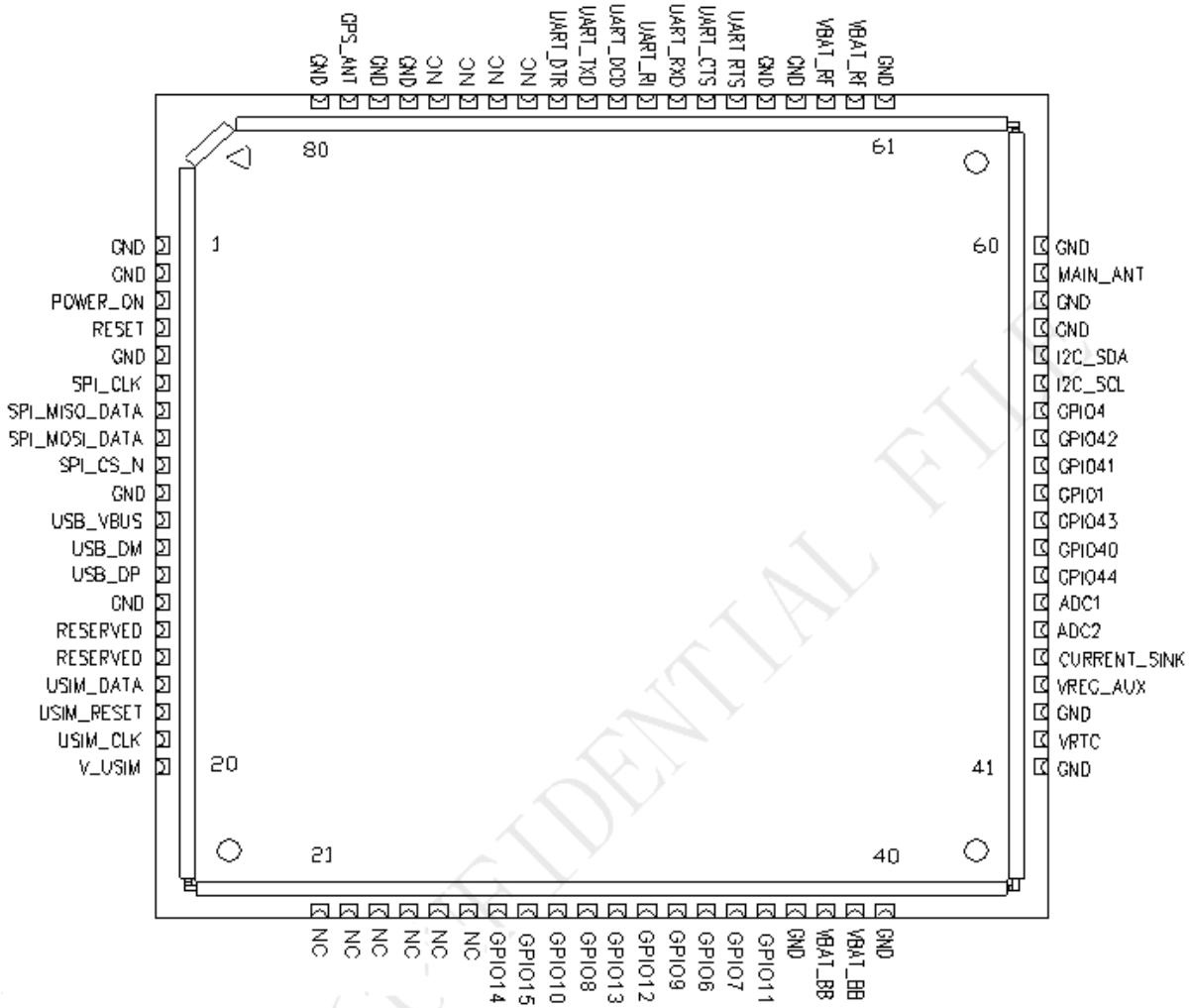
Dimension: 30 \* 30 \* 2.9 mm

Weight: 5.6g

80 LCC pads include

- Interface to external SIM 3V/1.8V
- USB 2.0
- UART
- I2C
- Keypad
- SPI
- PCM
- GPIO
- ADC

### 1.3. Pin



### 1.4. Picture



Figure 1: Top and Bottom view of SIM5320J

### 1.5. Dimension

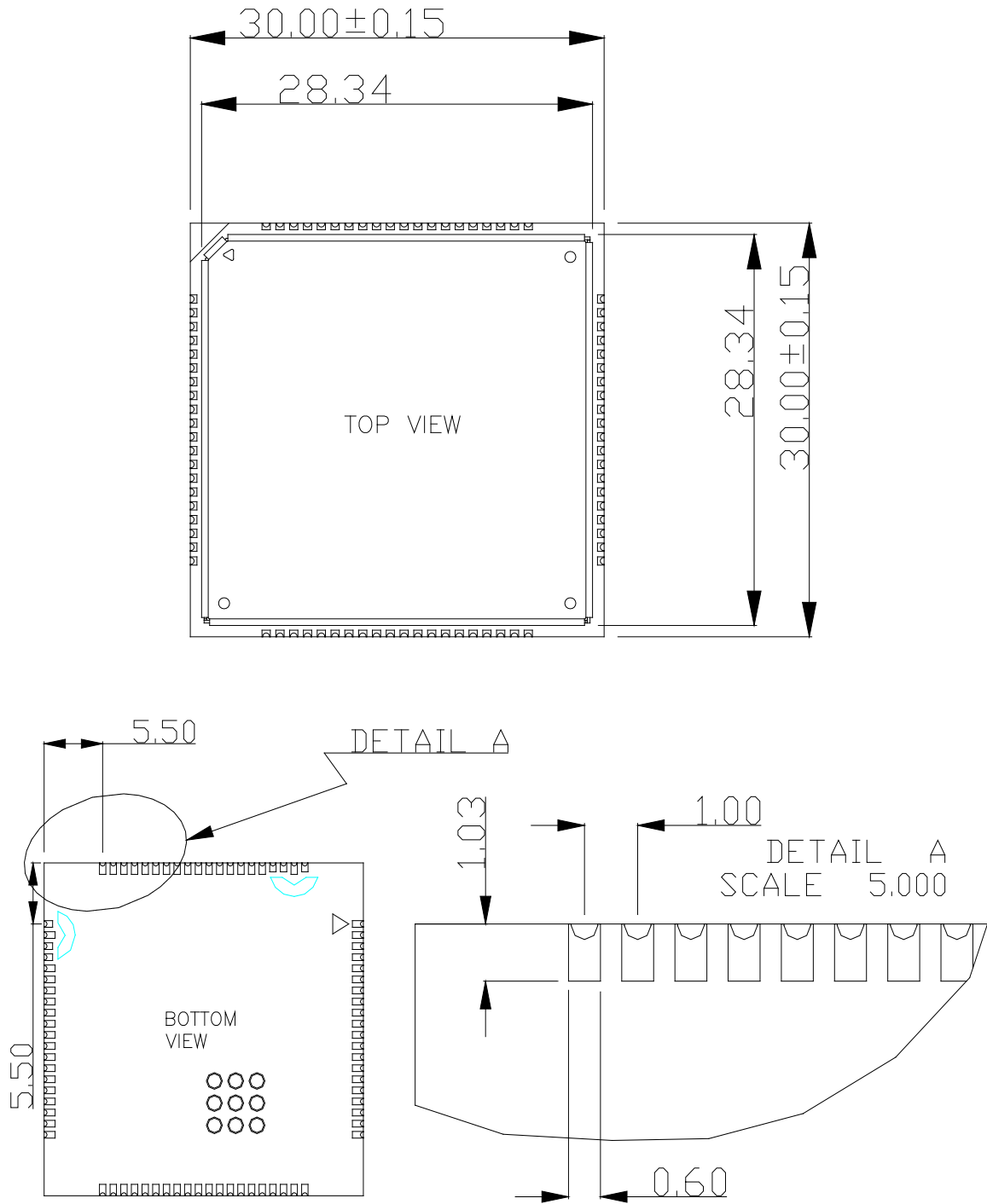


Figure 2: Dimention

## 2. Detail Block Diagram

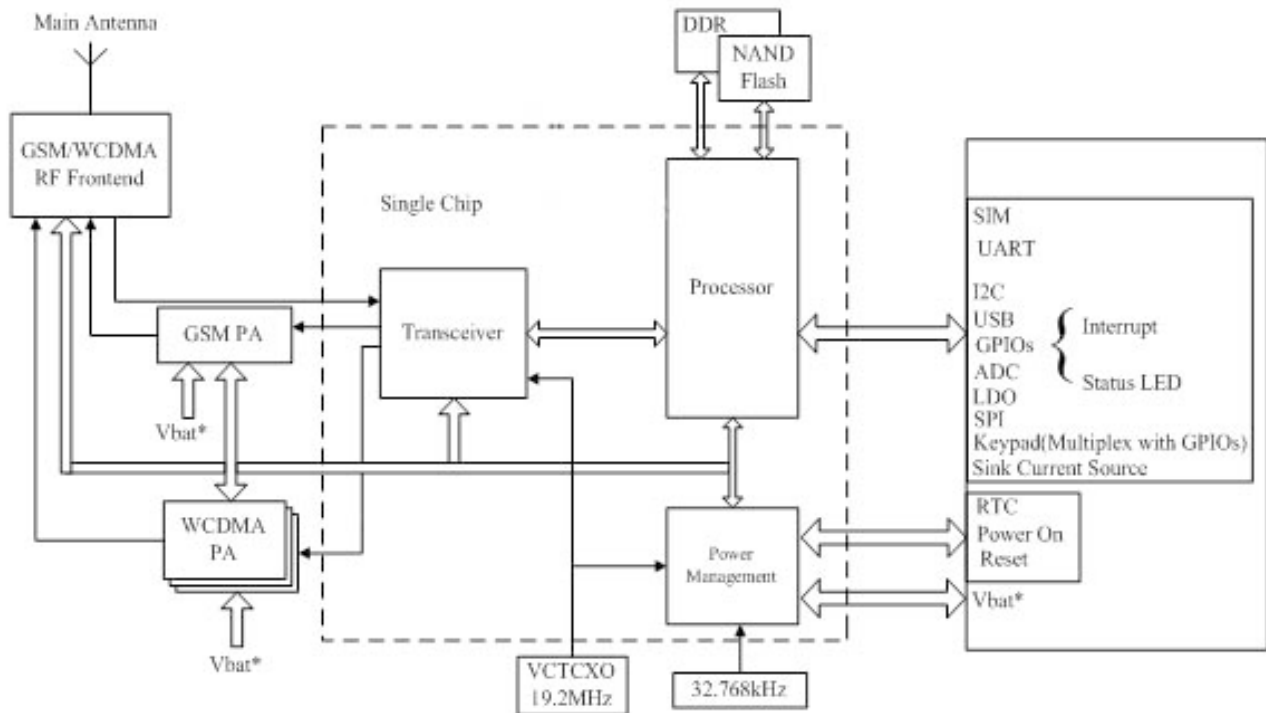


Figure 3: Block diagram of SIM5320J

## 3. Electrical and Reliability Characteristics

### 3.1. Absolute Maximum Ratings

The absolute maximum ratings stated in following table are stress ratings under non-operating conditions. Stresses beyond any of these limits will cause permanent damage to SIM5320J.

Table 1: Absolute maximum ratings

Parameter	Min	Max	Unit
Voltage at digital pins (1.8v mode)	-0.3	1.8+0.3	V
Voltage at digital pins (2.6v mode)	-0.3	2.6+0.3	V
Voltage at VBAT	-0.5	6.0	V
Voltage at VRTC	1.5	3.2	V
Voltage at USB_VBUS	-0.5	6.0	V

### 3.2. USIM Card Interface Characteristics

Table 2: USIM card interface characteristics

### 3.3. SIM\_VDD Characteristics

Pin name	3.0V mode			1.8V mode		
	Min	Typ	Max	Min	Typ	Max
V_USIM	2.7	3.00	3.3	1.65	1.8	2.0
USIM_RESET	0.8* V_USIM	3.00	V_USIM	0.8* V_USIM	1.8	V_USIM
USIM_CLK	0.7* V_USIM	3.00	V_USIM	0.8* V_USIM	1.8	V_USIM
USIM_DATA	0.7* V_USIM	3.00	V_USIM	0.8* V_USIM	1.8	V_USIM

### 3.4. Current Consumption (VBAT = 3.8V)

Table 3: Current consumption

GSM Sleep mode (without USB connection)	
GSM900	Sleep @DRX=2 4.5mA
	Sleep @DRX=5 2.7mA
	Sleep @DRX=9 2.3mA
DCS1800	Sleep @DRX=2 4.5mA
	Sleep @DRX=5 2.7mA
	Sleep @DRX=9 2.3mA
GSM Sleep Mode (with USB suspended)	
GSM900	Sleep @DRX=2 4.6mA
	Sleep @DRX=5 2.8mA
	Sleep @DRX=9 2.5mA
DCS1800	Sleep @DRX=2 4.6mA
	Sleep @DRX=5 2.8mA
	Sleep @DRX=9 2.5mA
DATA mode, GPRS ( 1 Rx,4 Tx ) CLASS 12	
GSM 900	@power level #5 <660mA, Typical 484mA
DCS1800	@power level #0 <530mA, Typical 346mA
DATA mode, GPRS ( 3Rx, 2 Tx ) CLASS 12	
GSM 900	@power level #5 <440mA, Typical 332mA
DCS1800	@power level #0 <400mA, Typical 260mA
EDGE Data	
DATA mode, EDGE( 1 Rx,4 Tx ) CLASS 12	
GSM 900	@power level #8 <500mA, Typical 332mA
DCS1800	@power level #2 <450mA, Typical 291mA
DATA mode, EDGE( 3Rx, 2 Tx ) CLASS 12	
GSM 900	@power level #8 <330mA, Typical 231mA
DCS1800	@power level #2 <300mA, Typical 206mA
UMTS Sleep Mode (without USB connection)	
WCDMA 2100	Sleep @DRX=9 2.2mA

	Sleep @DRX=8	2.7 mA
	Sleep @DRX=6	4.7mA
WCDMA 850	Sleep @DRX=9	2.2mA
	Sleep @DRX=8	2.7 mA
	Sleep @DRX=6	4.7mA
<b>UMTS Sleep Mode (with USB suspended)</b>		
WCDMA 2100	Sleep @DRX=9	2.4mA
	Sleep @DRX=8	2.8 mA
	Sleep @DRX=6	4.8mA
WCDMA 850	Sleep @DRX=9	2.4mA
	Sleep @DRX=8	2.8 mA
	Sleep @DRX=6	4.8mA
<b>HSDPA Data</b>		
WCDMA 2100	@Power 23dBm CQI=22	Typical 610mA
	@Power 21dBm CQI=5	Typical 540mA
	@Power -5dBm CQI=22	Typical 270mA
WCDMA 850	@Power 23dBm CQI=22	Typical 550mA
	@Power 21dBm CQI=5	Typical 490mA
	@Power -5dBm CQI=22	Typical 220mA

### 3.5. Electro-Static Discharge

SIM800H is an ESD sensitive component, so more attention should be paid to the procedure of handling and packaging. The ESD test results are shown in the following table.

**Table 4: The ESD characteristics (Temperature: 25 , Humidity: 45 %)**

Part	Contact discharge	Air discharge
VBAT,GND	±4KV	±6KV
UART,USB	±2KV	±6KV
Antenna port	±4KV	±6KV
Other ports	±2KV	±2KV

## 4. Radio Characteristics

### 4.1. Module RF Output Power

The following table shows the module conducted output power.

**Table 5: SIM5320J conducted RF output power**

Frequency	Max	Min
E-GSM900	33dBm ±2dB	5dBm ± 5dB

DCS1800	30dBm ±2dB	0dBm ± 5dB
E-GSM900 (8-PSK)	27dBm ±3dB	5dBm ± 5dB
DCS1800 (8-PSK)	26dBm +3/-4dB	0dBm ±5dB
WCDMA 2100	24dBm +1/-3dB	-56dBm ±5dB
WCDMA 850	24dBm +1/-3dB	-56dBm ±5dB

## 4.2. Module RF Receive Sensitivity

The following table shows the module’s conducted receive sensitivity, it is tested under static condition.

**Table 6: SIM5320J conducted RF receive sensitivity**

Frequency	Receive sensitivity
E-GSM900	< -106dBm
DCS1800	< -106dBm
WCDMA 2100	< -108dBm
WCDMA 850	< -106dBm

## 4.3. Module Operating Frequencies

The following table shows the module’s operating frequency range.

**Table 7: SIM5320J operating frequencies**

Frequency	Receiving	Transmission
E-GSM900	925 ~ 960 MHz	880 ~ 915 MHz
DCS1800	1805 ~ 1880 MHz	1710 ~ 1785 MHz
WCDMA2100	2110 ~ 2170 MHz	1920 ~ 1980 MHz
WCDMA 850	869 ~ 894 MHz	824 ~ 849 MHz

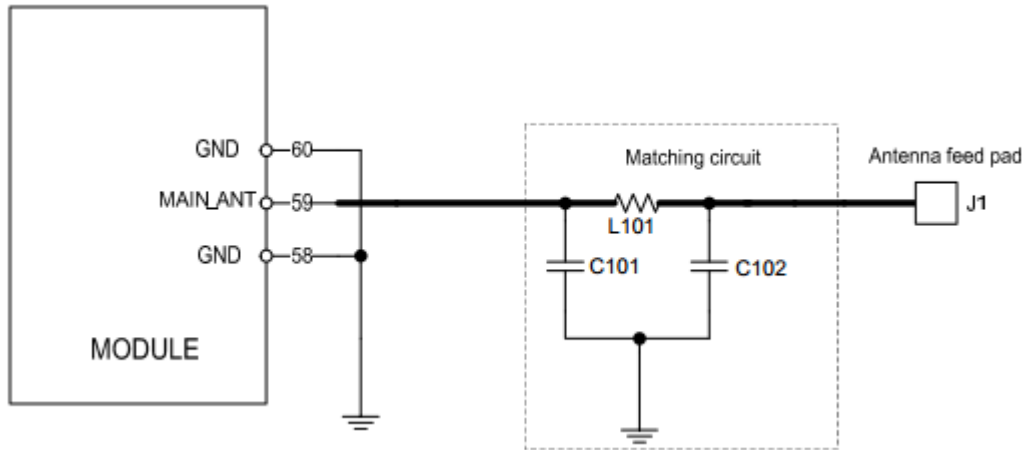
## 5. Antenna interface

SIM5320J provides RF antenna interface. Customer’s antenna should be located in the host board and connected to module’s antenna pad through micro-strip line or other types of RF trace and the trace impedance must be controlled in 50Ω. The maximum gain of the GSM antenna gain should not exceed 2dBi considering the SAR radio. SIMCom recommends that the total insertion loss between the antenna pad and antenna should meet the following requirements:

- GSM900<0.5dB
- DCS1800 <0.9dB
- WCDMA 2100<0.9dB
- WCDMA 850<0.5dB



To facilitate the antenna tuning and certification test, a RF connector and an antenna matching circuit should be added. The following figure is the recommended circuit.



**Figure1: antenna matching circuit**

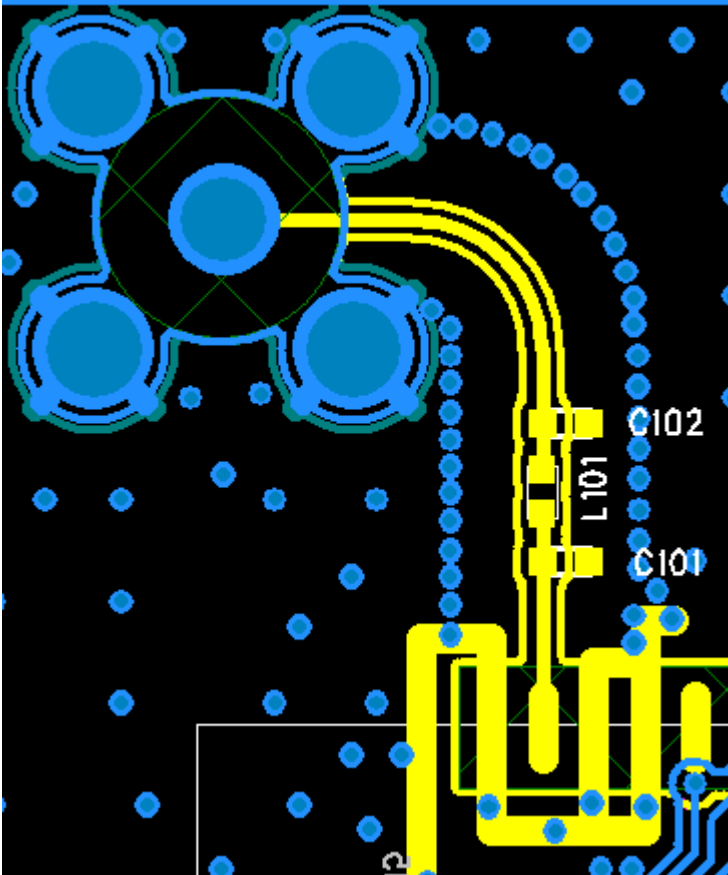
In this figure, the components L101,C101,C102 is used for antenna matching, the value of components can only be got after the antenna tuning, usually, they are provided by antenna vendor. By default, the L101 is 0 ohm resistors, and the C101, C102 are reserved for tuning.

The RF test connector in the figure is used for the conducted RF performance test, and should be placed as close as to the module's antenna pin. The traces impedance between components must be controlled in 50ohm.

### 5.1 Dipole Antenna Reference Design PCB

Mount these devices with brown mark facing up. Units: mm

Line width should be designed to provide 50  $\Omega$  impedance matching characteristics



### 5.2 Dipole Antenna Reference Design Schematic

