

SIM5320AL User Manual

WCDMA module

Model: SIM5320AL, SIM5320ALD

Manufacture: Shanghai SIMCom Wireless Solutions Limited

1. SIM5320AL Description

1.1. Summarize

Designed for global market, SIM5320AL is a dual-band UMTS /HSDPA that works on frequencies of WCDMA 1900/850MHz. The SIM5320AL support HSDPA. User can choose the module based on the wireless network configuration.

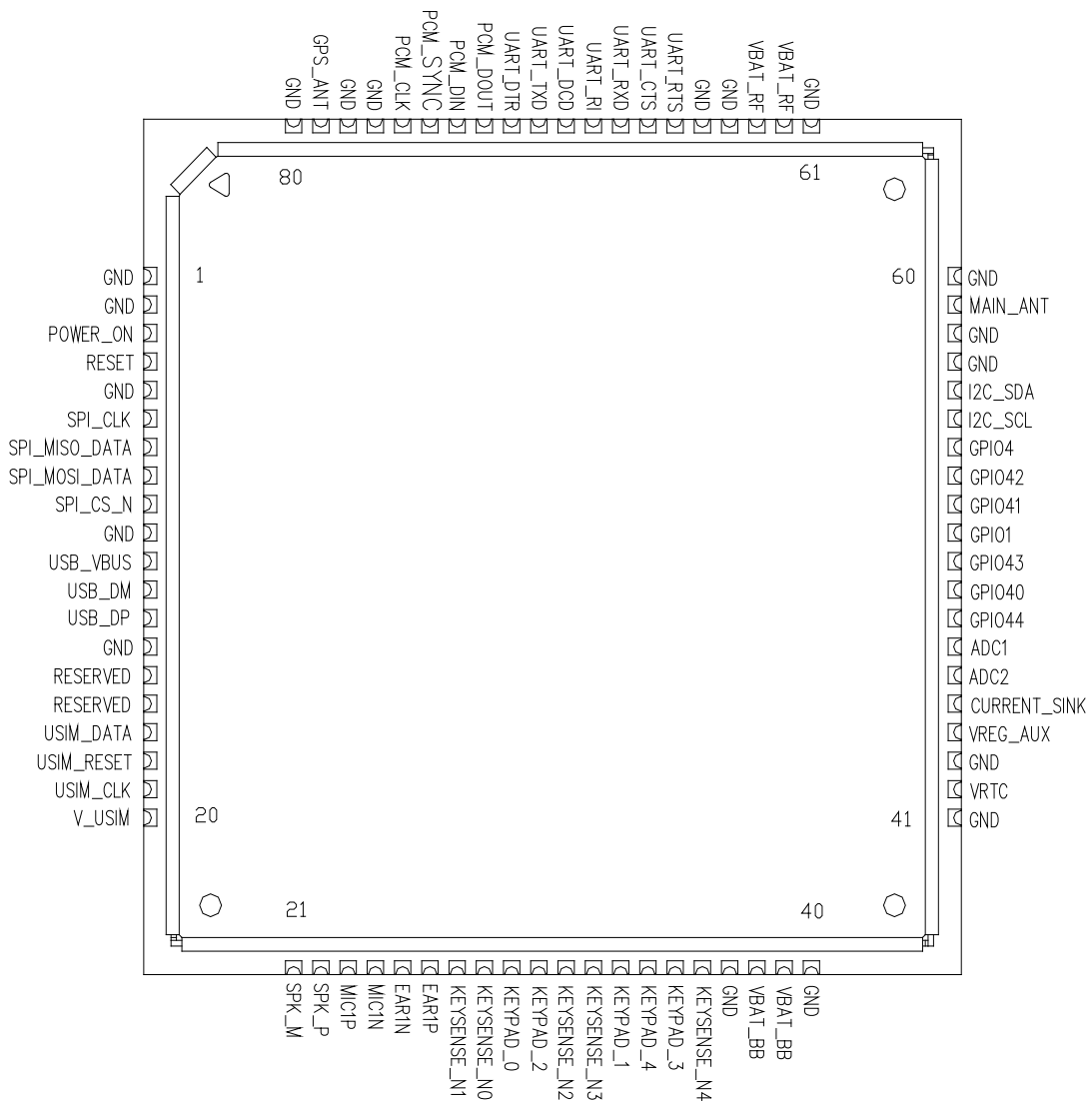
With a tiny configuration of 30*30*2.9 mm and integrated functions, SIM5320AL can meet almost any space requirement in users' application, such as Smart phone, PDA phone, industrial handhelds, machine-to-machine, vehicle applications, etc..

There are 80 pins on SIM5320AL, which provide most application interfaces for customers' board.

1.2. Feature

- Dual-Band UMTS/HSDPA 850/1900MHz
- Output power
 - UMTS 850/2100: 0.25W
- Control Via AT Commands
- Supply voltage range: 3.4~ 4.2V
- Extended operation temperature: -40°C to +85°C
- 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

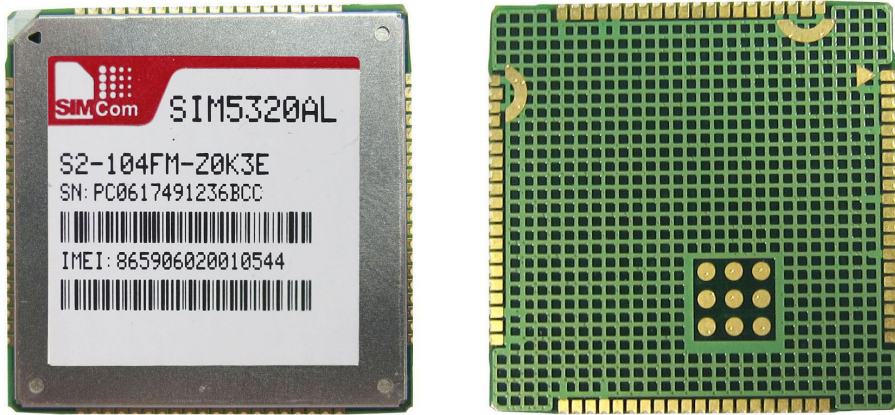
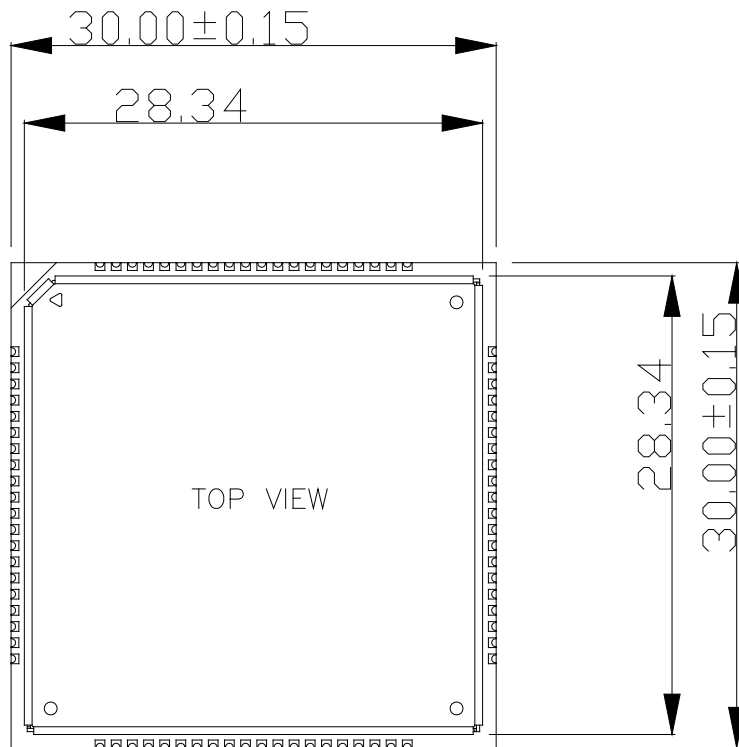


Figure 1: Top and Bottom view of SIM5320AL

1.5. Dimension



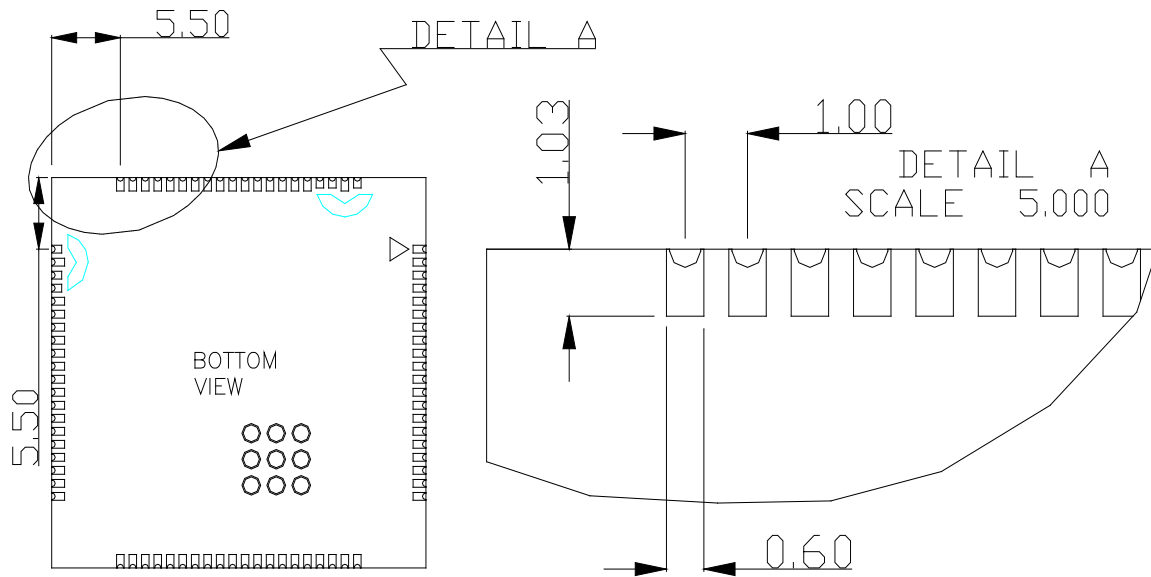


Figure 2: Dimention

2. Detail Block Diagram

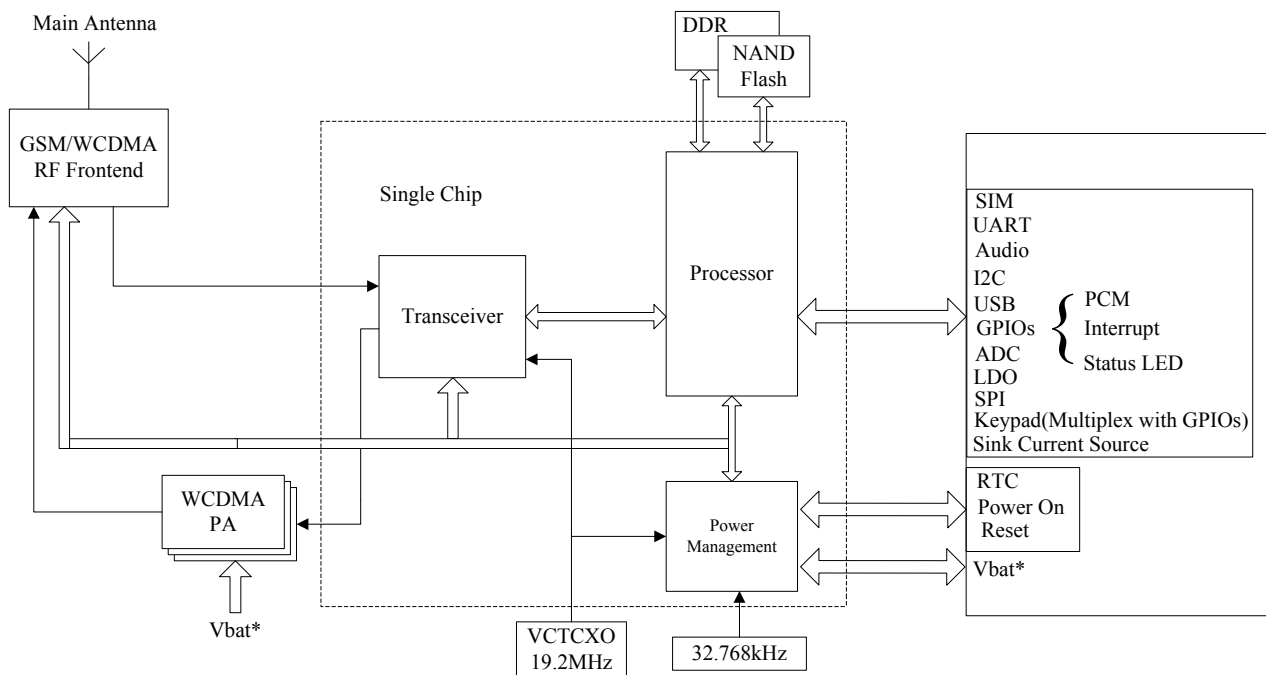


Figure 3: Block diagram of SIM5320AL

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 SIM5320AL.

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

| UMTS Sleep Mode (without USB connection) | |
|--|---------------------|
| WCDMA 1900 | 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 |
| UMTS Sleep Mode (with USB suspended) | | |
| WCDMA 1900 | 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 |
| HSDPA Data | | |
| WCDMA 1900 | @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°C, 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: SIM5320AL conducted RF output power

| Frequency | Max | Min |
|------------|---------------|-------------|
| WCDMA 1900 | 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: SIM5320AL conducted RF receive sensitivity

| Frequency | Receive sensitivity |
|------------|---------------------|
| WCDMA 1900 | < -108dBm |
| WCDMA 850 | < -106dBm |

4.3. Module Operating Frequencies

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

Table 7: SIM5320AL operating frequencies

| Frequency | Receiving | Transmission |
|-----------|---------------|---------------|
| WCDMA1900 | 1930~1990 MHz | 1850~1910 MHz |
| WCDMA 850 | 869 ~894 MHz | 824 ~849 MHz |

5. Antenna interface

SIM5320AL 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 3dBi considering the SAR radio. No antenna gain may be used that would exceed the 2W EIRP power limit in 1900MHz band. SIMCom recommends that the total insertion loss between the antenna pad and antenna should meet the following requirements:

- WCDMA 1900 < 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.

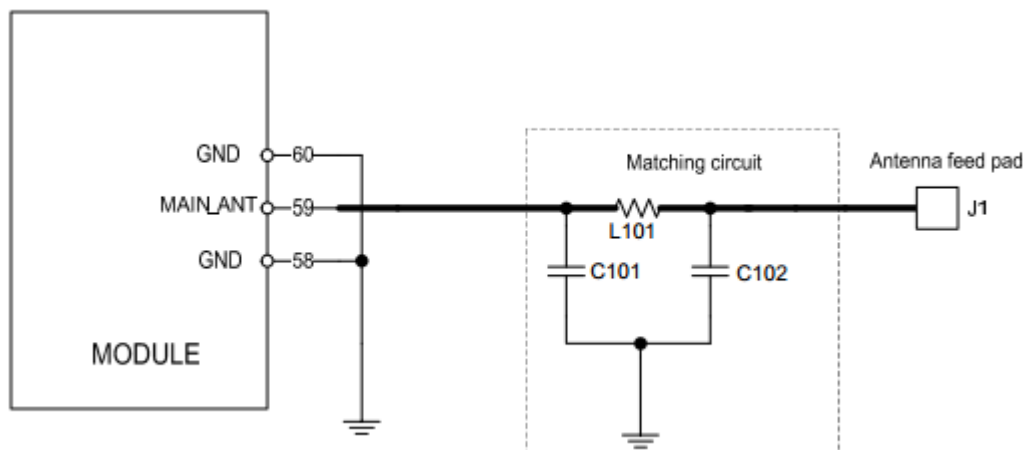


Figure1: antenna matching circuit

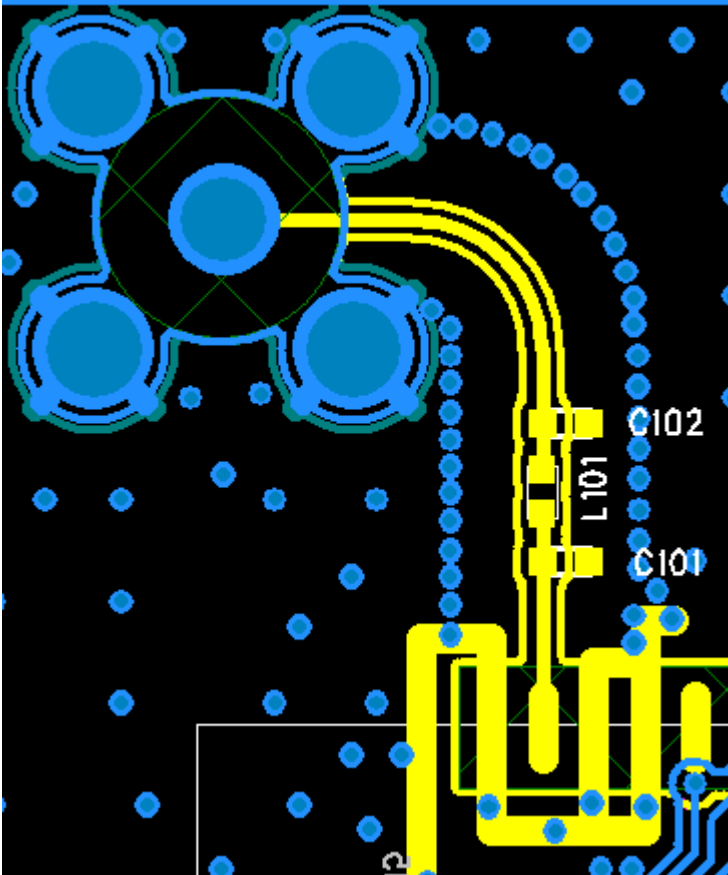
In this figure, the components L101, C101, C102 is used for antenna matching, the value of components can only be got after the antenna tuning, usually, they are provided by antenna vendor. By default, the L101 is 0 ohm resistors, and the C101, C102 are reserved for tuning.

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.

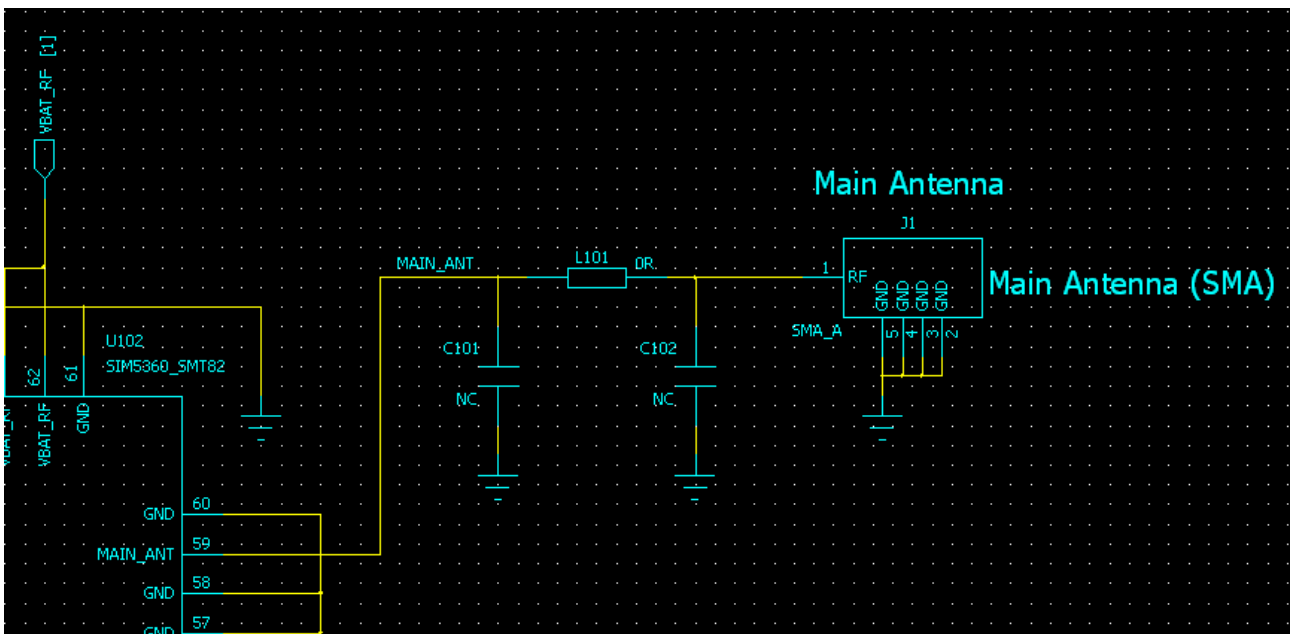
5.1 Dipole Antenna Reference Design PCB

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

Line width should be designed to provide 50 Ω impedance matching characteristics



5.2 Dipole Antenna Reference Design Schematic



FCC 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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device.

FCC Radiation Exposure Statement

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

“Contains Transmitter Module FCC ID: 2AJYU-180302009 Or Contains FCC ID:
2AJYU-180302009”

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. 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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install this modular with Single modular approval should perform the test of radiated emission and spurious emission according to FCC Part 22H and 24E requirement, Only if the test result comply with FCC Part 22H and 24E requirement, then the host can be sold legally.