



HUAWEI 30 mm x 30 mm LGA Module

## **Development Kit Guide**

Issue 04

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## About This Document

### Revision History

Document Version	Date	Chapter	Descriptions
01	2011-10-20		Creation
02	2014-04-26	All	Updated
03	2015-03-16	All	Added the description of the interface board 30X30LGADB VER.A
		All	Added the description of ME209u-526 module
		2.2	Updated setting up the DVK
		3.3.7	Added Micro SD card interface
		3.3.11	Updated test points
		3.4	Updated power consumption test
04	2015-08-14	All	Added the description of the ME909s series module

### Scope

MU509 series  
MC509 series  
MU609  
MU709 series  
ME909u series  
ME209u-526  
ME909s series



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# 1 Overview

## 1.1 About This Chapter

This chapter provides a brief description of the 30 mm x 30 mm LGA module development kit (DVK), including:

- Feature Overview
- Introduction to the DVK
- Components of the DVK

## 1.2 Feature Overview


The 30 mm x 30 mm LGA module DVK supports MU509 series, MC509 series, MU609, MU709 series, ME909u series, ME209u-526 and ME909s series module. Table 1-1 describes the features of DVK supported by LGA modules.

**Table 1-1** Features of DVK supported by LGA modules

Feature	Implementation	MC509	MU509	MU609	ME909u	MU709	ME209u-526	ME909s
Power Supply	220 V AC to 5 V DC Adaptor (Micro USB Port)	√	√	√	√	√	√	√
	Add another two 3 pin-single-row connector. One is 5 V and the other is GND.	√	√	√	√	√	√	√
	Input voltage range DC 4.5 V to 5.5 V (typical value is 5.0 V)	√	√	√	√	√	√	√
Antenna connector	GPS	√	X	√	√	X	X	X
	AUX	√	X	√	√	√	√	√



Feature	Implementation	MC509	MU509	MU609	ME909u	MU709	ME209u-526	ME909s
	Main	✓	✓	✓	✓	✓	✓	✓
SIM Ports	Standard SIM card socket	✓	✓	✓	✓	✓	✓	✓
	Micro SIM card socket	X	X	X	X (for ME909u-521) ✓ (for ME909u-523)	✓	✓	✓
Audio Ports	PCM (3.5 mm Audio Jack)	✓	✓	✓	✓ (for ME909u-521) X (for ME909u-523)	✓	X	✓
	Analog audio1(EAR OUT/MIC1)	✓	✓	X	X	X	X	X
	Analog audio2 (SPK OUT/MIC2)	✓	✓	X	X	X	X	X
Serial Ports	UART0	✓	✓	✓	✓	✓	Only for debugging	✓
	UART1	X	X	Only for debugging	✓	✓	Only for debugging	X
	UART2	X	X	X	Only for debugging	Only for debugging	X	Only for debugging
I2C and SPI	Three pins I2C port	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
	Five pins SPI port	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
RTC	Support a button cell and a capacity	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
USB Port	Micro USB Port	✓	✓	✓	✓	✓	✓	✓
	USB 2.0	Full Speed	Full Speed	High Speed	High Speed	High Speed	High Speed	High Speed
GPIOs	Switchable pull up/down resistors	✓	✓	✓	✓	✓	✓	✓
Indicator LED	Power on/off indicator	✓	✓	✓	✓	✓	✓	✓
	UART TX/Ring indicator 2*3	✓	✓	✓	Reserved	Reserved	Reserved	Reserved
	CTS/RTS indicator 2*2	✓	✓	✓	Reserved	Reserved	Reserved	Reserved

Feature	Implementation	MC509	MU509	MU609	ME909u	MU709	ME209u-526	ME909s
	Module status indicator	✓	✓	Reserved	Reserved	Reserved	Reserved	Reserved
	Module mode indicator	✓	✓	✓	✓	✓	✓	✓
	Module sleep indicator	Reserved	Reserved	✓	✓	✓	✓	✓
	USB insert detection (interface board)	✓	✓	✓	✓	✓	✓	✓
ADC input	2 Analog inputs	Reserved	Reserved	Reserved	X (for ME909u-521) ✓ (for ME909u-523)	Reserved	✓	✓
JTAG	On interface board	✓	✓	✓	✓	✓	✓	✓
HSIC	On interface board	X	X	X	Reserved	Reserved	Reserved	Reserved
High-Speed UART	High-Speed UART0	X	X	X	✓	✓	✓	✓
	High-Speed UART1	X	X	X	✓	X	✓	X
SD	SD card	X	X	X	X	Only for debugging	X	Only for debugging
 <b>NOTE</b> <ul style="list-style-type: none"> <li>Reserved means features DVK supports but the module does not support now.</li> <li>X indicates the module does not support the feature; ✓ indicates the module supports the feature.</li> </ul>								


**NOTE**

- For the detailed feature information, you can refer to the module's hardware guide.
- In the following chapters and sections, "module" refers to the 30 mm x 30 mm LGA module; "DVK" refers to the 30 mm x 30 mm LGA module development kit.

## 1.3 Introduction to the DVK

The DVK provides a complete solution based on the data functions of the module. For designers who adopt the module in their designs, the DVK facilitates their module-based programming and troubleshooting at the project development stage.

The DVK consists of two development boards. One is mother board and the other is interface board.

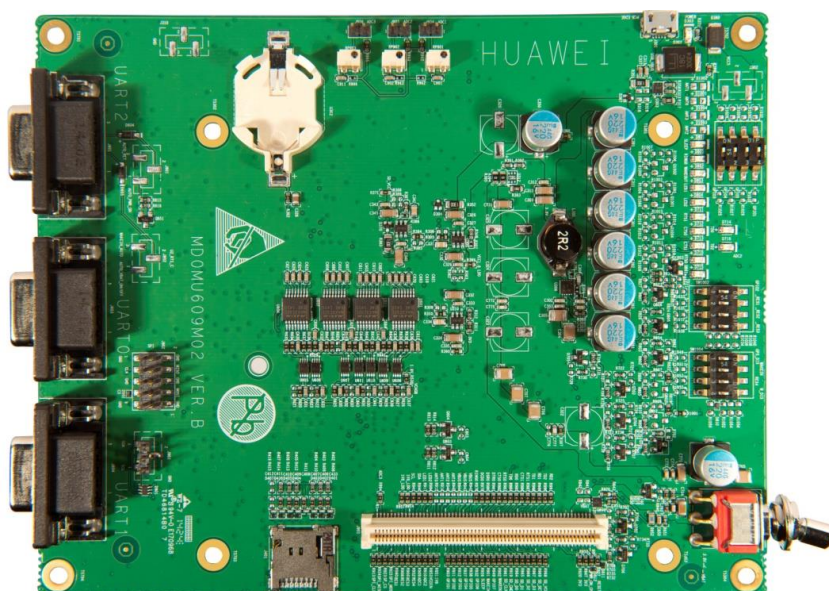
- The mother board (MD0MU609M02 VER.B) is the universal board and can be used in all 30 mm x 30 mm LGA modules, as shown in Figure 1-1 .
- There are two interface boards (ML0ME909UM VER.B or 30X30LGADB VER.A) for LGA modules, as shown in Figure 1-2 and Figure 1-3 . The 30 mm x 30 mm LGA module is soldered on this board.

Table 1-2 shows the interface board and mother board for LGA modules.

**Table 1-2** The interface boards and mother board for LGA modules

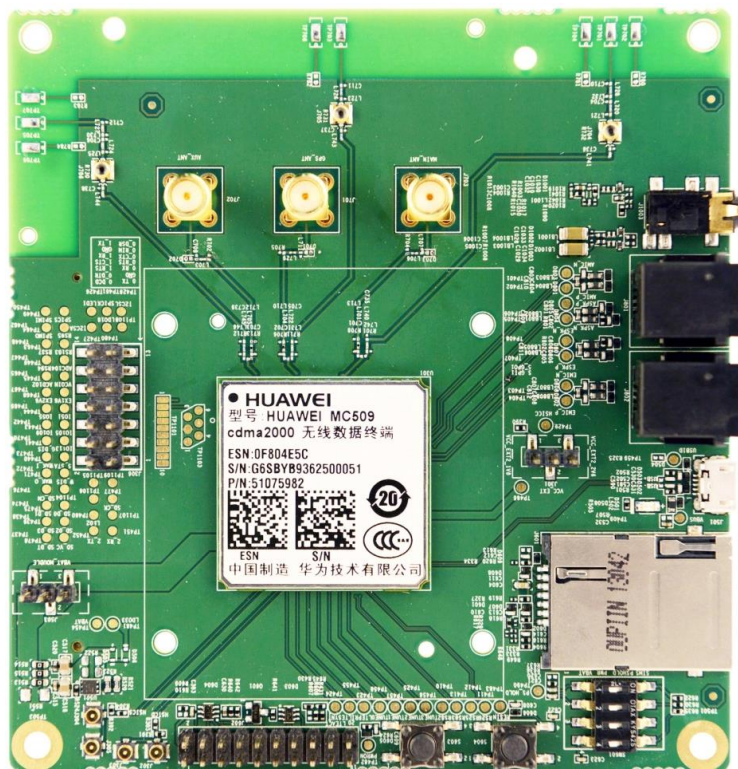
Product	Interface Board	Mother Board
MU509 series	ML0ME909UM VER.B	MD0MU609M02 VER.B
MC509 series	ML0ME909UM VER.B	
MU609	ML0ME909UM VER.B	
ME909u-521	ML0ME909UM VER.B	
ME909u-523	30X30LGADB VER.A	
MU709 series	30X30LGADB VER.A	
ME209u-526	30X30LGADB VER.A	
ME909s series	30X30LGADB VER.A	

**Figure 1-1** The mother board (MD0MU609M02 VER.B)

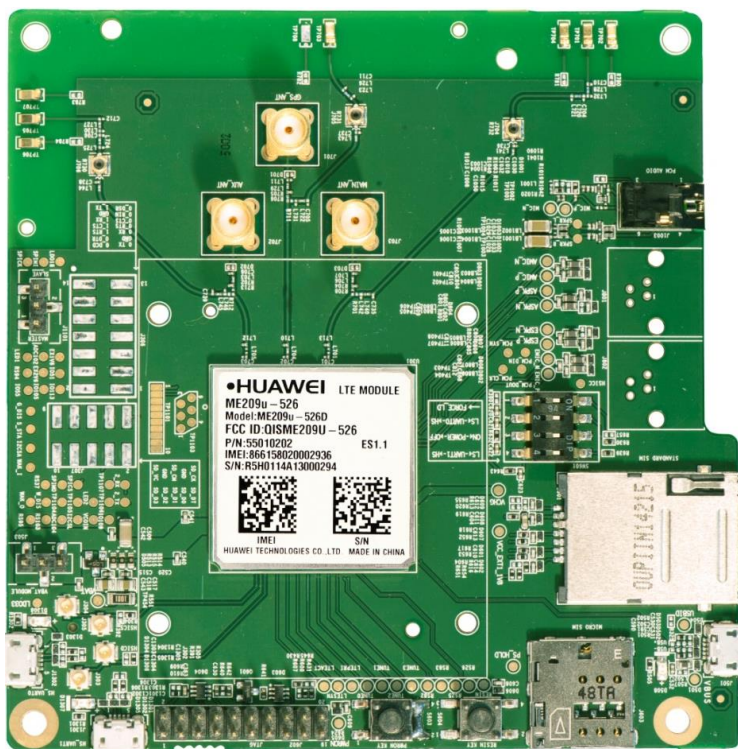




**Figure 1-2** The interface board (ML0ME909UM VER.B)



**Figure 1-3** The interface board (30X30LGADB VER.A)



Consisting of a dedicated interface board and accessories, the DVK provides the following interfaces:

- Two Micro USB interfaces, one is used for power supply and the other is used to communicate.
- Three standard RS-232 interfaces: 4-line (UART 1), 8-line/4-line (UART 0) and 2-line (UART 2)
- Standard Subscriber Identity Module (SIM) card interface
- Micro SIM card interface
- Three SMA (Small A Type) antenna connectors
- SD card interface
- Audio interface

## 1.4 Components of the DVK

Check the components and their quantities after you obtain the DVK. If any component is missing or damaged, contact with your DVK supplier. Table 1-3 lists the components of the DVK.

**Table 1-3** Components of the DVK

Number	Item	Quantity (pcs)	Category
1	Mother Board	1	Mandatory
2	Interface Board	1	Mandatory
3	Micro USB cable	2	Mandatory
4	Adapter	2	Mandatory
5	External antenna <ul style="list-style-type: none"><li>• 698 MHz–960 MHz, 1410 MH–2690MHz;</li><li>• <math>\geq -1</math> dBi;</li><li>• Omnidirectional</li></ul>	See note [1]	Mandatory <sup>[1]</sup>
6	D3.5 4P Plug Earphone	1	Mandatory
7	RS-232 serial cable	1	Mandatory
8	Handset	1	Optional (only for MC509 series and MU509 series module)
9	Handset cable	1	Optional (only for MC509 series and MU509 series module)

**NOTE**

- The mother board and the interface board have been assembled when you obtain the DVK. You do not need do the assembly by yourself.
- The mother board and the interface board should be assembled correctly to ensure modules work normally.
- [1]: The DVK provides three antenna connectors: MAIN, AUX and GPS. Yet not all the LGA modules support these three antennas. For the detailed information, refer to the module's hardware guide.

# 2 Installation and Use Guide

## 2.1 About This Chapter

This chapter describes how to install and use the LGA module's DVK.

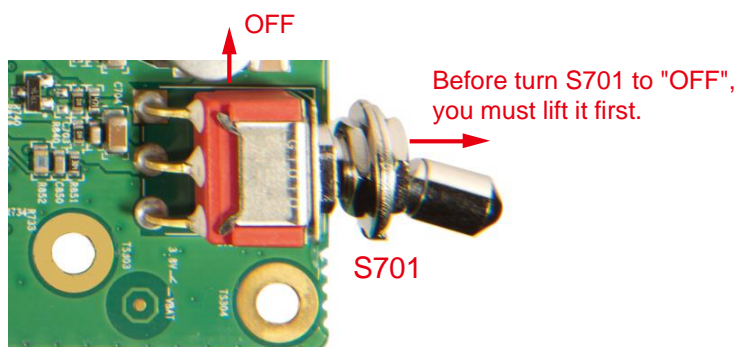
## 2.2 Setting Up the DVK

This chapter takes MC509 interface board (ML0ME909UM VER.B) and ME209u-526 interface board (30X30LGADB VER.A) as examples to describe how to install and use the LGA module's DVK.

To install the DVK, perform the following steps:

- Step 1 Lift the switch S701 on the mother board first, and then turn S701 to the "OFF" position.

**Figure 2-1** Turning S701 to the "OFF" position

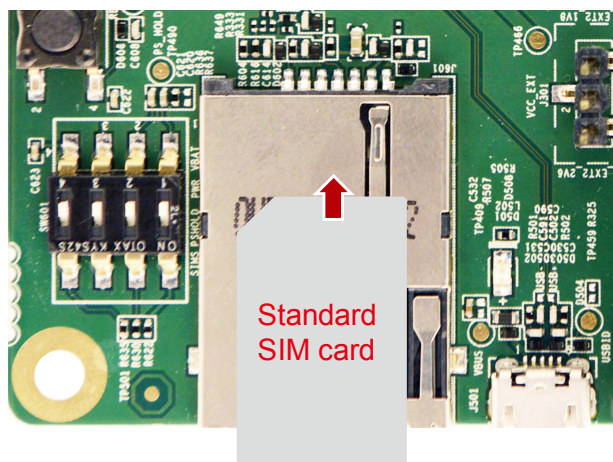


### NOTE

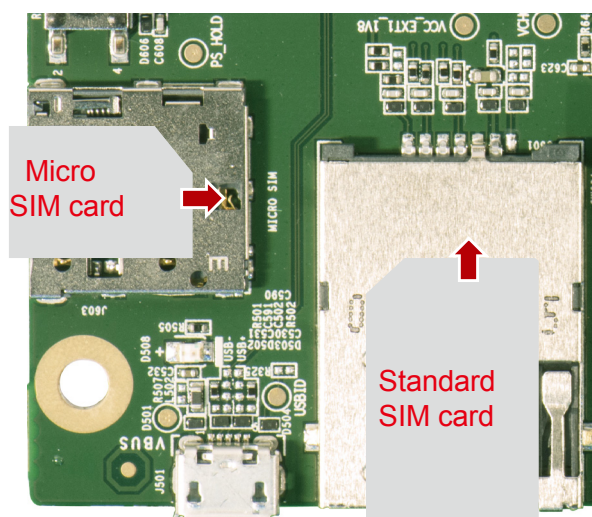
You must lift the switch first and then you can turn the switch to "OFF".

- Step 2 Before powering on the module, insert a SIM card into the standard SIM card socket or the Micro SIM card socket (if the communication is required).

**Figure 2-2** Inserting a standard SIM card into the SIM card socket (for the interface board ML0ME909UM VER.B)



**Figure 2-3** Inserting a standard SIM card or Micro SIM card into the standard SIM card socket or the Micro SIM card socket (for the interface board 30X30LGADB VER.A)



**NOTE**

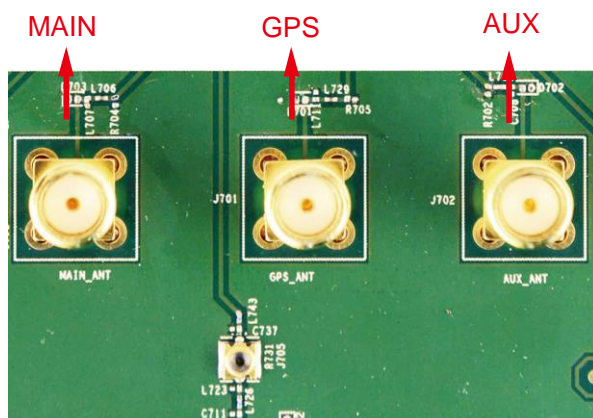
You should not insert both cards anytime.

Step 3 The DVK provides three antenna interfaces.

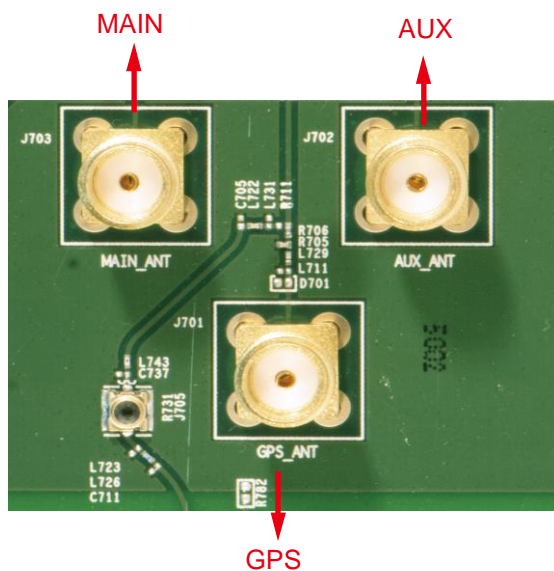
If RF communication is required, connect the SMA connectors on the DVK to the external antennas or a radio communication tester by using coaxial cables. The external antennas should be assembled well before powering on the module.



**Figure 2-4** Connecting the antenna (for the interface board ML0ME909UM VER.B)

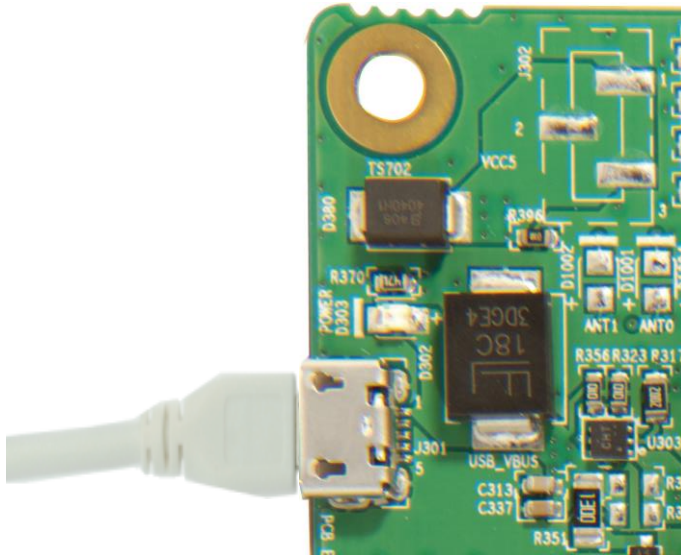


**Figure 2-5** Connecting the antenna (for the interface board 30X30LGADB VER.A)



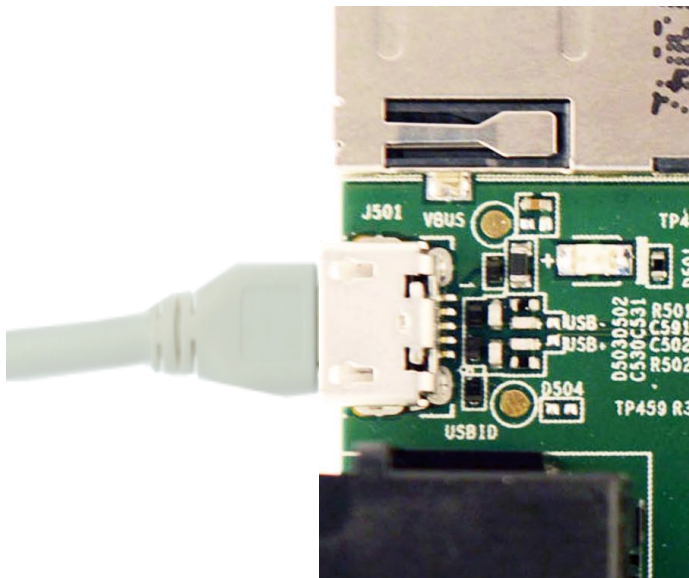
- Step 4** Connect one USB cable from adapter to the Micro USB port on the mother board directly. The Micro USB can supply power to the DVK.

**Figure 2-6** Connecting the USB cable from adapter to the Micro USB port on the mother board

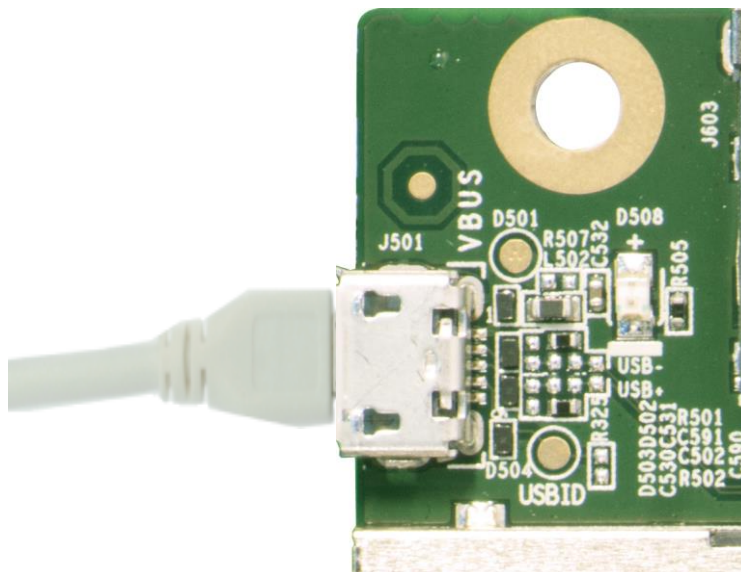


**Step 5** To communicate with a PC, connect the other USB cable to the Micro USB port on the interface board directly.

**Figure 2-7** Connecting the USB cable to the Micro USB port on the interface board (for the interface board ML0ME909UM VER.B)

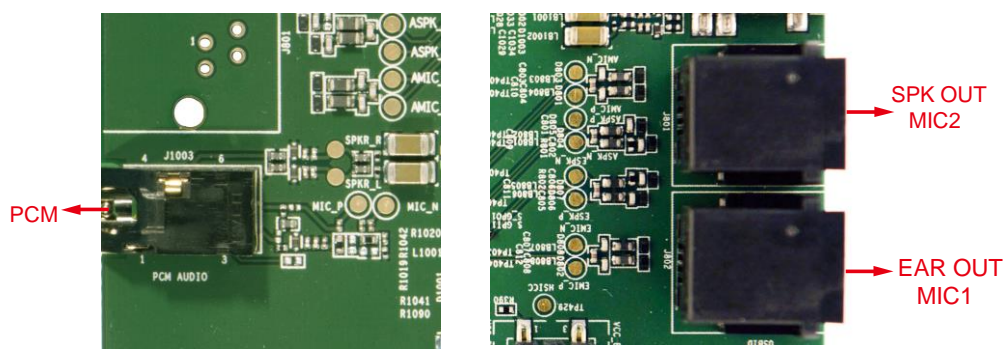


**Figure 2-8** Connecting the USB cable to the Micro USB port on the interface board (for the interface board 30X30LGADB VER.A)



- Step 6 Connect a D3.5 4P plug earphone to the audio port to test the PCM function.  
Connect a handset with handset cable to the audio port to test analog audio.

**Figure 2-9** Connecting an earphone and a handset



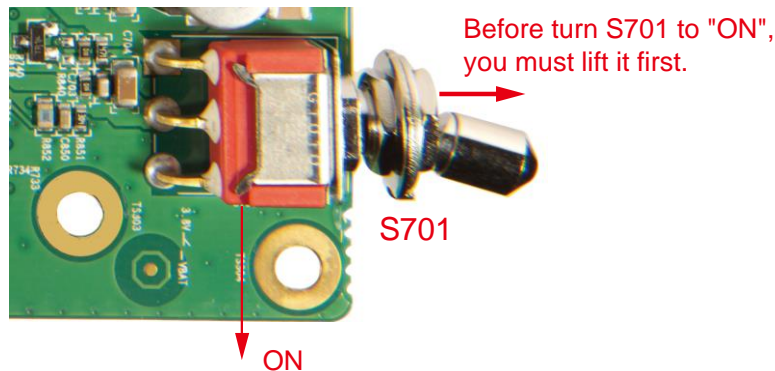
**NOTE**

Only MU509 series and MC509 series module support analog audio.

- Step 7 Lift the switch S701 on the mother board first, and then turn S701 to the "ON" position.



**Figure 2-10** Turning S701 to the "ON" position

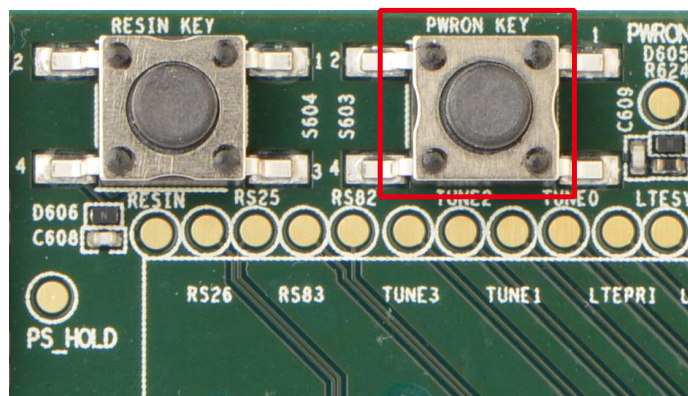


**NOTE**

You must lift the switch first and then you can turn the switch to "ON".

- Step 8 Press and hold the POWER\_ON\_OFF button (silk-screen is PWRON KEY) for more than 0.5s to power on the module. Besides, the module can be automatically powered on when the POWER\_ON\_OFF signal of SW601 is toggled to "ON" side (about the details, you can refer to section 3.3.10 ).

**Figure 2-11** Powering on the module

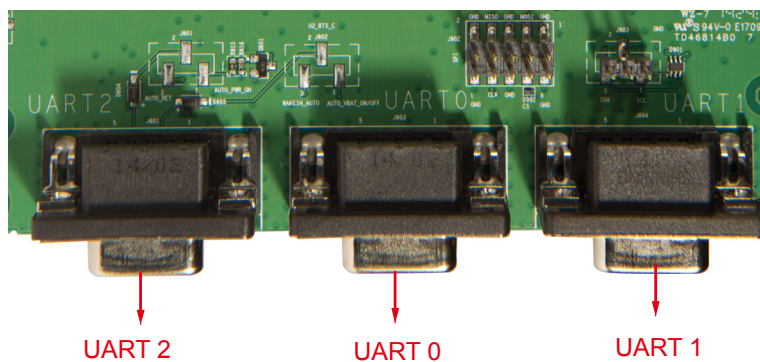


- Step 9 Connect the RS-232 serial cable to the DB9 port on the DVK directly. And the module can communicate with the host computer through UART.

**NOTE**

The DVK supports 3 UART ports but the module may not support all the UART ports. For example, MC509 and MU509 series module only support UART0; MU609 module supports UART0 and UART1 but not UART2. For details, you can refer to module's hardware guide.

**Figure 2-12** Connecting UART interface



# 3 Interface Description

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## 3.1 About This Chapter

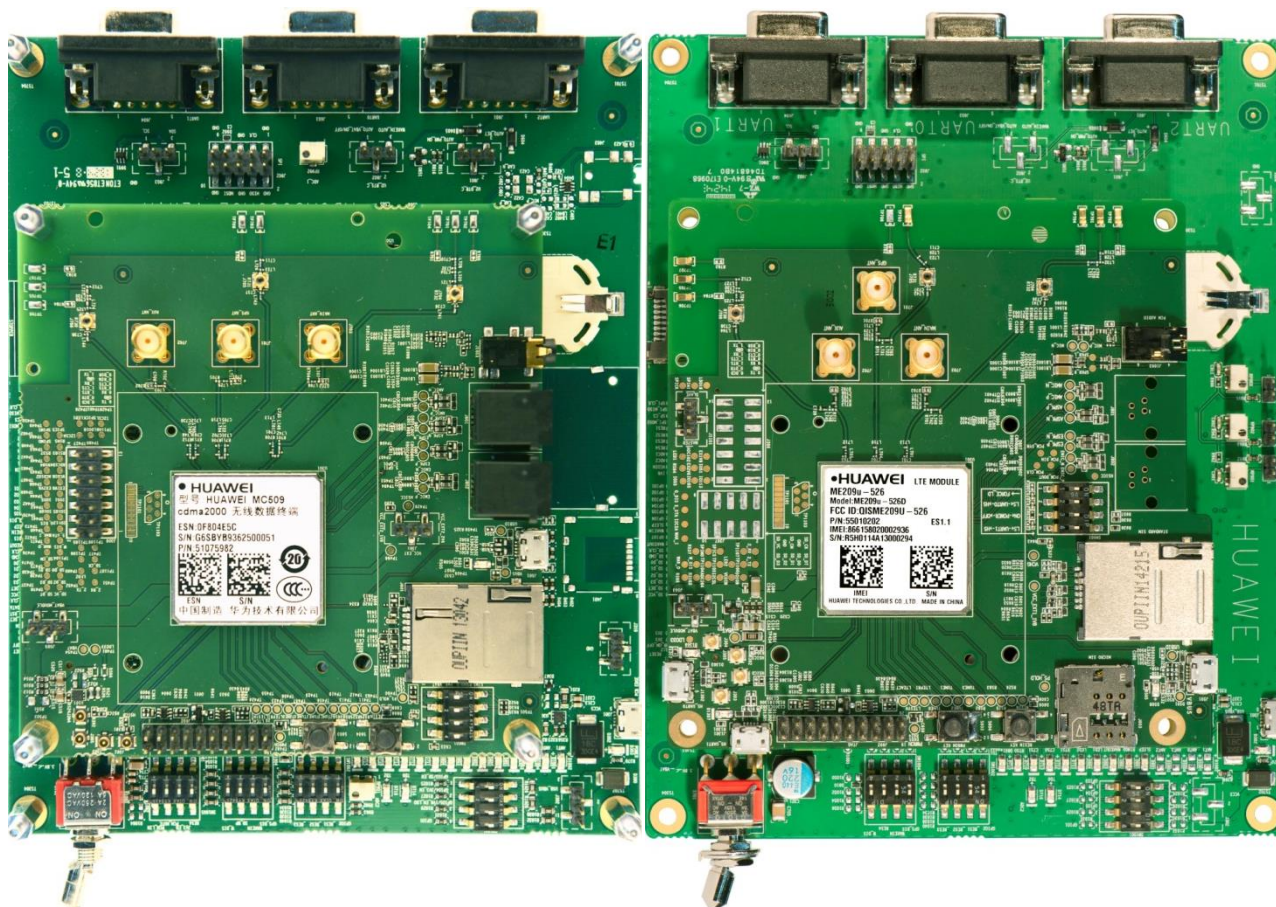
This chapter describes the DVK appearance, interface functions, and interface usage of the DVK.

- DVK Appearance
- Interface Functions
- Power Consumption Test

## 3.2 DVK Appearance

Figure 3-1 shows the appearance of the DVK (top view).

**Figure 3-1** Appearance of the DVK (top view)



## 3.3 Interface Functions

### 3.3.1 Power Interface

Power can be supplied to the DVK by the Micro USB 5 V power supply port on the mother board as showed in chapter 2.2 .

### 3.3.2 USB Communications Interface

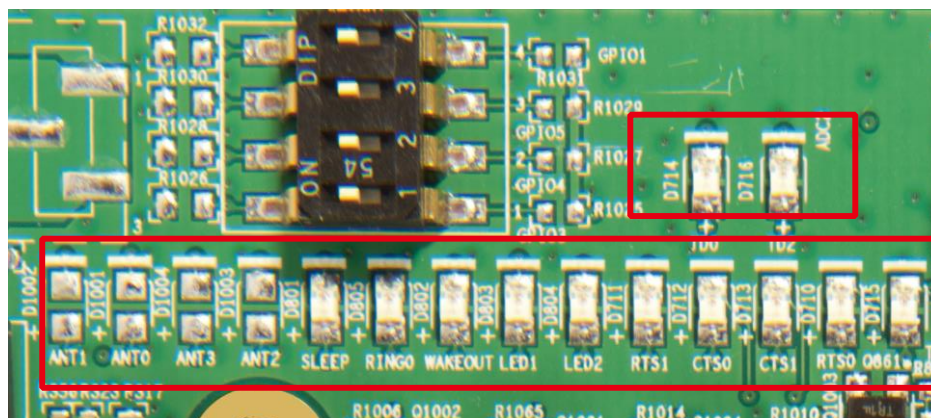
The DVK provides one Micro USB port on the interface board. The module can communicate with PC (or other DTE) through this Micro USB port.

### 3.3.3 LED Indicators

The DVK has sixteen LED indicators on the mother board. The description of these indicators is marked on the DVK, as shown in Figure 3-2 . Table 3-1 lists the functions of these indicators.



**Figure 3-2** LED indicators on the mother board



**Table 3-1** Functions of the LED indicators on the DVK

Position Number	Mark on the DVK	Color	Function of the LED When It Lights Up
D1002	ANT1	-	Reserved
D1001	ANT0	-	Reserved
D1004	ANT3	-	Reserved
D1003	ANT2	-	Reserved
D801	SLEEP	Green	Indicates the module enters the sleep mode
D805	RING0	-	Only used for internal test
D802	WAKEOUT	Green	Indicates that the WAKE_OUT signal output is at high level
D803	LED1	Green	LED_MODE signal of LGA pin 101
D804	LED2	Green	LED_STATUS signal of LGA pin 91
D711	RTS1	-	Only used for internal test
D712	CTS0	-	Only used for internal test
D713	CTS1	-	Only used for internal test
D710	RTS0	-	Only used for internal test
D715	TD1	-	Only used for internal test
D714	TD0	-	Only used for internal test
D716	TD2	-	Only used for internal test



#### NOTE

Whether LED1 or LED2 is available depends on the module. For the details, you can refer to module's hardware guide.

### 3.3.4 Audio Interface

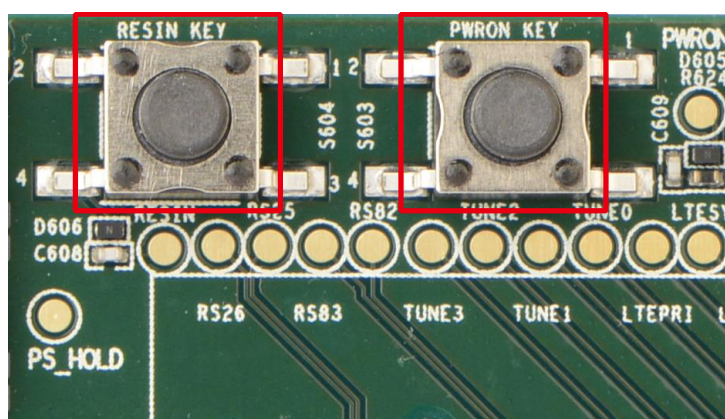
The DVK provides a 3.5 mm HEADSET connector on the interface board. You can connect a D3.5 4P plug earphone to test the PCM function.

The handset is ready for analog radio which is used for MU509 series and MC509 series module.

### 3.3.5 Buttons

The DVK provides a POWER\_ON\_OFF button (silk-screen is PWRON KEY) and a RESET (silk-screen is RESIN KEY) button, as shown in Figure 3-3 .

**Figure 3-3** POWER\_ON\_OFF and RESET button



#### POWER\_ON\_OFF Button

After you press the POWER\_ON\_OFF button, the module is powered on. After the module is powered on, pressing the POWER\_ON\_OFF button for more than 2.5s can power off the module.

#### RESET Button

When the module is powered on, pressing the RESET button can reset the module. For more information on the characteristics of the reset signal, please refer to the module's hardware guide.

### 3.3.6 SIM Card Interface

On the interface board ML0ME909UM VER.B, the DVK provides a standard push to push SIM card interface. On the interface board 30X30LGADB VER.A, the DVK provides a standard push to push SIM card interface and a Micro SIM card interface.

The module can support Class B/C SIM card. Before you turn on the module, insert a SIM card into the SIM card socket.

For more information on the characteristics of the SIM card interface, please refer to the module's hardware guide.

### 3.3.7 Micro SD Card Interface

The DVK provides a micro SD card interface. Customers can insert a micro SD card into the socket as memory function. Before using this function, please refer to module's hardware guide and make sure the module supports SDIO interface.

### 3.3.8 Antenna Interface

The DVK provides three antenna connectors: MAIN and AUX SMA RF connectors and GPS coaxial antenna connector. The external antennas should be assembled well before powering on the module.

SMA antenna connectors can be connected to an RF tester (CMU200 or Agilent 8960), or directly connected to external antennas for the testing services of the existing network. The GPS coaxial antenna connector can be directly connected to external GPS antenna for the test of GPS performance.

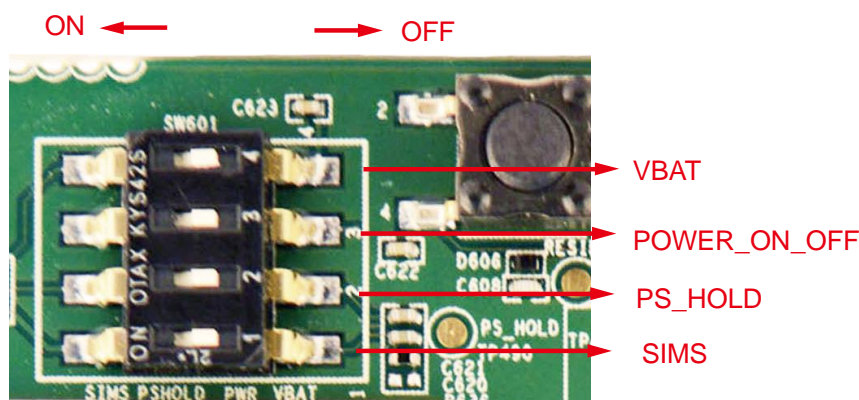
### 3.3.9 UART Interface

The DVK provides one 4-line UART interface (UART 1), one 8-line or 4-line UART interface (UART 0) and one 2-line UART interface (UART 2).

### 3.3.10 DIP Switch SW601

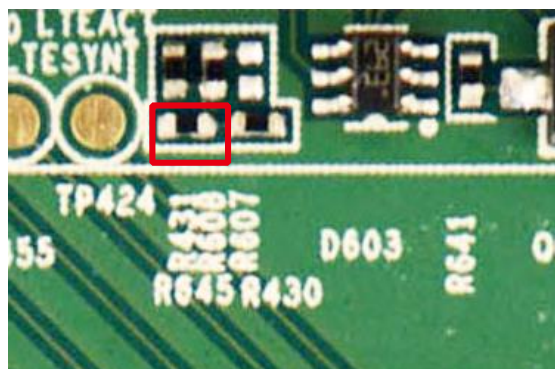
The interface board provides DIP switch SW601.

**Figure 3-4** DIP Switch SW601 on the interface ML0ME909UM VER.B



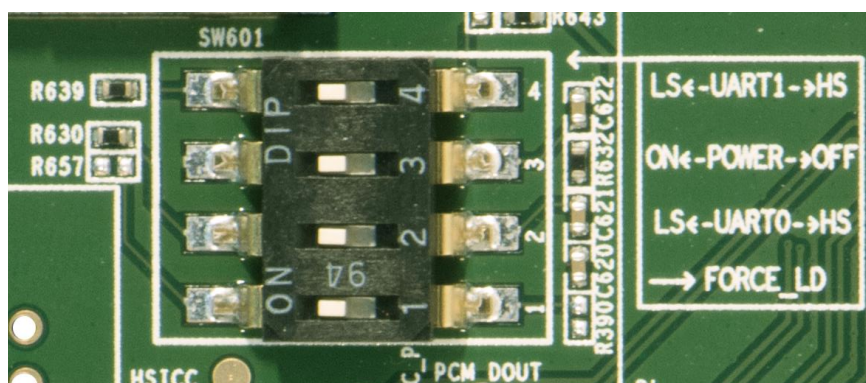
- When the VBAT signal is toggled to "ON" side, it is pulled down to the GND through a 10 kΩ resistor. Please keep VBAT in "ON" state anytime to discharge voltage when the module powers off.
- When the POWER\_ON\_OFF signal is toggled to "ON" side, it is pulled down to GND. In this situation, once the module is supplied power, it will be powered on automatically. Note that this function works only when R645 is mounted.

**Figure 3-5** Mounting R645



- When the PS\_HOLD is toggled to "ON" side, it will be pulled up to 1.8 V. Please keep PS\_HOLD in "OFF" state anytime.
- SIMS signal is used for internal test.

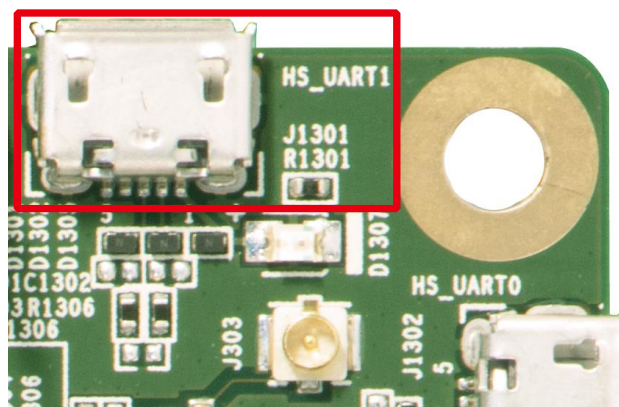
**Figure 3-6** DIP Switch SW601 on the interface 30X30LGADB VER.A



- UART1->HS: UART1 DB9 port on the mother board cannot be used. UART1 converts to USB signal on the interface board and can be tested through USB cable connecting to PC. In this situation, UART1 can work as high-speed UART if LGA module supports it. You should install the high-speed UART driver on the PC before you use it. Please contact with Huawei engineer to get the driver.



**Figure 3-7 HS\_UART1**

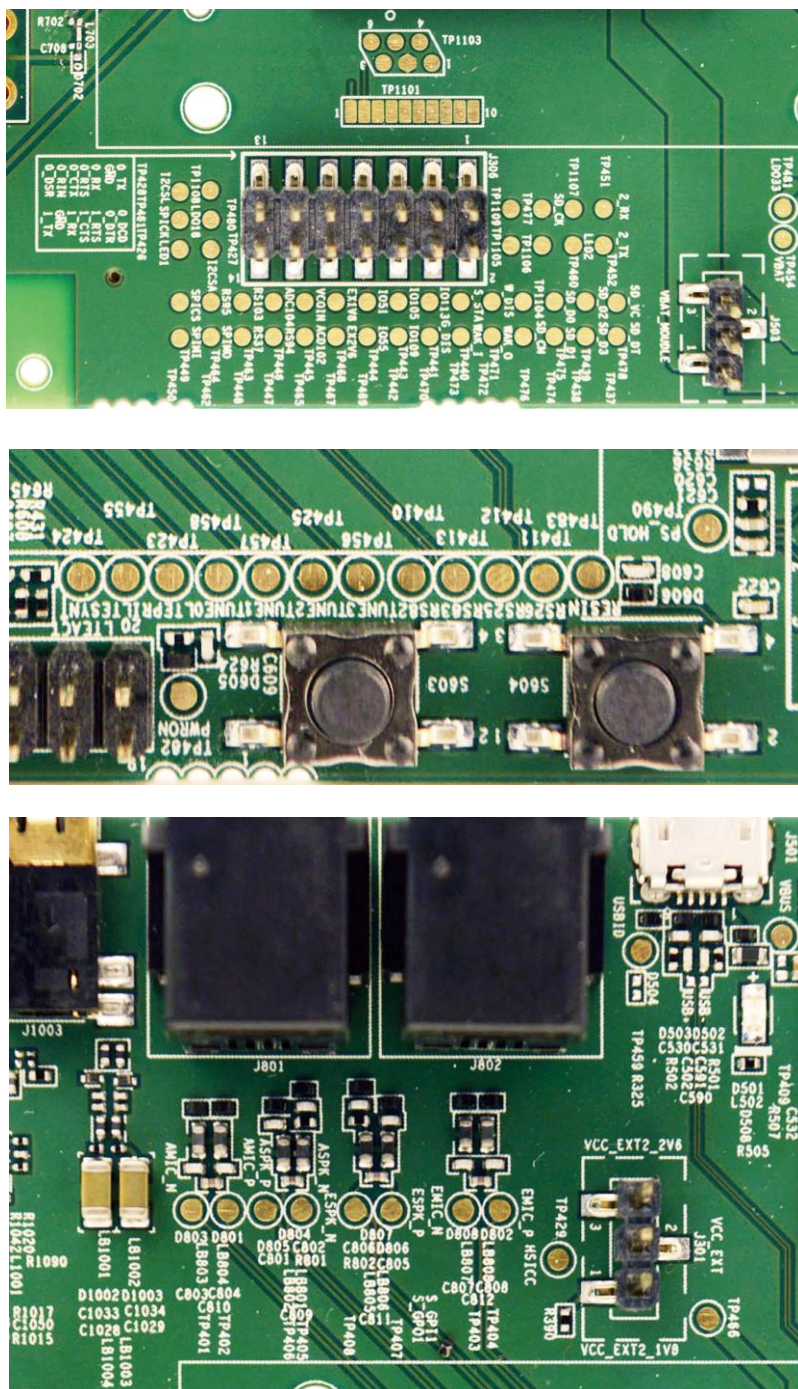


- LS<-UART1: UART1 DB9 port on the mother board can be used, but HS\_UART1 port on the interface board cannot be used.
- ON<-POWER: the POWER\_ON\_OFF signal is pulled down to GND. In this situation, once the module is supplied power, it will be powered on automatically. But if R645 is not installed, this function cannot be used, and then you need press PWRON KEY to power on the LGA module.
- POWER-> OFF: the POWER\_ON\_OFF signal is not pulled down to GND, which does not mean the LGA module will be powered off. You should press the PWRON KEY for n seconds to power off LGA module. "n" is different between LGA modules, and you can refer to LGA module's hardware guide.
- LS<-UART0->HS: refer to LS<-UART1->HS.
- FORCE\_LD: only for internal use.

### 3.3.11 Test Points

The DVK provides many test points for testing. The signal assignment of test points is shown in Figure 3-8 and Figure 3-9 .

**Figure 3-8** Test points (for the interface board ML0ME909UM VER.B)



**Table 3-2** Test point assignment on the the interface board ML0ME909UM VER.B

Screen Name	Signal Name	Screen Name	Signal Name
2_RX	UART2_RX	SPICS	SPI_CS
2_TX	UART2_TX	SPIMI	SPI_MISO



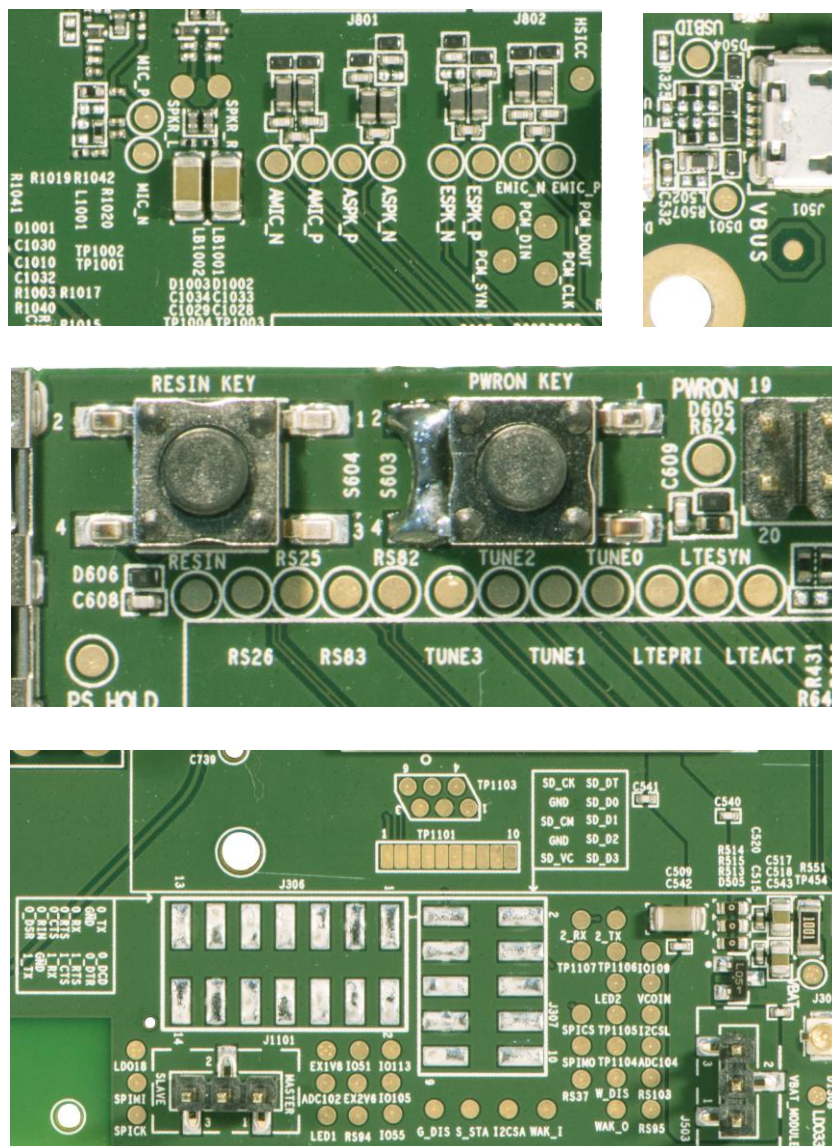
Screen Name	Signal Name	Screen Name	Signal Name
SD_CK	SD_CLK	TP1103	Only for internal use
LED2	LED2 (LGA pin 91)	VBAT	VBAT
TP1106	Only for internal use	LDO33	LDO_3V3 (from the mother board)
TP1109	Only for internal use	0_TX	UART0_TX
TP1105	Only for internal use	0_DCD	UART0_DCD
TP1108	Only for internal use	GND	GND
LDO18	LDO_1V8 (from the mother board)	0_DTR	UART0_DTR
I2CSA	I2C_SDA	0_RX	UART0_RX
I2CSL	I2C_SCL	1_RTS	UART1_RTS
SPICK	SPI_CLK	0_RTS	UART0_RTS
LED1	LED1 (LGA pin 101)	1_CTS	UART1_CTS
SD_VC	SD_VCC	0_CTS	UART0_CTS
SD_DT	SD_DET	1_RX	UART1_RX
SD_D2	SD_DATA2	0_DSR	UART0_DSR
SD_D3	SD_DATA3	1_TX	UART1_TX
SD_D0	SD_DATA0	PS_HOLD	PS_HOLD
SD_D1	SD_DATA1	RESIN	RESIN_N
TP1104	Only for internal use	RS26	Reserved
SD_CM	SD_CMD	RS25	Reserved
W_DIS	W_DISABLE_N	RS83	Reserved
WAK_O	WAKEUP_OUT	RS58	Reserved
S_STA	SLEEP_STATUS	TUNE3	ANT_TUNE3
WAK_I	WAKEUP_IN	TUNE2	ANT_TUNE2
IO113	GPIO (LGA pin 113)	TUNE1	ANT_TUNE1
G_DIS	GPS_DISABLE	TUNE0	ANT_TUNE0
IO105	GPIO (LGA pin 105)	LTEPRI	LTE_WLAN_PRIORITY
IO109	GPIO (LGA pin 109)	LTESYN	LTE_FRAME_SYNC
IO51	GPIO (LGA pin 51)	PWRON	POWER_ON_OFF
IO55	GPIO (LGA pin 55)	USBID	USB_ID
EX1V8	VCC_EXT_1V8	VBUS	USB_VBUS



Screen Name	Signal Name	Screen Name	Signal Name
EX2V6	VCC_EXT_2V6	AMIC_N	HANDMIC_N
VCOIN	VCOIN	AMIC_P	HANDMIC_P
ADC102	ADC1 (LGA pin 102)	ASPK_N	HANDSPK_N
ADC104	ADC2 (LGA pin 104)	ASPK_P	HANDSPK_P
RS94	Reserved	ESPK_N	SPKR_OUT_N
RS103	Reserved	ESPK_P	SPKR_OUT_P
RS37	Reserved	EMIC_N	HEADMIC_N
RS95	Reserved	EMIC_P	HEADMIC_P
SPI MO	SPI_MOSI	HSICC	Reserved
VCC_EXT	Only for internal use	-	-



**Figure 3-9** Test points (for the interface board 30X30LGADB VER.A)



**Table 3-3** Test point assignment on the the interface board 30X30LGADB VER.A

Screen Name	Signal Name	Screen Name	Signal Name
LDO18	LDO_1V8 (from the mother board)	0_CTS	UART0_CTS
SPIMI	SPI_MISO	1_RX	UART1_RX
SPICK	SPI_CLK	0_RIN	UART0_RING
EX1V8	VCC_EXT_1V8	GND	GND
ADC102	ADC1 (LGA pin 102)	0_DSR	UART0_DSR
LED1	LED1 (LGA pin 101)	1_TX	UART1_TX



Screen Name	Signal Name	Screen Name	Signal Name
IO51	GPIO (LGA pin 51)	TP1103	Only for internal use
EX2V6	VCC_EXT_2V6	RESIN	RESIN_N
RS94	Reserved	PS_HOLD	PS_HOLD
IO113	GPIO (LGA pin 113)	RS26	Reserved
IO105	GPIO (LGA pin 105)	RS25	Reserved
IO55	GPIO (LGA pin 55)	RS83	Reserved
G_DIS	GPS_DISABLE	RS82	Reserved
S_STA	SLEEP_STATUS	TUNE3	ANT_TUNE3
I2CSA	I2C_SDA	TUNE2	ANT_TUNE2
WAK_I	WAKEUP_IN	TUNE1	ANT_TUNE1
2_RX	UART2_RX	TUNE0	ANT_TUNE0
2_TX	UART2_TX	LTEPRI	LTE_WLAN_PRIORITY
TP1107	Only for internal use	LTESYN	LTE_FRAME_SYNC
TP1106	Only for internal use	LTEACT	LTE_ACTIVE
IO109	GPIO (LGA pin 109)	PWRON	POWER_ON_OFF
LED2	LED2 (LGA pin 91)	MIC_P	HEADSET_MIC_P
VCOIN	VCOIN	MIC_N	HEADSET_MIC_N
SPICS	SPI_CS	SPKR_R	HEADSET_SPKR_R
TP1105	Reserved	SPKR_L	HEADSET_SPKR_L
I2CSL	I2C_SCL	AMIC_N	HANDMIC_N
SPIMO	SPI_MOSI	AMIC_P	HANDMIC_P
TP1104	Only for internal use	ASPK_N	HANDSPK_N
ADC104	ADC2 (LGA pin 104)	ASPK_P	HANDSPK_P
RS37	Reserved	ESPK_N	SPKR_OUT_N
W_DIS	W_DISABLE_N	ESPK_P	SPKR_OUT_P
RS103	Reserved	PCM_SYN	PCM_SYNC
WAK_O	WAKEUP_OUT	PCM_DIN	PCM_DIN
RS95	Reserved	PCM_CLK	PCM_CLK
VBAT	VBAT	PCM_DOUT	PCM_DOUT
LDO33	LDO_3V3 (from the mother board)	EMIC_N	HEADMIC_N
SD_CK	SD_CLK	EMIC_P	HEADMIC_P

Screen Name	Signal Name	Screen Name	Signal Name
SD_DT	SD_DET	HSICC	Reserved
GND	GND	VCHG	VCHG
SD_D0	SD_DATA0	VCC_EXT1_1V8	VCC_EXT1_1V8
SD_CM	SD_CMD	USBID	USB_ID
SD_D1	SD_DATA1	VBUS	USB_VBUS
GND	GND	0_CTS	UART0_CTS
SD_D2	SD_DATA2	1_RX	UART1_RX
SD_VC	SD_VCC	0_RIN	UART0_RING
SD_D3	SD_DATA3	GND	GND
0_TX	UART0_TX	0_DTR	UART0_DTR
0_DCD	UART0_DCD	1_TX	UART1_TX
GND	GND	TP1103	Reserved
0_DTR	UART0_DTR	RESIN	RESIN_N
0_RX	UART0_RX	PS_HOLD	PS_HOLD
1_RTS	UART1_RTS	RS26	Reserved
0_RTS	UART0_RTS	RS25	Reserved
1_CTS	UART1_CTS	RS83	Reserved

## 3.4 Power Consumption Test

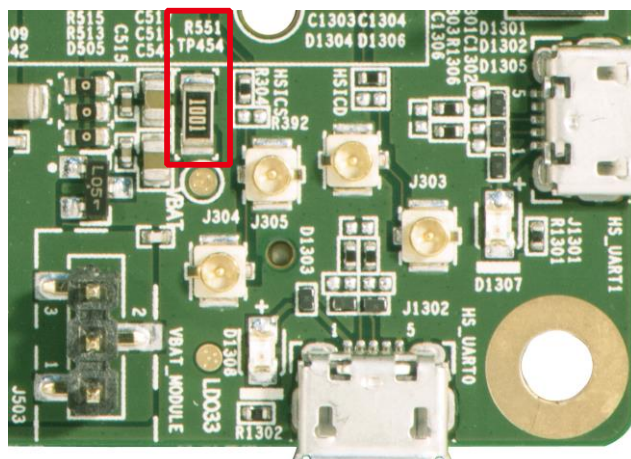
This section describes how to test the current of the LGA module.

For this section, only the interface board is needed and power is provided by an external power supply.

Before the test, you should delete the following resistors to reduce leakage current:

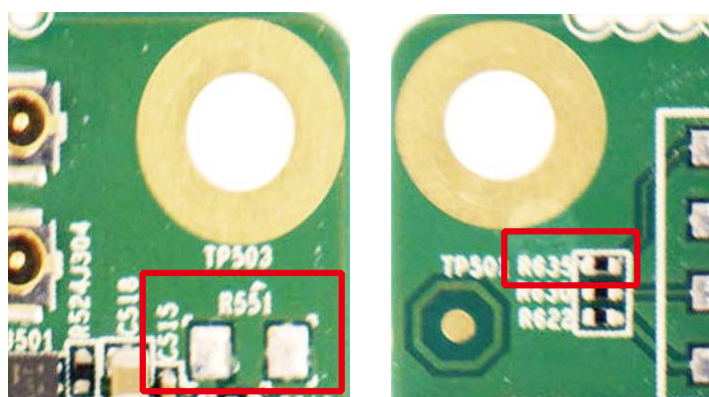
- For interface board 30X30LGADB VER.A, delete R551.

**Figure 3-10** Deleting R551



- For interface board ML0ME909UM VER.B, delete R551 and R635.

**Figure 3-11** Deleting R551 and R635

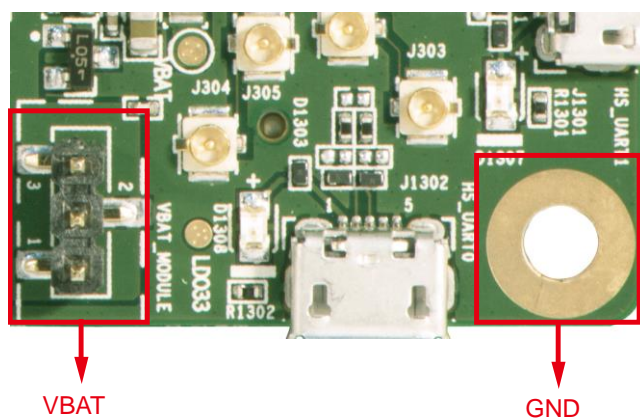


Step 1 Disassemble the mother board and the interface board.

Step 2 Connect the external power supply and interface board as follow:

VBAT is connected to the positive side and GND is connected to the negative side.





- Step 3 Set the voltage of the external power supply to be 3.8 V. The current range is not limited.
- Step 4 Power on the LGA module and record the current for different working status.



**NOTE**

When you finish a test, please shut down the module and cut off the power supply. Before going on another test, please make sure the shutting down time is more than 10 seconds.

# 4 Acronyms and Abbreviations

Acronym or Abbreviation	Expansion
AC	Alternating Current
CTS	Clear to Send
DC	Direct Current
DIP	Double In-line Package
DTE	Data Terminal Equipment
DVK	Development Kit
GPS	Global Position System
LGA	Land Grid Array
PCM	Pulse Code Modulation
RTS	Request to Send
RF	Radio Frequency
SIM	Standard Subscriber Identity Module
SMA	Small A Type
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus