Perfect Wireless Experience
完美无线体验

EVK-GT8619 User Manual

Version：V1.0.2
Date：2015-08-24

Copyright

Attention

The document is subject to update from time to time owing to the product version upgrade or other reasons. Unless otherwise specified, the document only serves as the user guide. All the statements, information and suggestions contained in the document do not constitute any explicit or implicit guarantee.

Trademark

The trademark is registered and owned by Fibocom Wireless Inc.

Versions

Version	Date	Remarks
V1.0.0	2013-07-30	Initial Version
V1.0.1	2015-04-26	Update the description of copyright and attention.
V1.0.2	2015-08-24	Update the logo.

Applicability Type

No.	Type	Note
1	G600	
2	G610	Need adapter, ADP-G610-XXX-YY
3	G620	Need adapter, ADP-G620-XXX-YY
4	G510	Need adapter, ADP-G510-XXX-YY

Contents

1 Preface

1.1 Scope

This document outlines the evaluation kits of Fibocom module, related technical detail, and testing information about it. It ensures that the user can quickly and conveniently develop wireless communication products by themselves.

1.2 Audience

The target audiences of this manual include engineers and testers who will use Fibocom module to develop wireless communication products.

2 Overview

2.1 Description

The GT8619 development kit can be used for testing Fibocom module after connecting to module via 50-pin connector. It has the following features:

- Each pin has a testing point
- Provides two methods to supply the power
- The main signal uses LED indicator
- Supports USB interface and RS232 serial port
- Support strace debugging software
- Two audio interfaces
- Supports SIM card interface
- Provides several buttons and jumper caps
- RF Cable included
- Supports SMA antenna interface

2.2 Specification

Development board	GT8619
DC power adapter	AC 220V / DC 9V/1A Φ2.5mm
Serial port line	DB9
GSM antenna	Frequency: 850/900/1800/1900MHz Impedance: 50ohm Gain: 0 dBi (unity) gain or greater VSWR: Less than: 2.5:1

2.3 Development Board

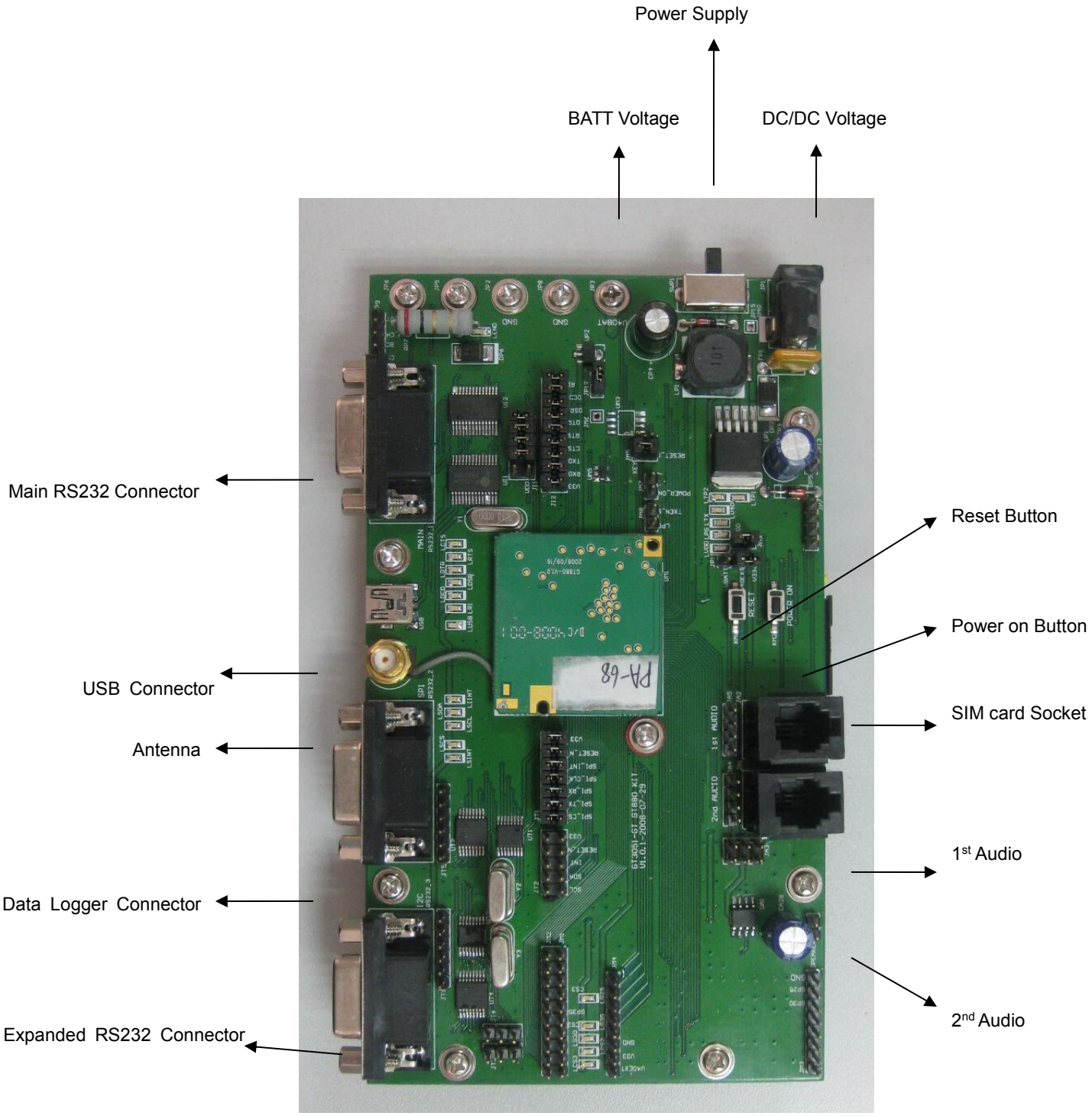


Figure 2- 1Development Board

3 Quick Guide

3.1 Connection

1) Connect antenna transfer line to module RF interface
2) Install the modulator adapter on the development board
3) Install GSM antenna to SMA interface
4) Install SIM card
5) Ensure the installation of nine jumper capsJI2
6) Ensure the installation of jumper caps JP12, JM9
7) Ensure the installation of jumper caps JP11 (V40EXT---V33)
8) Ensure the installation of jumper caps JM5 (KEY---RESET_N)
9) Make sure the power supply switch is in the middle
10) Connect the PC serial port to EVB UART1by a serial port line
11) Plug in the power adapter

3.2 Run Hyper Terminal or another Serial's Tools on PC

1) Open the corresponding serial port
2) Set the serial port of Hyper Terminal as 115200-8-N-1-None Flow

3.3 Power Supply

1) LV40 indicator is on when power adapter is plugged in
2) The switch is pushed to the direction of DC socket
3) LVDD indicator is on when the module is on
4) Press POWER_ON button for at least 600mS
5) LPG indicator and LCTS indicator are on if it successfully powered on.
6) Input AT command in PC Hyper Terminal, and return OK

7) Input AT+ CSQ, and return +CSQ: 31,99 OK

8) The development board and the module works fine.

Please refer to following chapters or AT Command User Manual.

4 Development Board Description

This chapter introduces development board and corresponding functions of the module in details.

4.1 Power Supply

Development board supports two kinds of power supplies. One can be directly connect with VBATT and supply power through connection end. The other supplies broader power through outside power supply. Development board switches the voltage to 4.0V through inside DC/DC, and then supplies power.

4.1.1 Direct Power Supply

Direct power supply will be loaded on modules. So the bound of power supply should refer to the requirement of GRPS module.

Note: Please use correct voltage to avoid damage to the module.

Power Connector	Description
V40BAT GND	DC power supply. BATT = 3.3 V to 5.2 V 4.0V is recommended Supplied current > 2.0A

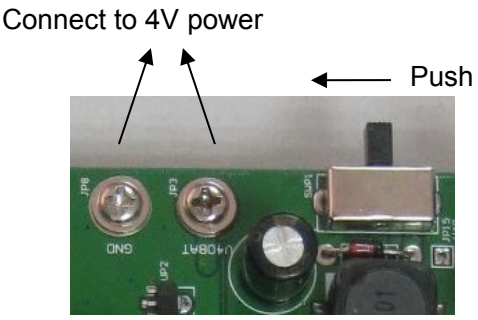
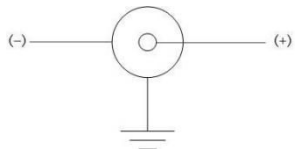


Figure 4- 1 Direct Power Supply

4.1.2AC-DC Adapter Power Supply

After insert outside power supply adapter, the DC/DC set down circuit of development board will on work at once and LV40 LED indicator will be on. It transfers the 4.0V voltage which will supply to the module after turning on the switch.

Power Connector	Description
	Straight insert voltage socket, core is Φ2.5mm; Input voltage:8V~15V; power supply: ≥9W; Development board has over voltage protection, under voltage protection, over current protection, and reverse protection.

4.1.3Peripheral Circuit of Power Supplies

There is a LDO chip that produces 3.3V voltage on development board to satisfy the need of other IC, LED or others circuit.

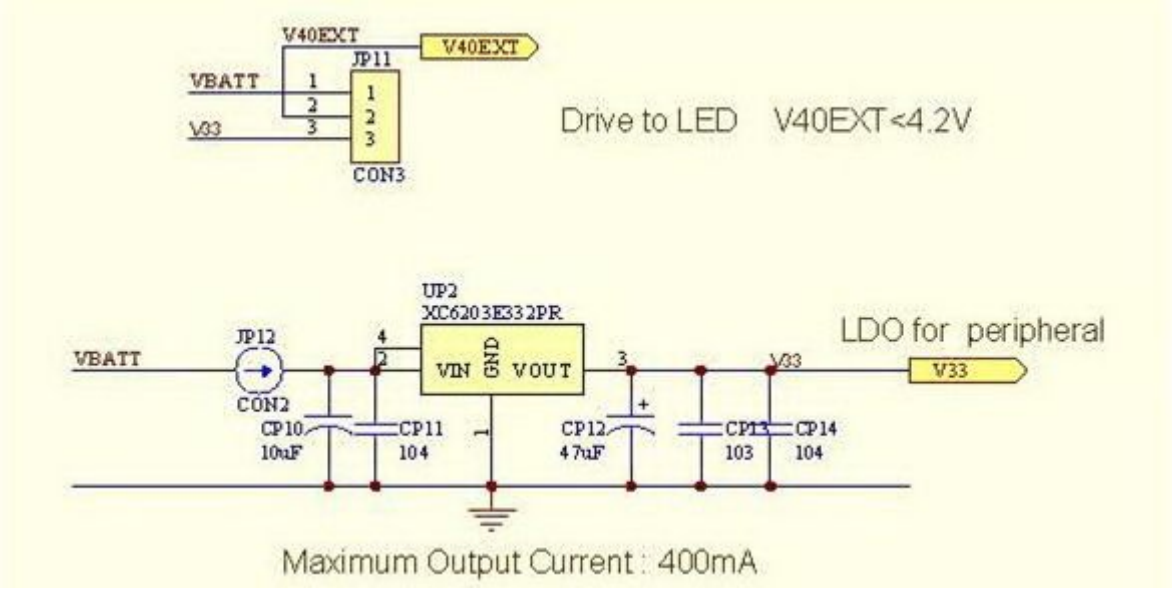


Figure 4-2 3.3V Power Circuit

Jumper Switch	Description
JP12	Turn on/ off 3.3V voltage output
JP11	Choose the power supply of LED or others circuit as VBATT or 3.3V

Note: When you test the parameter of current, please take out the two jumper caps. And the tested current will be the current consumed by module only.

4.2 Main Interface

Main RS232 interface and USB interface use the same UART interface of the module. Six LED indicators(LRI/LDCD/LDSR/ DTR/LRTS/LCTS)can exactly indicate the logic level of each pin in UART interface of the module.

The default value of main communication interface: adapt to baud rate -8-N-1-NONE.

PC and other DTE equipments will fully satisfy all functions of the module through communication interface and AT command.

Note: You cannot use two interfaces at the same time. Please switch between JI1 and JI2.You can identify whether is in SLEEP mode or not through the state of LCTS LED indicator.

Jumper Switch	Description
JI1	Turn on/ off USB interface as main communication interface
JI2	Turn on/ off Main RS232 as main communication interface

4.2.1Main DB9 RS232 Interface

This interface is a complete 8-line interface, and it can be connected with PC or other DTE equipments directly. Development board has RS-232 Transceiver SP3238EEA inside.

4.2.2USB Interface

Development board has USB transfer UART interface chip (PL2303). It will connect four interfaces (TXD/RXD/CTS/RTS) to UART interface of the module. LUSB LED indicator will be on after USB is inserted.

Note: You need to install driver in some operating system when you use USB.

4.3 Switch and Control

In this chapter, switch and control directions include: POWER_ON / RESET_N / LPG / TX_EN / VDD. LPG/TX_EN/VDD directs the state through LED indicator. POWER_ON / RESET_N have corresponding buttons and circuit.

4.3.1 Peripheral Circuit of POWER_ON

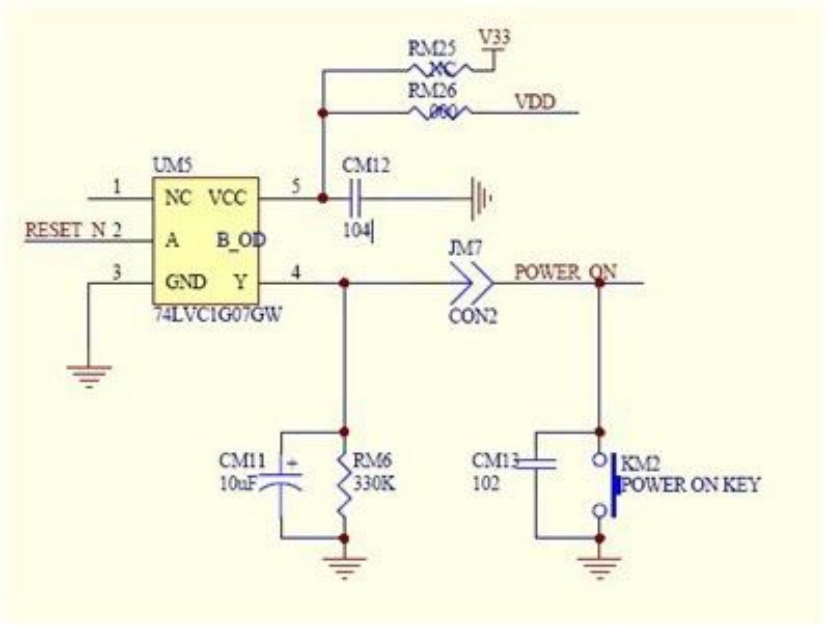


Figure 4- 3 POWER_ON Circuit Diagram

Development Board	Description
RM6 & CM11	Power_on pin is pulled up in GPRS module. Connect RM6 and CM11 externally to turn on the module automatically.
JM7	Disable / Enable automatic turn-on
KM2 & CM13	Manually turn on/off ensure it will excess 600mS
UM5 and others	When the automatic turn-on enable, it can be in effect even after reset.

Note: The interval time should be more than 5s between the development board re-power.

4.3.2Peripheral Circuit of RESET_N

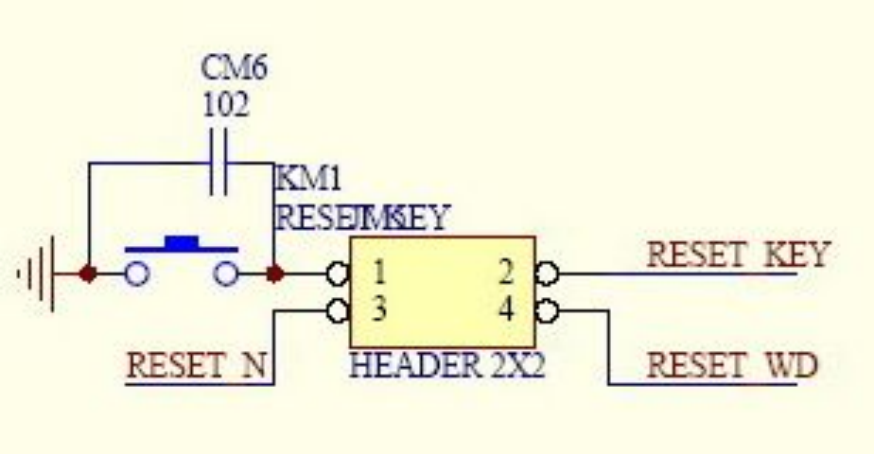


Figure 4-4 Peripheral Circuit of RESET_N

Development Board	Description
KM1&CM6	Button, manual reposition
JM5	Jumper (1-3): Manually RESET_N

4.3.3LVDD LED Indicator

Development Board	Description
JM9	Disable / Enable VDD LED indicator

4.3.4Power on Process

Development Board	Description	
Power supply	LVDD	Turn off If outside 3.3V voltage acts on any IO interface, it will cause current reperfusion, and affect the normal indicator of VDD.
	LPG	Turn off
	LTX	Turn off
Power ON (automatic turn on or press POWER_ON button)	VDD	Turn on
	LPG	Turn on
	TX_EN	Turn off (It twinkles when it register network)

Turn off	Press POWER_ON button more than 3S, and the state of all LED is the same as power off mode.

4.4 RTC (Real Time Clock)

The module includes a particular pin of RTC power supply. The RTC will continue running after main power supply is cut off.

Lead the pin to JP7-1pin on development board, and design a 220uF standby capacitance. Short circuit JP7 (1-2pin) will ensure real time clock continue running about 160 seconds after the main power supply is cut off.

You can directly provide power supply to KP7-1pin, or put a button battery to ensure the long-time running of real time clock.

4.5 SIM Card Interface

Development board includes a complete SIM card socket and interface circuit.

This circuit doesn't support SIM_CD.

4.6 Audio Interface

There are three audio interfaces: the first audio interface, the second audio interface and hand-free interface.

As shown in the following picture:

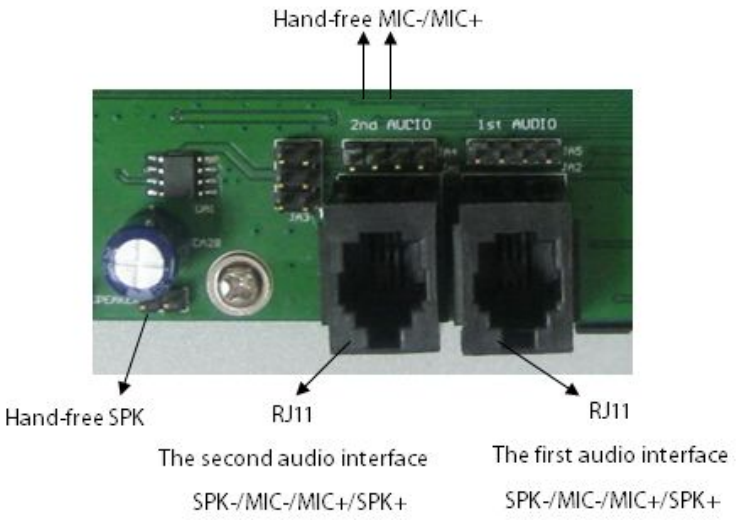


Figure 4- 5 Audio Interface

The hand-free audio and the second audio interface are connecting to the same audio interface of the module, so you cannot use the second audio interface RJ11 and hand-free interface at the same time.

Development Board	Description	
JA3	JA3(1-2pin)	Turn on/ off AUXO+ to hand-free interface
	JA3(3-4pin)	Turn on/ off PA power supply hand-free interface
	JA3(5-6pin)	Turn on/ off AUXO+ to hand-free interface

4.7 ADC Interface

Development board JP7 (3pin/4pin)will connected to ADC1 and ADC2(80pin only). You can inquire about the voltage after ADC transfer through AT command.

Note: Please remove RP10/RP11/RP12/RP13 when you test outside voltage.

4.8 Debugging Interface

There is a debug interface inside development board. It will be used to analyze and debug the reference and function when the module is running. The interface will be simulated to UART through SPI, and then transferred to a serial port through RS-232 Transceiver SP3238EEA.

Note: It just supports G600 and G610.

Meanwhile there are LSINT/LSCS LED indicators on development board that will indicate the work state of SPI transfer serial port.

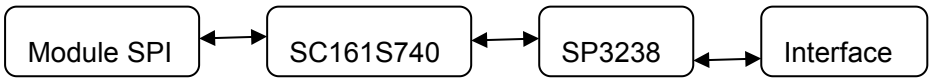


Figure 4- 6 SPI transfers to Serial Port

Development Board	Description
JT1	Turn on/ off SPI transfer serial port circuit

5 Performance Testing

5.1 Current Testing

The current of the module is an important parameter.

The development board is design with less current consumption. So it can be test with the module cooperatively. The current consumption reflected the G600 current consumption exactly.

Here are the test procedures:

1) Use the direct power supply
2) Turn off 3.3V power supply(JM12)
3) Turn off outside power supply(JP11)
4) The main communication interface is USB interface, and provides UART interface voltage through VDD.
5) Turn off LVDD LED indicator
6) Turn off other interface connections

The sketch map of testing environment:

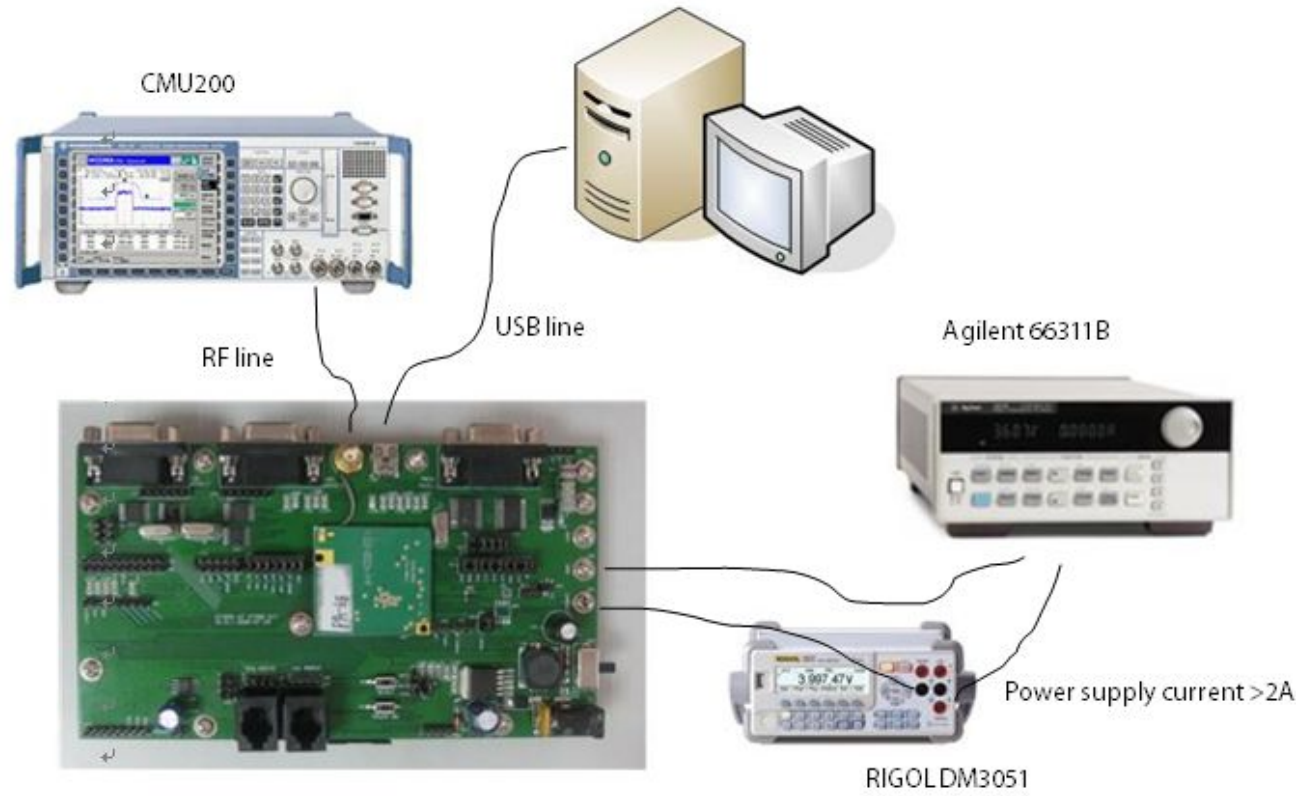


Figure 5- 1 Test Environment

Note: It's recommended that the power supply should be used Agilent 66311B or higher level programmable power supply. In this environment you don't need a current meter.

5.2 Current Testing Description

Example: G600

G600 Current Test Report					Sample A
Item	**Description**	**Condition**	**STD-G**	**Unit**	
I off	RTC mode		**90.0**	uA	**75.0**
GSM 900/1800 current					
I idle	Idle mode	GSM only, DRX=2, -85dBm			
		EGSM900	**26.0**	mA	**24.5**
		DCS1800	**26.0**	mA	**24.9**
I idle-RX		MAX	**200.0**	mA	**135.7**
I idle-base		base (average)	**23.0**	mA	**21.2**

I sleep	Low power mode	EGSM900, -85dBm			
		DRX=2	**4.0**	mA	**3.7**
		DRX=5	**2.5**	mA	**2.3**
		DRX=9	**2.0**	mA	**1.7**
I sleep-RX		MAX	**200.0**	mA	**131.7**
I sleep-base		base (average)	**1.3**	mA	**1.1**
I gsm-avg	Average current	EGSM900 PCL=5	**300.0**	mA	**235.1**
	GSM voice	PCL=10	**160.0**	mA	**144.6**
	1 Tx slot	PCL=15	**130.0**	mA	**115.4**
	1 Rx slot	PCL=19	**125.0**	mA	**106.5**
		DCS1800 PCL=0	**255.0**	mA	**186.7**
		PCL=5	**155.0**	mA	**127.6**
		PCL=10	**130.0**	mA	**108.0**
		PCL=15	**125.0**	mA	**102.6**
I gsm-max	Peak current	EGSM900 PCL=5	**2000.0**	mA	**1060.1**
	GSM voice	PCL=10	**740.0**	mA	**476.9**
	1 Tx slot	PCL=15	**400.0**	mA	**291.4**
	1 Rx slot	PCL=19	**315.0**	mA	**241.1**
		DCS1800 PCL=0	**1565.0**	mA	**740.8**
		PCL=5	**630.0**	mA	**357.6**
		PCL=10	**370.0**	mA	**229.3**
		PCL=15	**315.0**	mA	**205.4**
GPRS 900/1800 current					
I idle	Idle mode	GPRS, DRX=2, -85dBm			
		EGSM900	**26.0**	mA	**24.6**
		DCS1800	**26.0**	mA	**24.8**
I sleep	Low power mode				
		DRX=2	**4.0**	mA	**3.6**

		DRX=5	**2.5**	mA	**2.2**
		DRX=9	**2.0**	mA	**1.6**
I gprs-avg	Average current	EGSM900 PCL=5	**520.0**	mA	**378.7**
	GPRS Class 10	PCL=10	**260.0**	mA	**207.1**
	2 TX slot	PCL=15	**185.0**	mA	**149.5**
	3 Rx slot	PCL=19	**165.0**	mA	**134.3**
		DCS1800 PCL=0	**420.0**	mA	**290.1**
		PCL=5	**240.0**	mA	**177.0**
		PCL=10	**180.0**	mA	**138.4**
		PCL=15	**170.0**	mA	**126.5**
I gprs-max	Peak current	EGSM900 PCL=5	**2000.0**	mA	**1240.2**
	GPRS Class 10	PCL=10	**730.0**	mA	**575.9**
	2 TX slot	PCL=15	**400.0**	mA	**314.7**
	3 Rx slot	PCL=19	**315.0**	mA	**238.1**
		DCS1800 PCL=0	**1565.0**	mA	**868.2**
		PCL=5	**615.0**	mA	**429.5**
		PCL=10	**360.0**	mA	**264.2**
		PCL=15	**315.0**	mA	**202.0**

Note:

- Test algorithm is not accurate, only for reference.
- Max Supply Current and Relative Power level recorded simultaneously
- Pay attention to the condition of GPRS attach
- It is the same Max Supply Current standard at GPRS or GSM

5.3 RF Testing Description

Example: G600

G600 RF Sector(EGSM900) Test Report						Sample A		
Item	Description	Condition	STD-ETSI	STD-G	Unit	Channel		
						1	62	124
		EGSM900 PCL=5	<90	<50	Hz	-31.96	-10.33	19.89
Frequency		10	<90	<50	Hz	-43.46	-9.75	-5.1
Error		15	<90	<50	Hz	-24.67	-10.27	-8.78
		19	<90	<50	Hz	13.62	-2.97	-7.88
RMS		EGSM900 PCL=5	<5	<3	°	0.6	1.0	0.9
Phase		10	<5	<3	°	0.4	0.8	0.8
Error		15	<5	<3	°	0.4	0.8	0.9
		19	<5	<3	°	0.8	0.8	0.8
Peak		EGSM900 PCL=5	<20	<10	°	5.7	6.0	4.7
Phase		10	<20	<10	°	-1.7	-2.3	-2.9
Error		15	<20	<10	°	1.3	-2.2	-2.4
		19	<20	<10	°	2.1	-2.5	2.3
Transmitter	ΔP≤1dB	EGSM900 PCL=5	33±2	32.5±0.5	dBm	32.6	32.4	32.4
output		6	31±3	31±1.5	dBm	31.2	31.1	31.0
power		7	29±3	29±1.5	dBm	29.0	29.0	28.9
		8	27±3	27±1.5	dBm	27.1	27.1	27.0
		9	25±3	25±1.5	dBm	25.1	25.1	25.1
		10	23±3	23±1.5	dBm	23.0	23.0	22.9
		11	21±3	21±1.5	dBm	21.1	21.1	21.0
		12	19±3	19±1.5	dBm	19.1	19.1	19.1
		13	17±3	17±1.5	dBm	17.0	17.0	17.0
		14	15±3	15±1.5	dBm	15.0	15.0	14.9
		15	13±3	13±1.5	dBm	13.0	13.0	13.0
		16	11±5	11±2.5	dBm	11.1	11.1	11.0
		17	9 ±5	9 ±2.5	dBm	9.5	9.5	9.5
		18	7 ±5	7 ±2.5	dBm	8.1	8.1	8.1
		19	5 ±5	5 ±3	dBm	6.2	6.2	6.1

Transmitter output burst timing (Pass or Fail)		EGSM900 PCL=5		Insde Template	PASS	PASS	PASS
		6		Insde Template	PASS	PASS	PASS
		7		Insde Template	PASS	PASS	PASS
		8		Insde Template	PASS	PASS	PASS
		9		Insde Template	PASS	PASS	PASS
		10		Insde Template	PASS	PASS	PASS
		11		Insde Template	PASS	PASS	PASS
		12		Insde Template	PASS	PASS	PASS
		13		Insde Template	PASS	PASS	PASS
		14		Insde Template	PASS	PASS	PASS
		15		Insde Template	PASS	PASS	PASS
		16		Insde Template	PASS	PASS	PASS
		17		Insde Template	PASS	PASS	PASS
		18		Insde Template	PASS	PASS	PASS
		19		Insde Template	PASS	PASS	PASS
Output RF		EGSM900 PCL=5		Insde	PASS	PASS	PASS

spectrum (due to switching) (Pass or Fail)		10		Template Insde Template	PASS	PASS	PASS
		15		Insde Template	PASS	PASS	PASS
		19		Insde Template	PASS	PASS	PASS
Output RF spectrum (due to modulation) (Pass or Fail)		EGSM900 PCL=5		Insde Template	PASS	PASS	PASS
		10		Insde Template	PASS	PASS	PASS
		15		Insde Template	PASS	PASS	PASS
		19		Insde Template	PASS	PASS	PASS
Receiver sensitivity		EGSM900 PCL=5 BER<2.439% & FER<1%	**≤-102**	**≤-108** dBm	-109.00	-109.4	-109.2
Signal strength		EGSM900					
		Cell Power=-88(dBm)	**22(-3~+2)**	**22(-2~+2)**	23	22	23
		Cell Power=-102(dBm)	**8(-4~+2)**	**8(-3~+2)**	8	8	9
		Cell Power=-108(dBm)	**2(-4~+2)**	**2(-3~+2)**	3	3	4

G600 RF Sector (DCS1800) Test Report						Sample A		
Item	Description	Condition	STD-ETSI	STD-G1	Unit	Channel		
						512	698	885
Frequency Error		DCS1800 PCL=0	**<180**	**<100**	Hz	-114.49	23.18	46.49
		5	**<180**	**<100**	Hz	-13.56	-21.11	8.46
		10	**<180**	**<100**	Hz	26.93	28.35	37.97
		15	**<180**	**<100**	Hz	42.62	33.71	21.11

RMS Phase Error		DCS1800 PCL=0	**<5**	**<3**	°	0.91	0.96	1.04
		5	**<5**	**<3**	°	1.03	0.82	0.82
		10	**<5**	**<3**	°	0.89	0.89	0.86
		15	**<5**	**<3**	°	0.84	0.88	0.97
Peak Phase Error		DCS1800 PCL=0	**<20**	**<10**	°	5.20	7.97	2.96
		5	**<20**	**<10**	°	-3.64	2.61	2.90
		10	**<20**	**<10**	°	2.69	-2.61	2.85
		15	**<20**	**<10**	°	2.88	-2.74	-3.43
Transmitter output power	ΔP≤1dB	DCS1800 PCL=0	**30±2**	**29.5±0.5**	dBm	29.6	29.6	29.5
		1	**28±3**	**28±1.5**	dBm	27.6	27.8	28.0
		2	**26±3**	**26±1.5**	dBm	25.8	25.9	26.1
		3	**24±3**	**24±1.5**	dBm	23.9	24.1	24.3
		4	**22±3**	**22±1.5**	dBm	22.0	22.1	22.3
		5	**20±3**	**20±1.5**	dBm	19.8	20.0	20.3
		6	**18±3**	**18±1.5**	dBm	17.6	17.7	18.0
		7	**16±3**	**16±1.5**	dBm	15.8	16.0	16.3
		8	**14±3**	**14±1.5**	dBm	13.9	14.1	14.4
		9	**12±4**	**12±2**	dBm	11.7	11.9	12.2
		10	**10±4**	**10±2**	dBm	9.9	10.1	10.4
		11	**8±4**	**8±2**	dBm	8.0	8.3	8.6
		12	**6 ±4**	**6 ±2**	dBm	5.7	5.9	6.2
		13	**4 ±4**	**4 ±2**	dBm	4.4	4.6	4.9
		14	**2 ±5**	**2 ±2.5**	dBm	2.9	3.1	3.3
		15	**0 ±5**	**0 ±3**	dBm	0.9	1.0	1.3
Transmitter output burst timing (Pass or Fail)		DCS1800 PCL=0		**Insde Template**		PASS	PASS	PASS
		1		**Insde Template**		PASS	PASS	PASS
		2		**Insde Template**		PASS	PASS	PASS
		3		**Insde Template**		PASS	PASS	PASS
		4		**Insde Template**		PASS	PASS	PASS
		5		**Insde Template**		PASS	PASS	PASS
		6		**Insde Template**		PASS	PASS	PASS

		7		**Insde Template**		PASS	PASS	PASS
		8		**Insde Template**		PASS	PASS	PASS
		9		**Insde Template**		PASS	PASS	PASS
		10		**Insde Template**		PASS	PASS	PASS
		11		**Insde Template**		PASS	PASS	PASS
		12		**Insde Template**		PASS	PASS	PASS
		13		**Insde Template**		PASS	PASS	PASS
		14		**Insde Template**		PASS	PASS	PASS
		15		**Insde Template**		PASS	PASS	PASS
Output RF spectrum (due to switching) (Pass or Fail)		DCS1800 PCL=0	***1**	**Insde Template**		PASS	PASS	PASS
		5		**Insde Template**		PASS	PASS	PASS
		10		**Insde Template**		PASS	PASS	PASS
		15		**Insde Template**		PASS	PASS	PASS
Output RF spectrum (due to modulation) (Pass or Fail)		DCS1800 PCL=0	***2**	**Insde Template**		PASS	PASS	PASS
		5		**Insde Template**		PASS	PASS	PASS
		10		**Insde Template**		PASS	PASS	PASS
		15		**Insde Template**		PASS	PASS	PASS
Receiver sensitivity		DCS1800 PCL=0 BER<2.439% & FER<1%	**≤-100**	**≤-107**	dBm	-109	-109.8	-108.5
Signal strength		DCS1800 Cell Power=-88(dBm)	**22(-3~+2)**	**22(-2~+2)**		22	22	22

		Cell Power=-102(dBm) Cell Power=-107(dBm)	8(-4~+2) 3(-4~+2)	8(-3~+2) 3(-3~+2)		8 4	8 4	8 4

6 RF Antenna

There is SMA RF interface on development board. It is connected to RF interface of the module through a RF cable which transfers SMA to U.FL. The GSM antenna can be connected by the SMA connector.

7 Default Jumper Cap

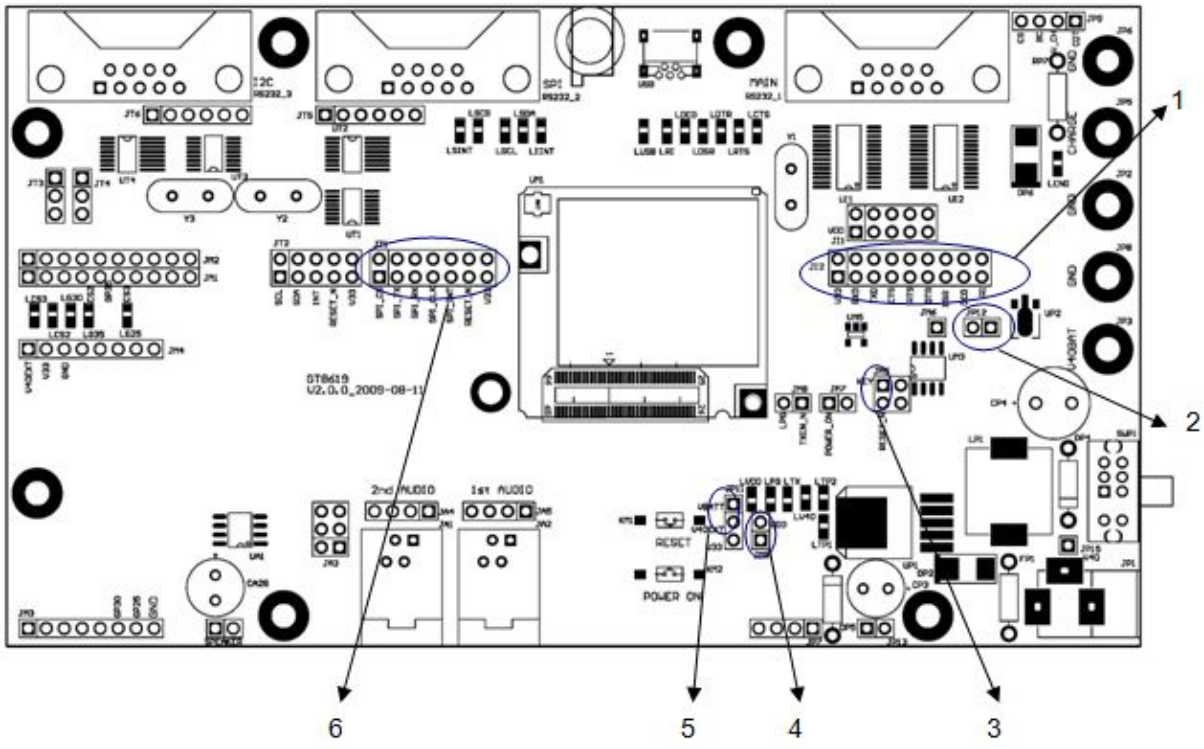


Figure 7- 1 Default Jumper Cap

Number	Locate	PCS	Description
1	JI2	9	Connect the Module UART to DB9 connector
2	JP12	1	Support the external voltage by LDO chip
3	JM5(1-3)	1	Support the external RESET button
4	JM9	1	Enable VDD led
5	JP11(1-2)	1	Support the external led voltage by VBAT
6	JT1	7	Connect the Module SPI as Trace port to DB9 connector