

GT2GM-M Wireless Module User Manual

Status :	File Indicator :	EL_GT2GM-M Hardware Design Guide
<input type="checkbox"/> Draft	Current Version :	1.2
<input type="checkbox"/> Release	Author :	
<input type="checkbox"/> Revise	Date :	2012-07-18

Version History

[illegible]

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1 Introduction

1.1 Overview

The GT2GM-M module is a tiny, standards-based, wireless data modem that provides GPRS wireless data connectivity, it suitable for embedding environment in some wireless products, such as wireless modem、handheld computers、GPS Tracker 、other machine-to-machine devices and vertical applications. In addition, The GT2GM-M module allows you access to the Internet easier and convenient.

1.2 Electrical features

Input supply voltage:

- VBAT—Min 3.3 V, Max 4.2V

Typical DC power consumption(Total):

- Standby current: 2 mA
- GPRS (1Tx+4Rx) Data current: 300 mA—350 mA
- MCP(Norflash+SRAM) working current:20mA@1.8V
- Baseband CPU working current:40mA@2.8V
- RF Power amplifier working current:500mA@3.8V

1.3 RF features

- 2G band support : PCS 1.9GHz
- Support for GPRS multi-slot class 12

1.4 SW features

- Standard AT command interface
- embedded TCP/IP、UDP protocol stack

1.5 Terms and Abbreviations

JTAG	Joint Test Action Group
ADC	Analog to Digital Converter
LED	light-emitting diode
PA	Power Amplifier
UART	Universal Asynchronous Receiver and Transmitter
RF	Radio Frequency
I/O	Input / Output
PD	Pull Down
PU	Pull Up

GPIO general purpose input or output port

2 Feature

Item	Description
Temperature range	Normal range: -20°C to +70°C (full compliant) Storage: -40°C to 85°C
Weight (in g)	6g (typical)
Physical dimension	29.5 x 26.0 x 2.4 mm
Connector Type	36 Pin stamp
Power supply	External input : 3.3V to 4.2V
Power consumption	Off mode: 0 A (typical) Sleep mode: 0.8mA Standby mode: 2.0mA
SIM card	Support 3.0V SIM card
GPIOs	Support 8 GPIOs output
UART	UART1:For debug and flash download, RF calibration or AT command Communication. UART2:For data service
Power on key pin	Low level for power on system.
System Voltage (GPIO Voltage)	2.8V
Input/Output Impedance (ANT impedance)	50 ohm
TCP/IP,UDP	Built-in TCP/IP ,UDP protocol stack

3 Block Diagram

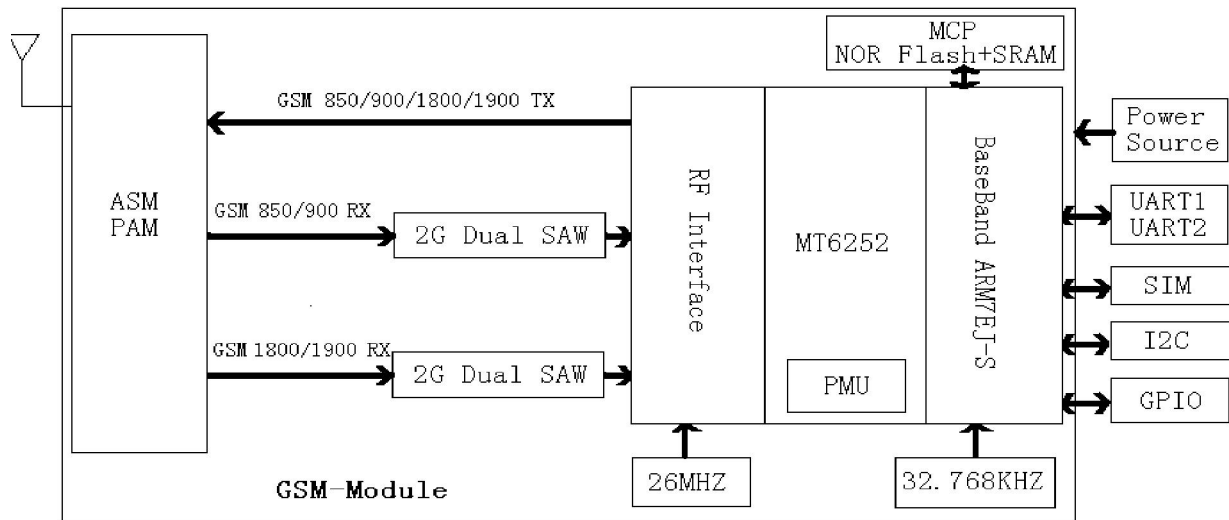


Figure 1 GT2GM-M Block Diagram

4 ELECTRICAL SPECIFICATION

4.1 Supply Voltage

Symbol	Parameter	Min	Typ	Max	Unit
VBAT	PMIC, PA	3.3	3.8	4.2	V
Voltage Ripple	2%, 0~100kHz (Max. values not exceeding operating voltage)				
Input current	VBAT		1.2		A

4.2 Recommended Operation Conditions

4.2.1 TEMPERATURE, HUMIDITY

Symbol	Parameter	Min	Typ	Max	Unit
Ta	Ambient Operation Temperature	-20		70	C
Ts	Storage Temperature	-40	25	85	C
Humidity	Relative Humidity			95%	%

4.2.2 Digital signal DC electrical specifications

Symbol	Parameter	Min	Typ	Max	Unit
Supply voltage	VCC Regulated	2.7	2.8	2.9	V
Low level input voltage	VIL	-0.3	0	0.35*VCC	V
High level input voltage	VIH	0.65*VCC	2.8	VCC+0.3 V	V

4.3 Power Consumption

The power consumption is typical value measured at 25 C temperature.

Operation		Parametmeters		Min	Typ	Max	Unit
				Input Voltage		3.4	3.6
Off mode				500	600	700	uA
GPRS	Data transfer 1Rx 1Tx	850MHZ	PCL=5,TX=33dBm	382	375	373	mA
			PCL=19,TX=5dBm	162	154	152	mA
		1900MHZ	PCL=0,TX=30dBm	311	308	305	mA
			PCL=15,TX=0dBm	138	131	127	mA
GPRS	Data transfer (clasee12) 4RX,1TX	850MHZ	PCL=5	387	385	381	mA
		1900MHZ	PCL=0	339	335	331	mA

4.4 Radio Performance

Over full range of values specified in the “Recommended Operation Condition”

Features	Description
Frequency Band	GPRS : Dualband , 850/1900
Max. TX power	Class 4 (+33dBm ± 2 dB) for EGPRS 850 Class 1 (+30dBm ± 2 dB) for PCS/GPRS 1900

4.5. Output power

TRP(dBm)						
Band	Designation	Freq(MHz)	TCH	Conducted Power (dBm)	FS SPEC	Test criterion
GSM 850	TX	824.20	128	31.5	26.50	CTIA 2.2.2
	TX	836.60	190	31.5		
	TX	848.80	251	31.5		
GSM 1900	TX	1850.20	512	28.5	25.50	CTIA 2.2.2
	TX	1880.00	661	28.5		
	TX	1909.80	810	28.5		

4.6 Sensitivity

TIS(dBm)						
Band	Designation	Freq(MHz)	TCH	Conducted Sensitivity (dBm)	FS SPEC	Test criterion

GSM 850	RX	869.20	128	-107.00	-99.00	CTIA 2.2.2
	RX	881.60	190	-107.00		
	RX	893.80	251	-107.00		
GSM 1900	RX	1930.20	512	-107.00	-101.00	CTIA 2.2.2
	RX	1960.00	661	-107.00		
	RX	1989.80	810	-107.00		

5 PIN definition

Pin name	DI R	Pin Numbe r	First Function(Note 1)	Second function(Note 1)
GND	I	5,7,16, 17 32,33,3 435,36	Ground	Same as left
GSM ANT	I/O	6	Antenna feed point	Same as left
VBAT	I	2,3,4	Power supply	Same as left
VCHG	I	1	Battery Charging input port (DC 5V—7V)	Same as left
System_reset	I	9	System reset pin(low level valid)	Same as left
GPIO3	I/O	8	General purpose input or output port with pull up 47K	KCOL4
PWRKEY	I	10	POWER KEY(low level valid in 2 seconds)	Same as left
SIMDAT	I/O	11	SIM card data signal	Same as left
SIMCLK	I	12	SIM card clock signal	Same as left
SIMRST	I	13	General purpose input output	Same as left
SIMVCC	I	14	SIM card power supply(Need added C=100nF to GND)	Same as left
VIO	O	15	<u>2.8V@100mA</u> output DC voltage	Same as left
GPIO45	I/O	18	General purpose input or output port with pull down 47K	KROW7
URXD1	I/O	19	UART 1 data receiving port(for debug, download S/W, AT command)	Same as left
UTXD1	I/O	20	UART 1 data transmitting port(for debug, download S/W, AT command)	Same as left
UTXD2	I/O	21	UART 2 data transmitting port	Same as left
URXD2	I/O	22	UART 2 data receiving port	Same as left

LED	I	23	LED sink port	Same as left
GPIO1	I/O	24	General purpose input or output port with pull up 47K,or interrupt input	KCOL6
GPIO2	I/O	25	General purpose input or output port with pull up 47K	KCOL5
EINT0	I	26	Interrupt input port	Same as left
GPIO33	I/O	27	General purpose input or output port with pull down 47K	Speaker negative
GPIO44	I/O	28	General purpose input or output port with pull down 47K	Speaker positive
LED_GPS	I	29	LED sink port (For GPS signal indication)	Same as left
SCL	O	30	I2C Serial clock port or GPIO15	Microphone positive
SDA	I/O	31	I2C Serial data port or GPIO17	Microphone negative

Note 1: You can only use first function or second function in one time, don't using alternately.

Default is first Function.

6 Functional description

6.1 ANT PORT

In this module, we have one antenna port (PIN 6:ANT) for signal transfer. To reduce the RF trace loss, the antenna port in the module had better be as close as possible to the antenna pad in the PCB. For maximum transmitter power and receiver sensitivity, a 50 transmission line is suggested to connect the antenna pad and the antenna port of the module. In addition, the RF signal will be impacted by high data rate. We strongly suggest the audio trace and SIM signal trace to be short as possible and as far away as possible from the RF trace and power line. To prevent cross coupling, signal traces on your PCB must not be routed through the module backside.

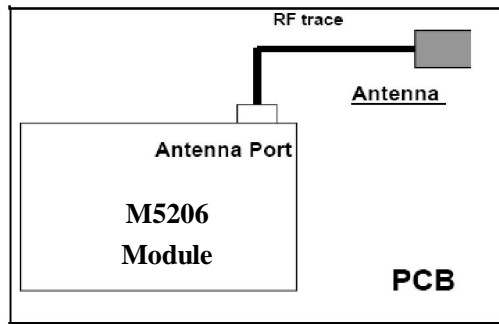


Figure2 GT2GM-M module placement

The antenna pad in your PCB should be 3~5mm wide and there must not be any other traces and ground under the pad. If needed, the matching network can be added between the antenna pad and antenna port. The recommended circuit is shown as below:

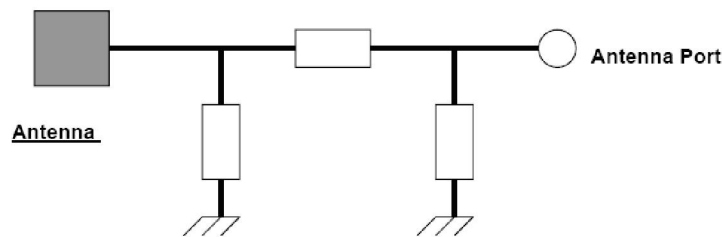


Figure 3 GT2GM-M Antenna match

6.2 VBAT Pin (Pin 2~4)

The Power amplifier is supplied by the VBAT pin. During transmitting mode, high output power will draw a large amount of current. The width of this power trace that is connected to the VBAT pin could not be less than 60mil. In addition, it is better to shunt a 100uf@6.3V (low ESR) bypass capacitor on VBAT pins to prevent voltage drop and to reduce ripple.(The maximum current should be 1500mA in some time)

6.3 Charge in Pin (Pin 1)

In this module, we added the charge manage circuit for lithium battery , the max charge Circuit should be 400mA. The charge voltage 5.5V+/-0.5V.

6.4 UART interface

The UART1 used as debug 、 software download or as AT command control

Pin name	DIR	Pin Number	Function unit
TXD1	O	20	UART 1 data transmitting port
RXD1	I	19	UART 1 data receiving port

The UART2 used as transmitting DATA between the module from user, only supply 2 signals as follow table:

Pin name	DIR	Pin Number	Function unit
TXD2	O	21	UART 2 data transmitting port
RXD2	I	22	UART 2 data receiving port

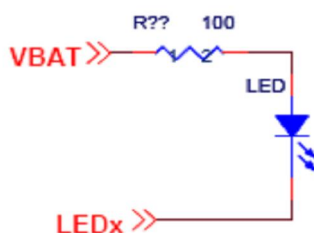
This module also support baud rate from 9600 to 921600

6.5 GPIOs

The GT2GM-M module has 8 GPIOs (PIN8,PIN18,PIN24,PIN25,PIN27, PIN28, PIN30,PIN30): Please refer to corresponding programming application for details as to all the GPIO ports.

6.6 LED

GT2GM-M module has 2 LED driver pin(pin23 & pin29), please ref. the following sch.



6.7 SIM card interface

In the Current Version of hardware, The module includes a SIM Socket. When the user use this interface, You must use the Voltage Dependent Resistor (VDR) or TVS component on the transmission signal in the same time. The SIM Card digital interface in the GT2GM-M ensures the translation of logic levels between GT2GM-M and the SIM Card, for the transmission of 3 different signals: clock signal (SIMCLK, PIN12), reset signal (SIMRST, PIN13) from GT2GM-M to the SIM Card; and serial data signal from GT2GM-M to the SIM Card (SIMDATA, PIN11). The SIM card interface can be programmed to drive a 3.0V SIM Card. Importance that the Voltage Dependent Resistor (VDR) or TVS component is necessary on the transmission signal , and the bias cap is lower than 30pF was suggested. The bypass cap of VCC net was suggested 1uF, and it must be added in your design.

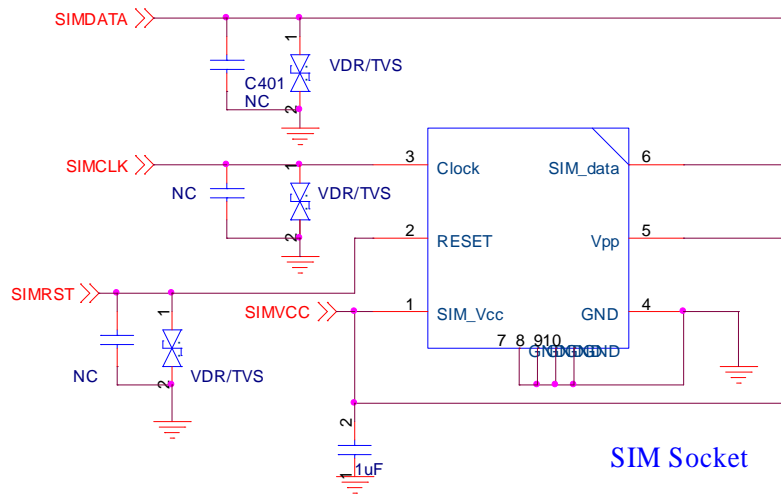


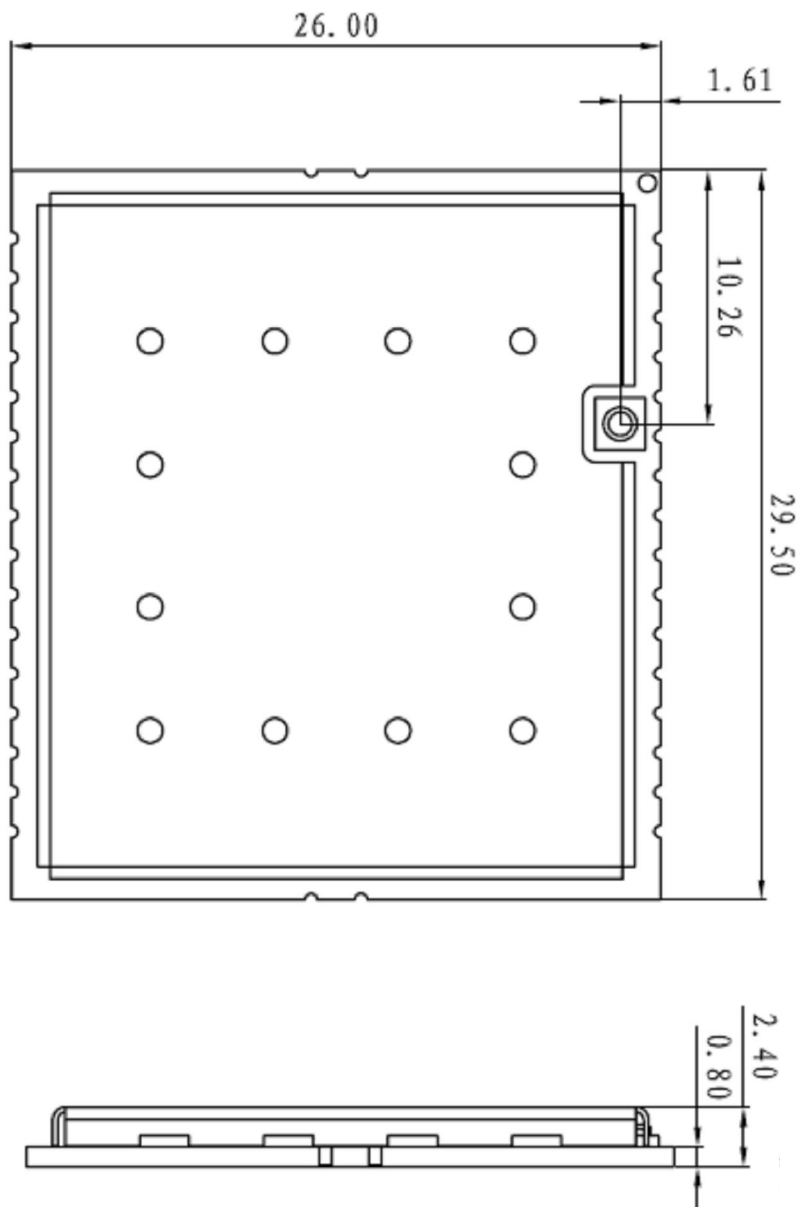
Figure4 SIM card interface

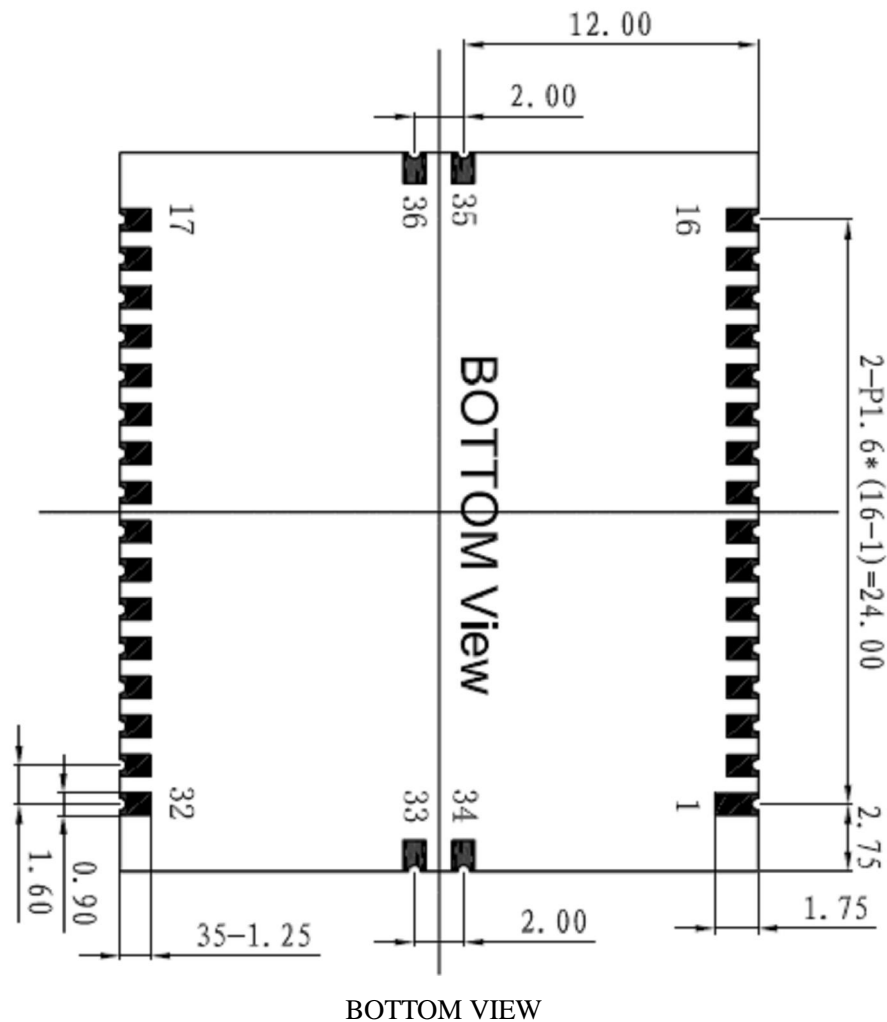
reference circuit

6.8 Power on

The pin 10(powerkey) is for power on the module, please keep 2 seconds low level and then turn to high level to power on the module.

7 Mechanical Structure(mm)





8 Important announcement

The device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference ;changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is

connected.

Consult the dealer or an experienced radio/TV technician for help.

Please notice that 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 FCC ID:N69-715000” any similar wording that expresses the same meaning may be used.

The antennas used for this transmitter as shown in this filing must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter

9 Construction and setup

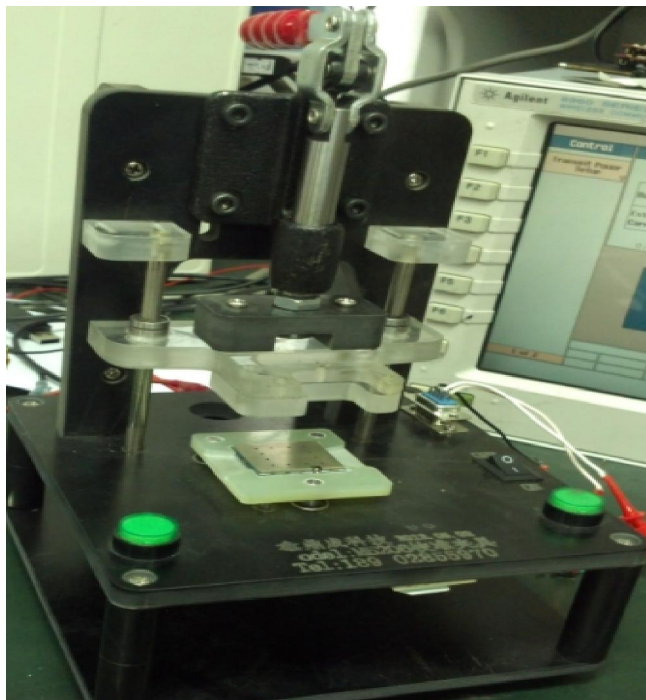
The Module test is comprised of following basic steps. The first is to put the DUT into module test jig and the second is to connect the PC terminal emulator and start the measurement tool, and then stop the test program:

- 1) Setup the test platform

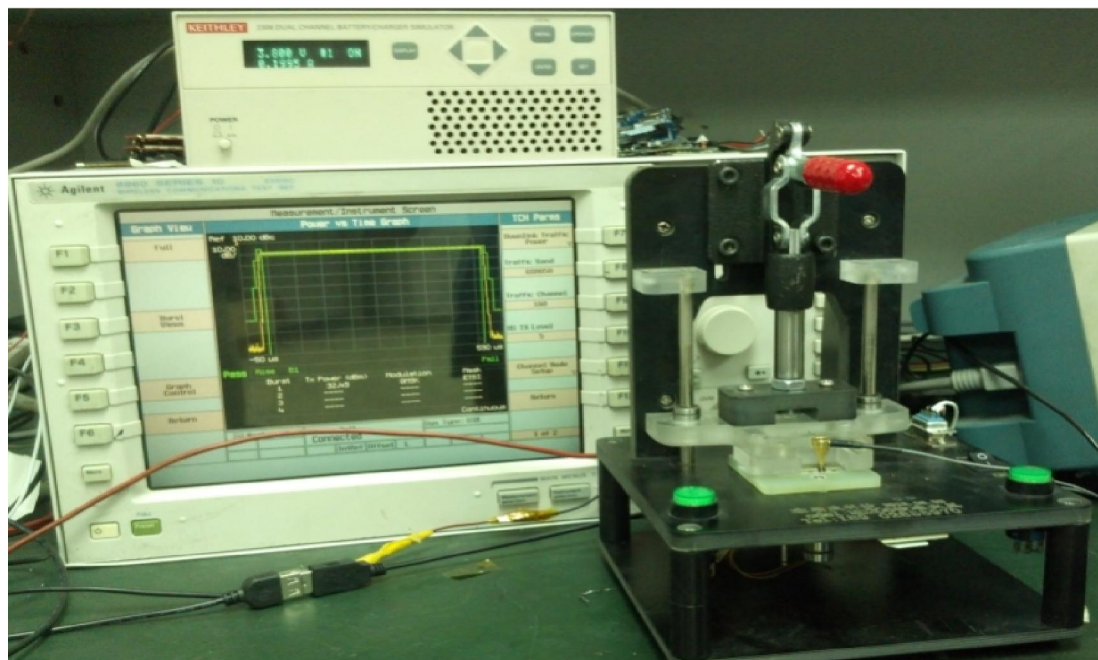
- a. Supply the DC POWER to JIG: Voltage=3.8V and Current=1.0A

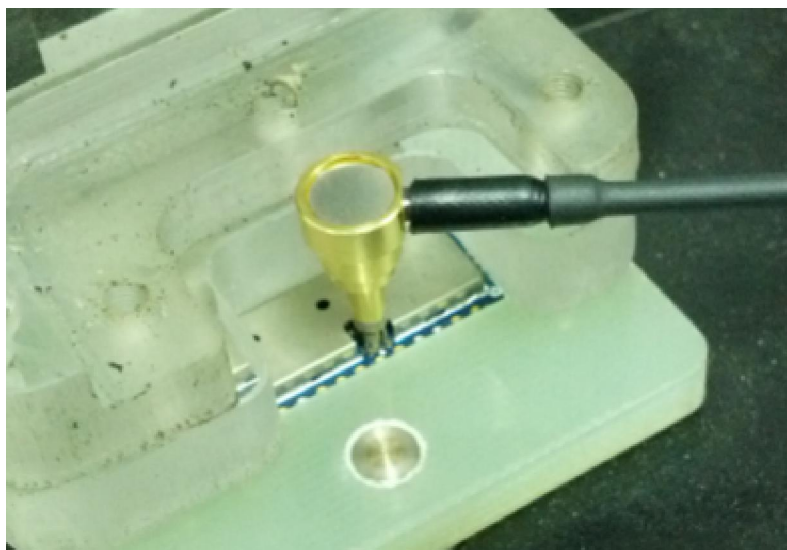


- b. Connect the PC UART to the JIG, and then open the software tool SSCOM32



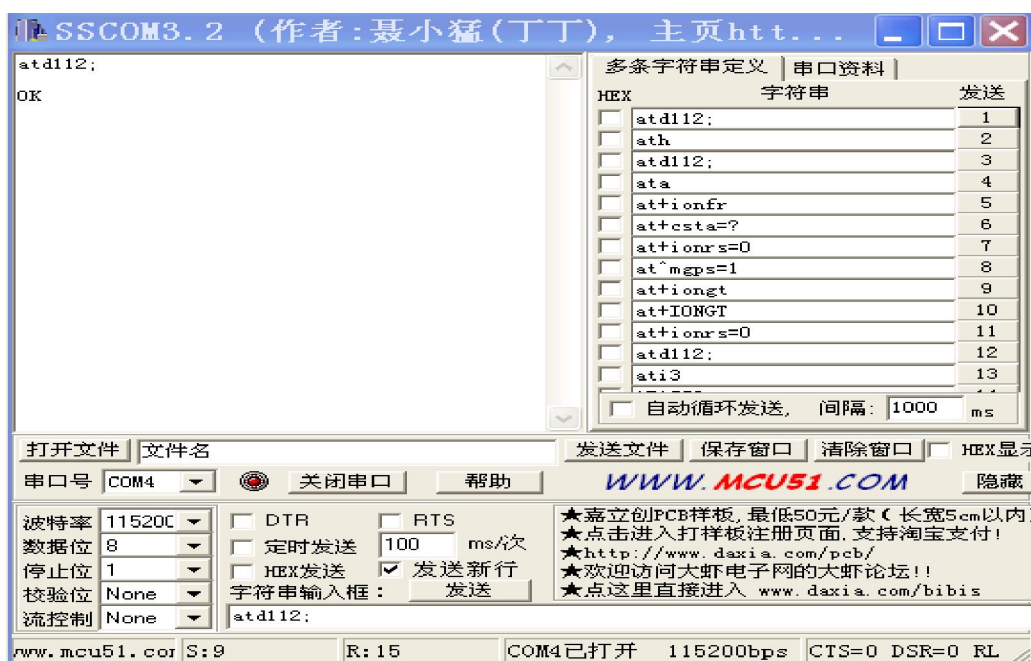
c. Put the GT2GM-M module into the JIG, connect the HP8960 with RF cable

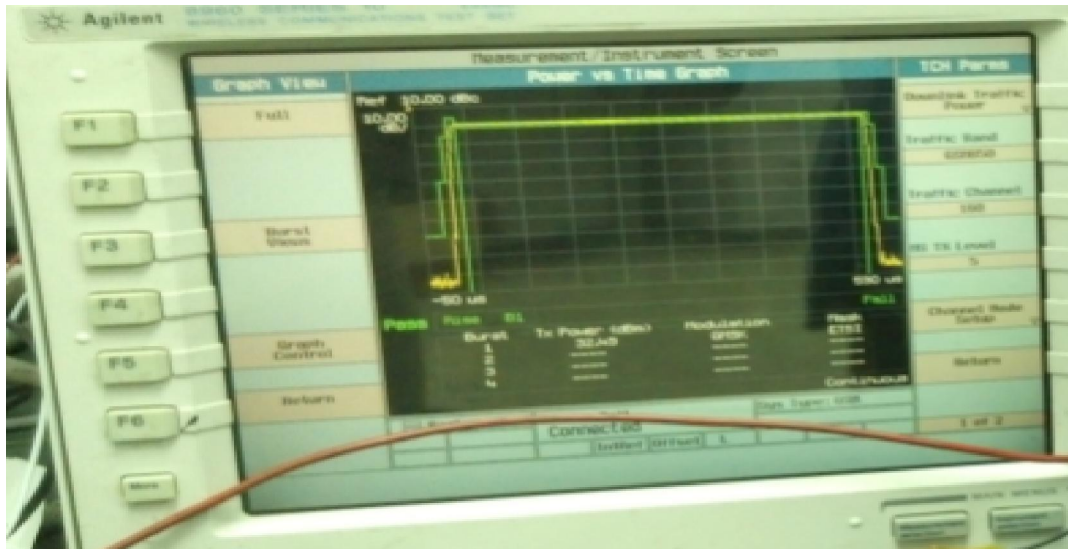




2) Start to test

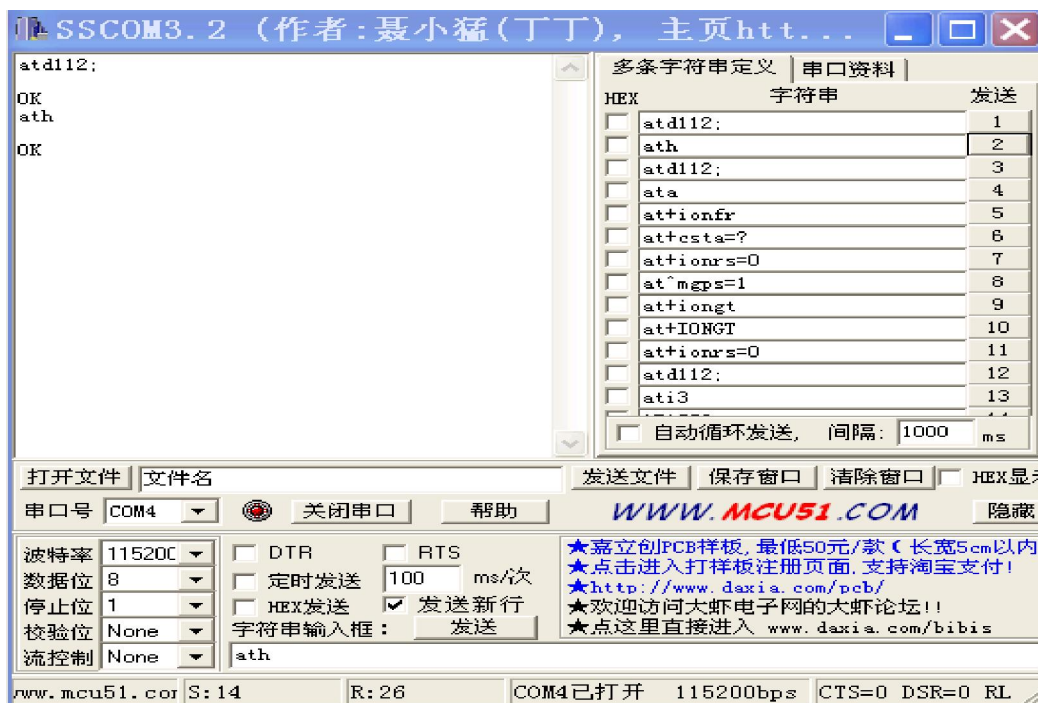
Send the AT command to the module by the software tool, and then the user can control the module by PC





3) End the test program

The user can stop the test program by AT command "ATH"



10. Installation information

The Tracker uses a simple cabling arrangement and supports splicing into an OBDII extension for power. Connection to the vehicle is made through a 3mm pitch rectangular header connection common to the automotive market.

As any GPS location device, the Module should be installed in a vehicle, so that it has an unobstructed view of the sky during normal operation. Double sided foam tape can be used to secure the surface not facing the sky, if needed.