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Revision History

Issue Date	Version	Description
2018/01/29	1.0	Initial Issued
2018/02/09	1.1	Add LTE antenna
2018/02/26	1.2	Add ZB test

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1. Introduction

This User Manual of UMC-I21M2 is to describe how to use the following sections for lab test by specific qualified engineers or technicians. Furthermore, this SMCC (Smart Metering Communication Card) is NOT intended for commercial use but designed as part of Smart Meter product which mainly provides 4G LTE WAN access. For the procedure of SMCC installation and set-up for testing and operating, the information is described as well in the following description.

FCC Interference Statement

This module complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This module may not cause harmful interference and (2) this module must accept any interference received, including interference that may cause undesired operation.

Radiation Exposure Statement

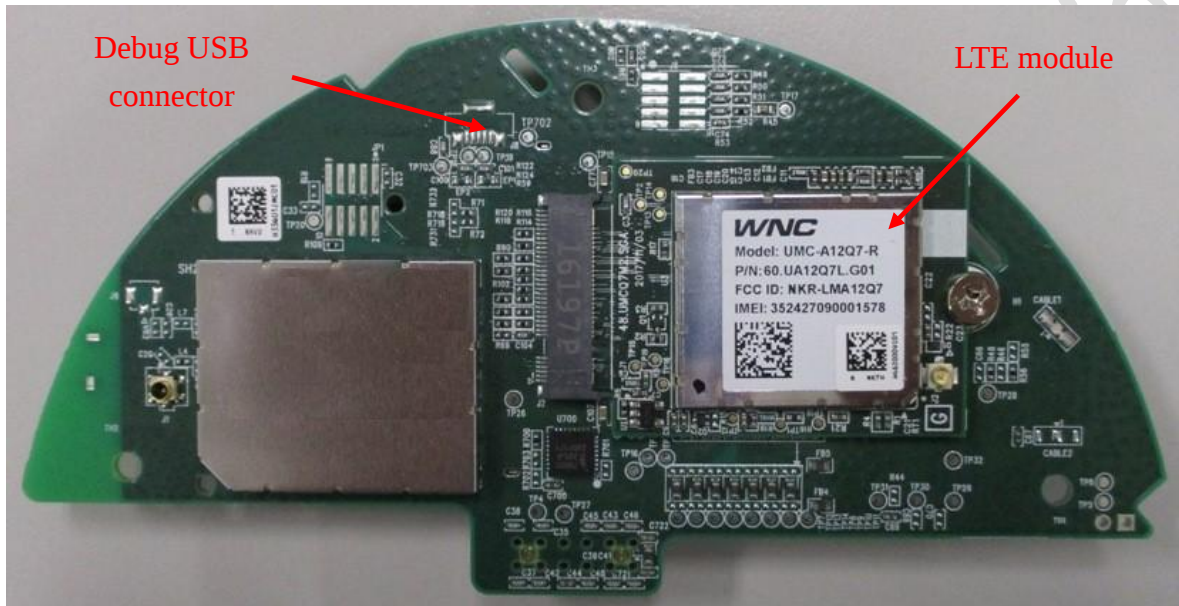
This module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This module should be installed and operated with minimum distance of 20cm between radiator and human body.

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

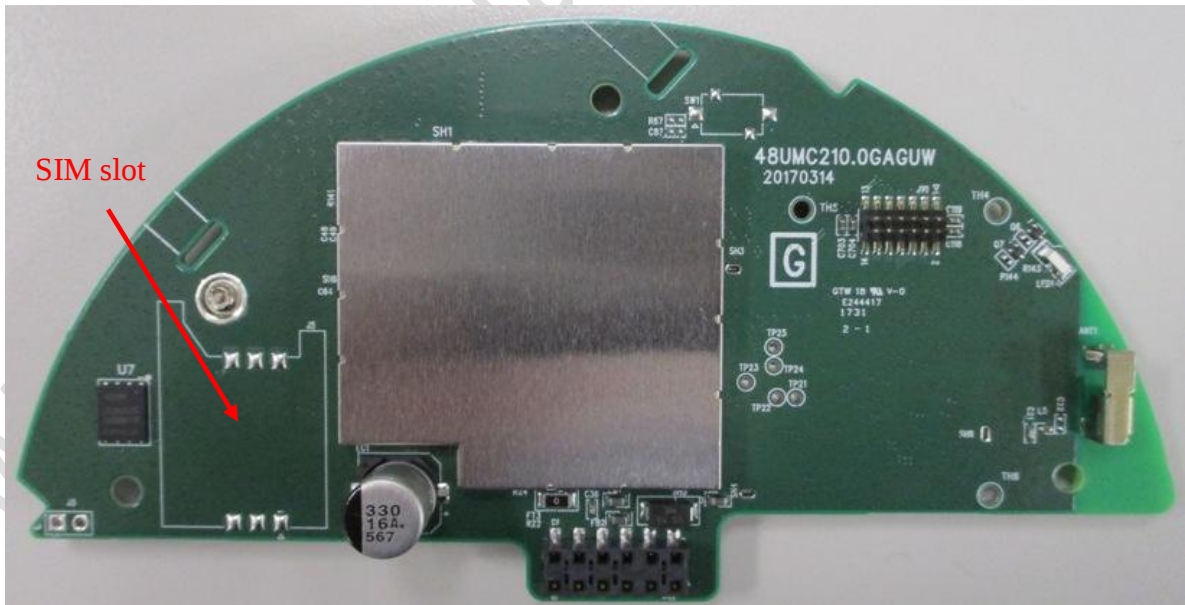
2. Test Setup Configuration

2.1 Power Supply and Debug Console Connection

i. Top view of UMC-I21M2



ii. Bottom view of UMC-I21M2



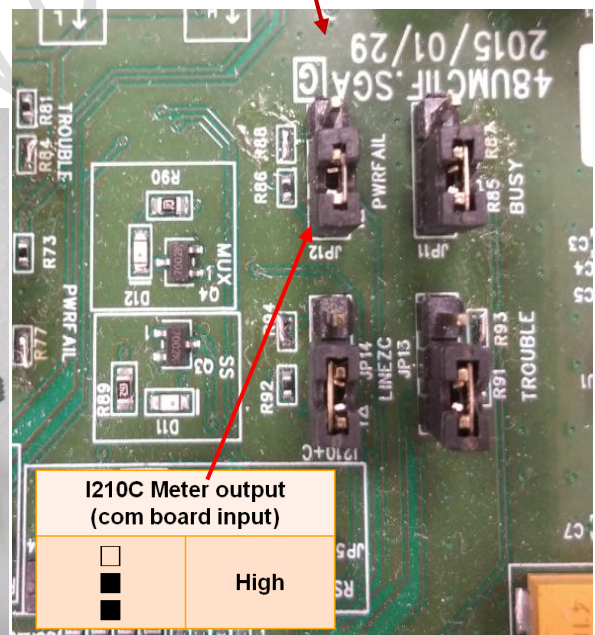
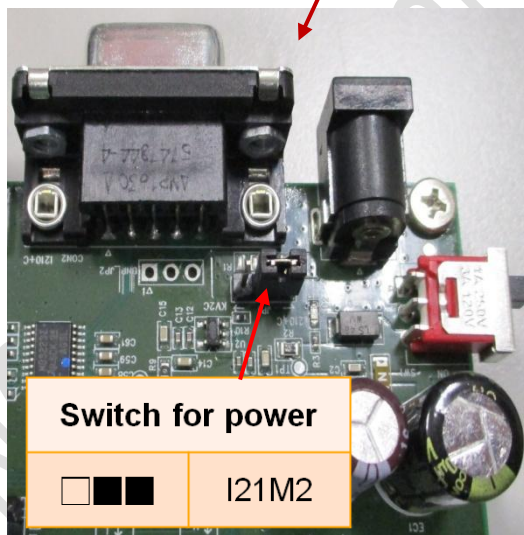
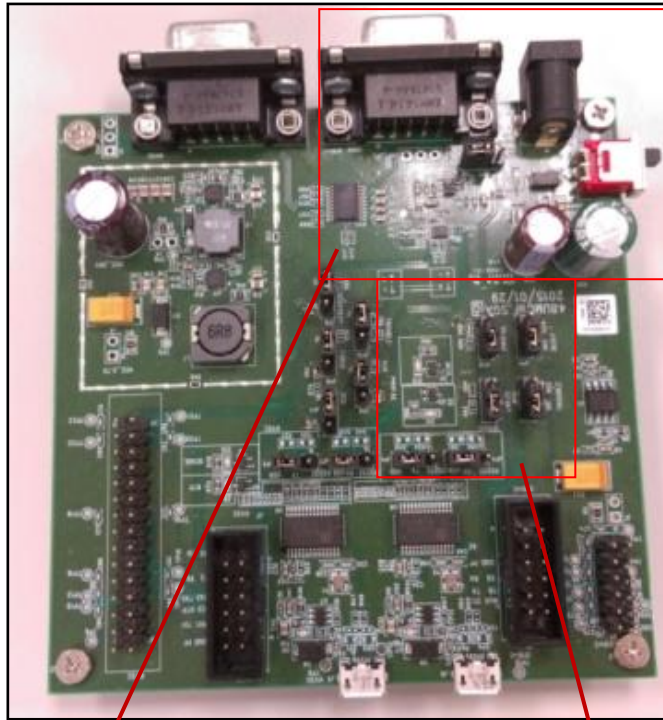
Make sure to insert the SIM card for LTE test.

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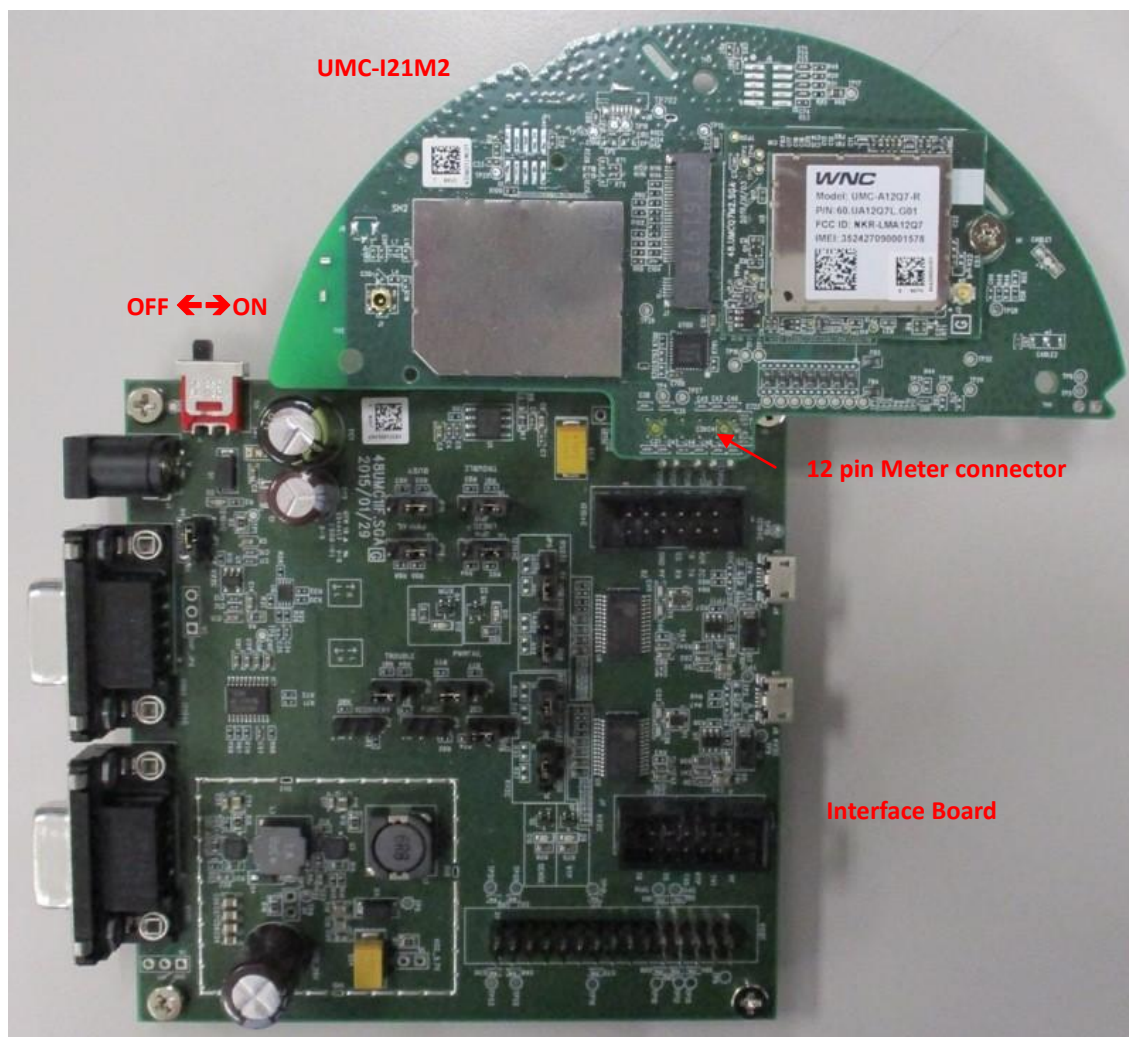
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iii. Interface board



Make sure the jumpers are in right position.

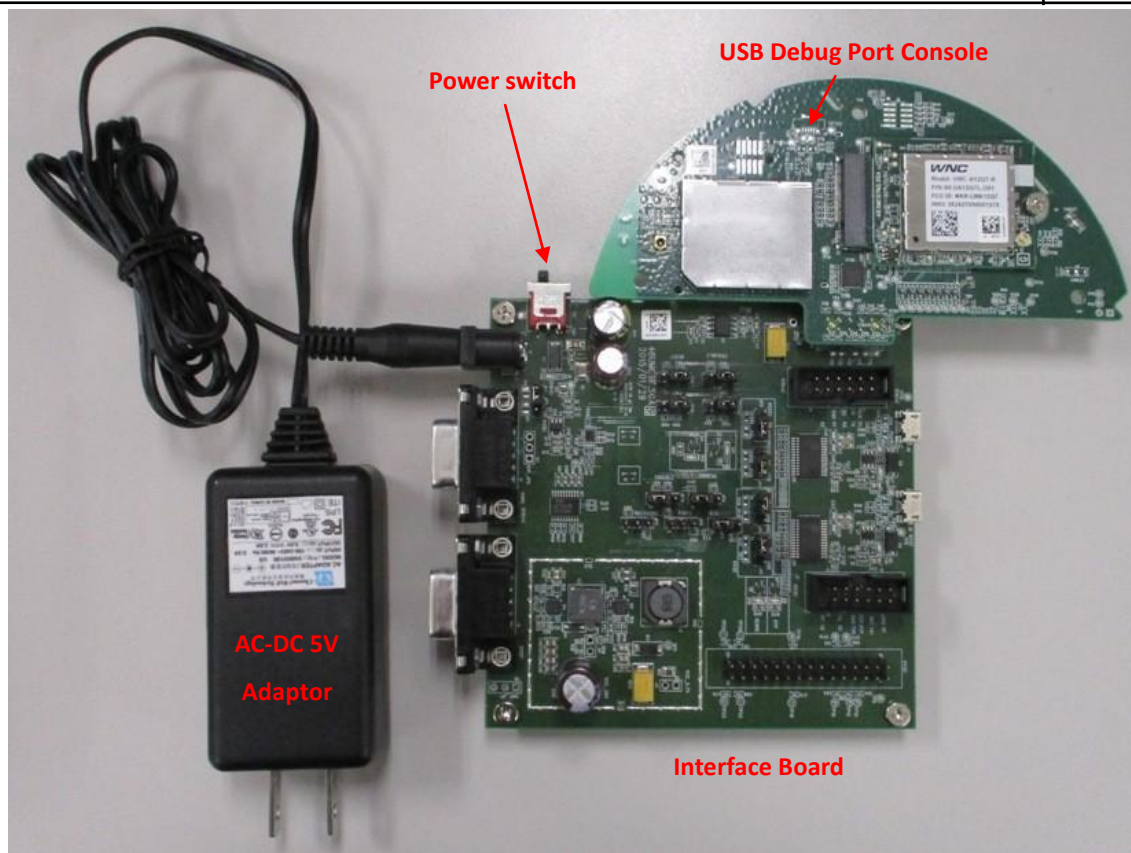
iv. Connection between interface board and UMC-I21M2



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Power on Sequence:

- I. Connect UMC-I21M2 to interface board
- II. Attach AC-DC Adaptor & USB Debug Port Cable
- III. Turn on the power switch
- IV. System will be accessible after waiting 20 seconds

2.2 Antenna Connection



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Connector for ZigBee conducted test

2.3 Hardware Component Introduction

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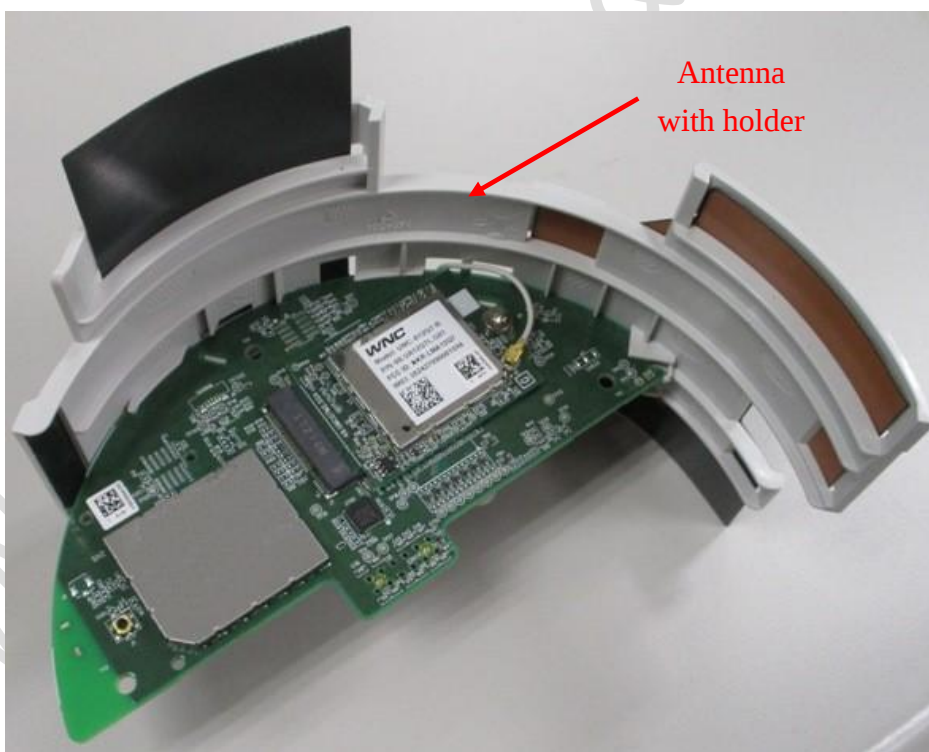
AC-DC 5V Adaptor



Interface Board



UMC-I21M2 LTE Antenna



3. LTE B13 Test and ZB Test

It is recommended to use Anritsu MT8821C for RF conductive tests.setc

In the field, please use Qualcomm tool, QXDM, and AT-command to control device and log device message.

For LTE radiation tests, the LTE antenna gain lists below.

➤ LTE Main Antenna

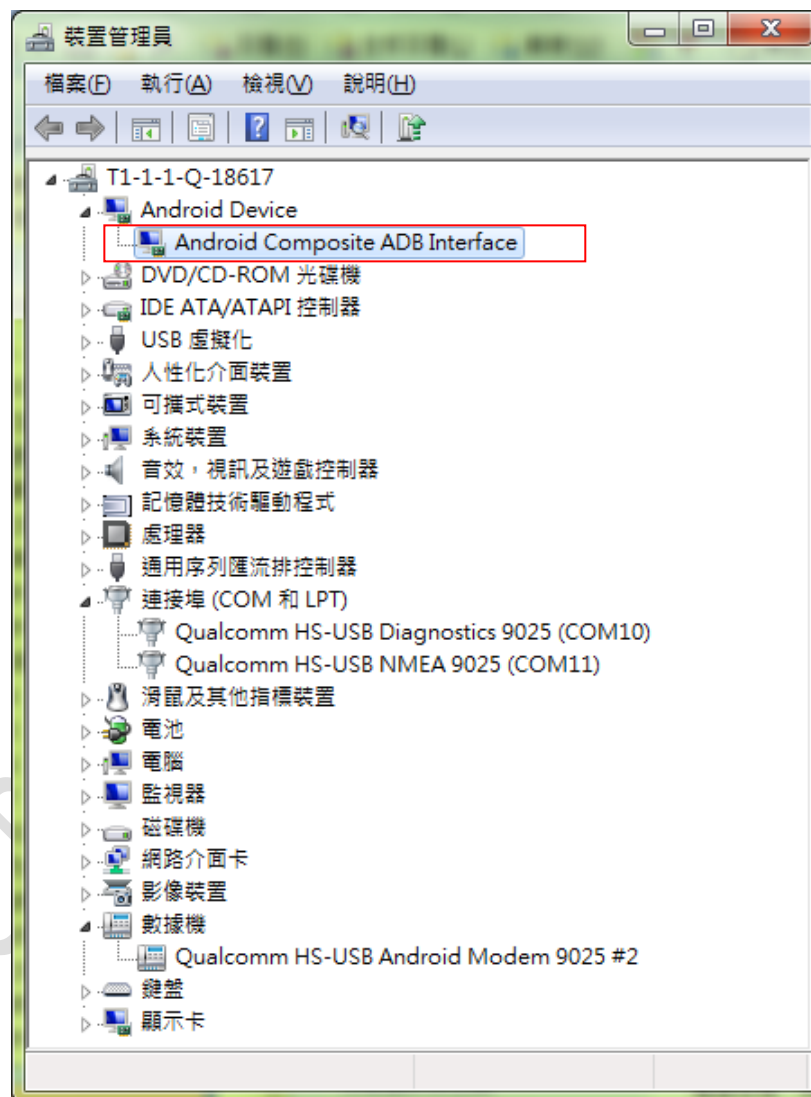
✧ Band 13 Peak Gain: 1.5dBi~2.49dBi

3.1 Install Qualcomm USB driver

Install the Qualcomm USB driver & ADB driver

3.2 Confirm the Qualcomm device

Confirm the Android Device “Android Composite ADB interface”



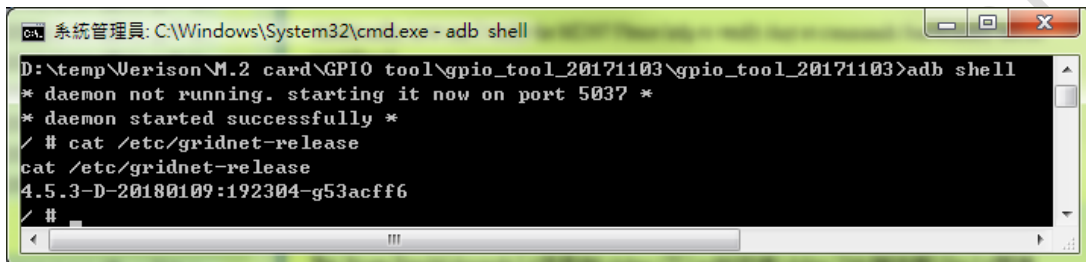
3.3 Enter ADB shell

Command in Command Prompt:

adb shell

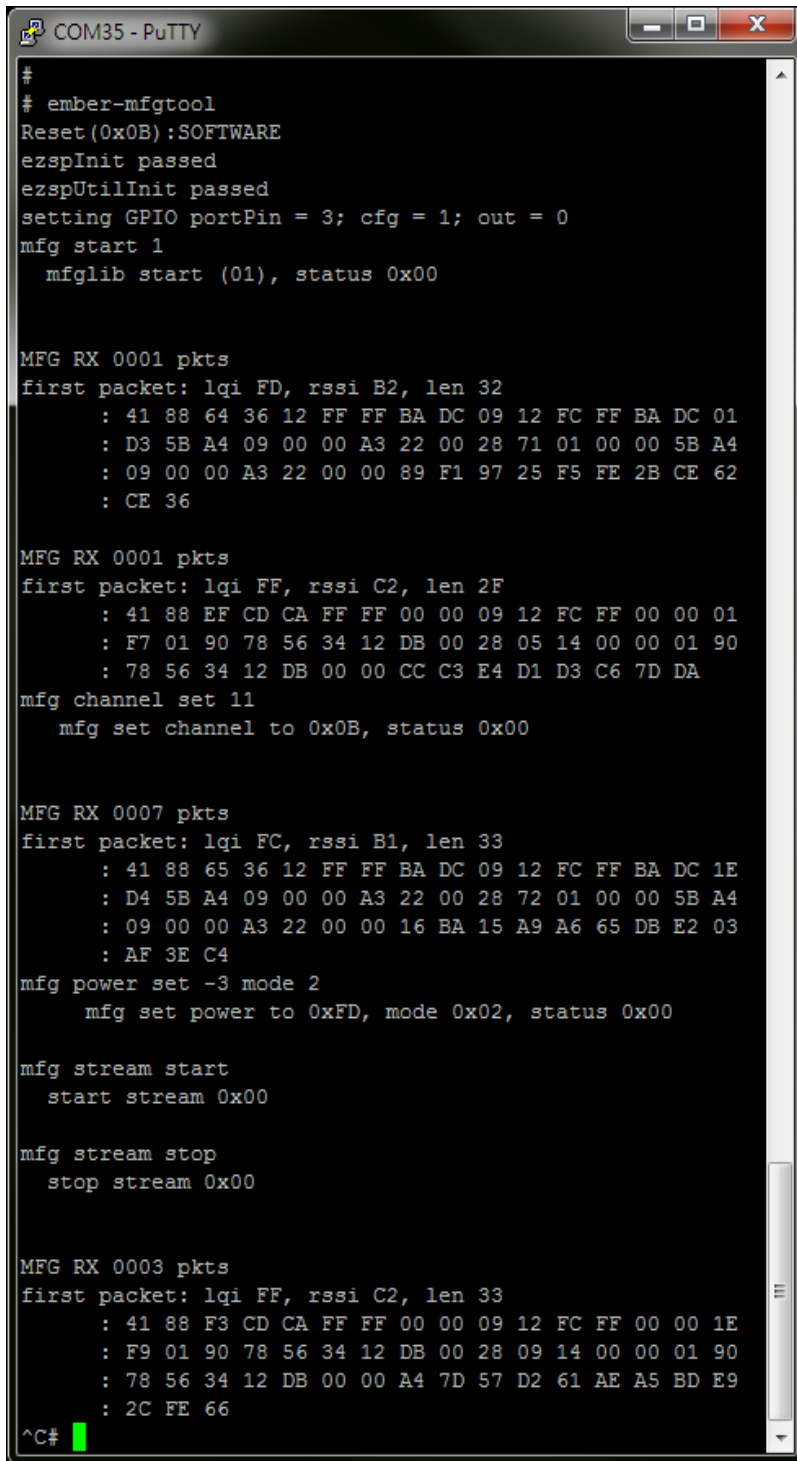
Command in adb shell:

cat /etc/gridnet-release



```
C:\Windows\System32\cmd.exe - adb shell
D:\temp\Verison\M.2 card\GPIO tool\gpio_tool_20171103\gpio_tool_20171103>adb shell
* daemon not running. starting it now on port 5037 *
* daemon started successfully *
/ # cat /etc/gridnet-release
cat /etc/gridnet-release
4.5.3-D-20180109:192304-g53acff6
/ #
```

3.4 ZigBee Test Command



```
COM35 - PuTTY
#
# ember-mfgtool
Reset (0x0B):SOFTWARE
ezspInit passed
ezspUtilInit passed
setting GPIO portPin = 3; cfg = 1; out = 0
mfg start 1
  mfglib start (01), status 0x00

MFG RX 0001 pkts
first packet: lqi FD, rssi B2, len 32
  : 41 88 64 36 12 FF FF BA DC 09 12 FC FF BA DC 01
  : D3 5B A4 09 00 00 A3 22 00 28 71 01 00 00 5B A4
  : 09 00 00 A3 22 00 00 89 F1 97 25 F5 FE 2B CE 62
  : CE 36

MFG RX 0001 pkts
first packet: lqi FF, rssi C2, len 2F
  : 41 88 EF CD CA FF FF 00 00 09 12 FC FF 00 00 01
  : F7 01 90 78 56 34 12 DB 00 28 05 14 00 00 01 90
  : 78 56 34 12 DB 00 00 CC C3 E4 D1 D3 C6 7D DA
mfg channel set 11
  mfg set channel to 0x0B, status 0x00

MFG RX 0007 pkts
first packet: lqi FC, rssi B1, len 33
  : 41 88 65 36 12 FF FF BA DC 09 12 FC FF BA DC 1E
  : D4 5B A4 09 00 00 A3 22 00 28 72 01 00 00 5B A4
  : 09 00 00 A3 22 00 00 16 BA 15 A9 A6 65 DB E2 03
  : AF 3E C4
mfg power set -3 mode 2
  mfg set power to 0xFD, mode 0x02, status 0x00

mfg stream start
  start stream 0x00

mfg stream stop
  stop stream 0x00

MFG RX 0003 pkts
first packet: lqi FF, rssi C2, len 33
  : 41 88 F3 CD CA FF FF 00 00 09 12 FC FF 00 00 1E
  : F9 01 90 78 56 34 12 DB 00 28 09 14 00 00 01 90
  : 78 56 34 12 DB 00 00 A4 7D 57 D2 61 AE A5 BD E9
  : 2C FE 66
^C#
```

Enter Zigbee control mode:

ember-mfgtool

Set mfg start:

mfg start 1

Freq. channel setting:

mfg channel set 11

Channel Low : 11 -> CH11

Channel Mid : 18 -> CH18

Channel High : 25 -> CH25

Power level/mode setting:

mfg power set -3 mode 2

Single tone output:

mfg tone start

Single tone output stop:

mfg tone stop

Modulation signal output:

mfg stream start

Modulation signal output stop :

mfg stream stop

Exit:

<Ctrl>+<X>

<Enter>

4. Interfaces

This SMCC offers following interfaces to communicate with module. Before using USB emulated ports, it requires to install the Qualcomm's USB driver on your windows PC in advance. After driver installation is finished, device manager will show below USB emulated COM ports.

4.1 Qualcomm HS-USB MDM Diagnostics 90B2 (COM port)

This port is created for modem debugging purpose and used by Qualcomm PC tools to communicate with the module. Qualcomm's tool is protected by Qualcomm License.



4.2 Qualcomm HS-USB WWAN Adapter 90B2

This port is created as a virtual network interface which could be used by PC to connect with Internet.



4.3 Qualcomm HS-USB Modem 90B2

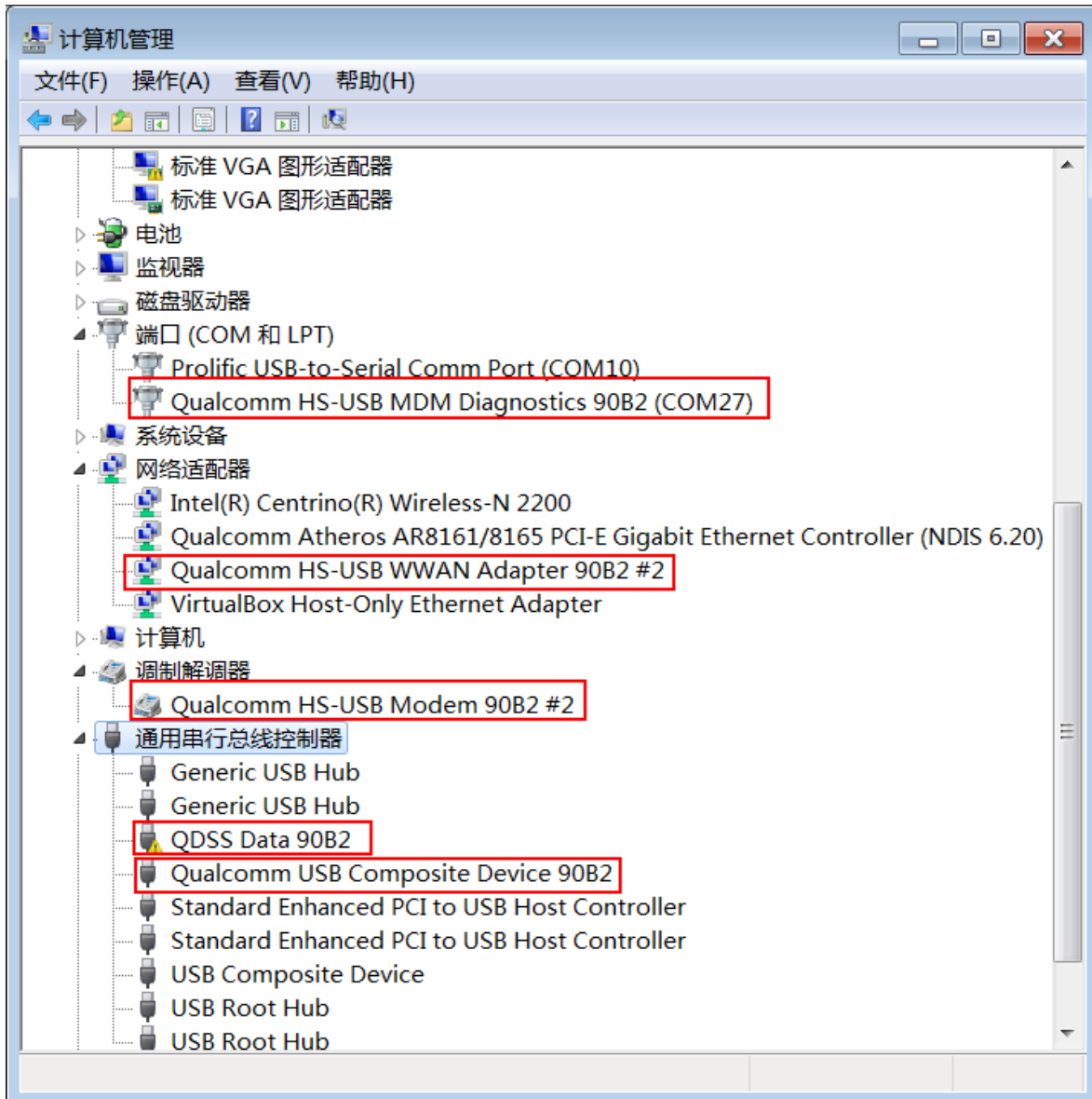
This port is also called as modem port. Testers could use PC terminal tool to connect with the port and send AT commands to control modem directly.



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5. Federal Communication Commission Interference

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 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 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 technician for help.

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FCC Caution:

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and the maximum antenna gain allowed for use with this device is +2.49 dBi.
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

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End Product Labeling:

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: NKR-CB1GI21M2”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information to the End User:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

6. Appendix I

Environmental Setup

1. Windows 7 x64

The environment setup was tested on Windows 7 x64 successfully.

2. USB driver

QUD.WIN.1.1 Installer will be needed to be installed for the following ports:

- Qualcomm HS-USB MDM Diagnostics 90B2
- Qualcomm HS-USB MDM WWAN Adapter 90B2
- Qualcomm USB Composite Device 90B2
- QDSS Data 90B2
- Qualcomm HS-USB Modem 90B2

3. ADB driver

<http://adbdriver.com/>

4. ADB shell