

AW-CU484

IEEE 802.15.4 and Bluetooth LE 5.0 wireless microcontroller Stamp LGA Module

User Guide

Rev. A

(For Certification)



Revision History

Version	Revision Date	Description	Initials	Approved
A	2020/11/23	● Initial Version	Shihhua Huang	N.C. Chen



1. System Setup

(1) Hardware Requirements

- Host system need running the Windows10 x64 operating system
- IQxel-M8
- RF isolation chamber for receive measurements.
- RF attenuators
- RF cable
- NFC reader

(2) Software Requirements

- PL-2303GC Driver

PL23XX_Prolific_DriverInstaller_v200 > PL23XX_Prolific_DriverInstaller_v200 搜尋 PL23XX

名稱	修改日期	類型	大小
PL23XX-M_LogoDriver_Setup_v200_20190815.exe	2019/8/15 下午 0...	應用程式	9,974 KB
PL2303 Windows Driver Manual v1.23.0.pdf	2019/6/17 下午 0...	Adobe Acrobat D...	1,815 KB
PL2303_CheckChipVersion_v1006.exe	2013/1/15 下午 0...	應用程式	208 KB
PL2303_DriverInstallerv1.23.0_ReleaseNote.txt	2019/8/15 下午 0...	文字文件	15 KB
PL2303CheckChipVersion_ReadMe.txt	2015/6/17 下午 1...	文字文件	2 KB
PL2303G_DriverInstallerv1.4.0_ReleaseNote.txt	2019/7/16 下午 0...	文字文件	5 KB

- Tera Term (tool)

Note: Tera Term is our suggestion, you can try any terminal tool.

名稱	修改日期	類型	大小
teraterm-4.63.exe	2009/9/8 下午 04...	應用程式	7,045 KB

- DK6Production flash programmer folder (please contact FAE)

Note: You must have below files

機磁碟 (C:) > nxp > DK6ProductionFlashProgrammer 搜尋 DK6ProductionFlash..

名稱	修改日期	類型	大小
DK6Programmer.exe	2019/11/16 上午 02:02	應用程式	588 KB
ftd2xx.dll	2019/5/28 下午 07:15	應用程式擴充	215 KB
jn5189dk6_hello_world.bin	2020/4/15 上午 10:11	BIN 檔案	17 KB
JN-AN-1242-JN518x-Customer-Module-Evaluation-Tool.bin	2020/2/28 下午 05:23	BIN 檔案	69 KB
JN-AN-1242-K32W061-Customer-Module-Evaluation-Tool.bin	2020/5/1 下午 09:52	BIN 檔案	56 KB
libgcc_s_dw2-1.dll	2019/5/28 下午 07:15	應用程式擴充	110 KB
pdcurses.dll	2019/5/28 下午 07:15	應用程式擴充	116 KB
programmer.dll	2019/11/16 上午 02:02	應用程式擴充	972 KB
qn9090dk6_hci_black_box_bm.bin	2020/3/3 下午 02:03	BIN 檔案	149 KB
qn9090dk6_hello_world.bin	2020/2/20 上午 10:53	BIN 檔案	21 KB
uninstall.exe	2020/2/13 下午 02:22	應用程式	323 KB

- Mbt.exe (please contact FAE)

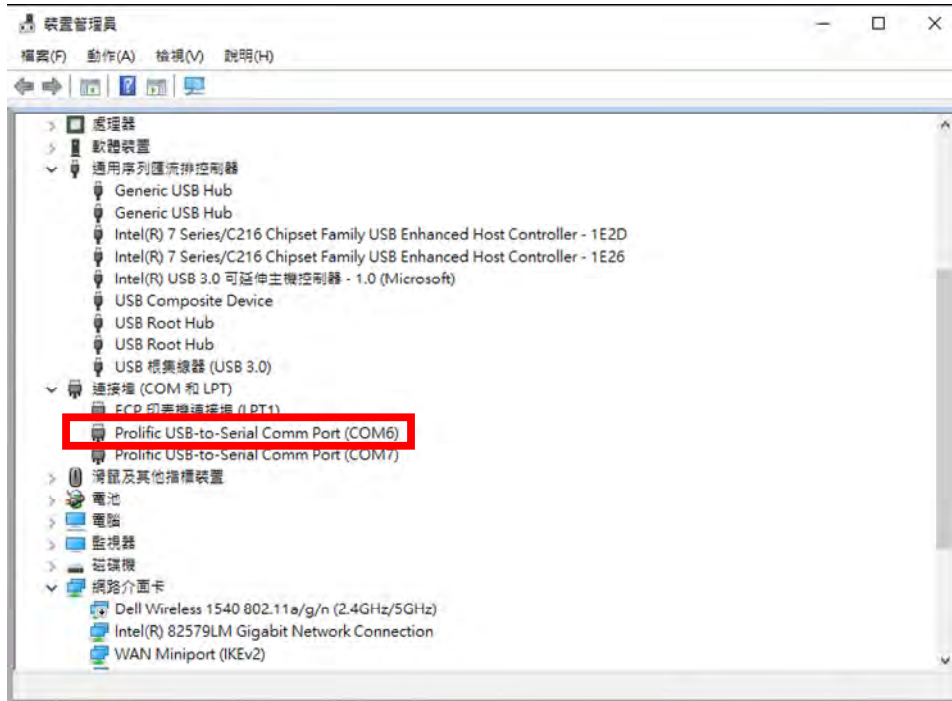
Note: mbt is our suggestion. You can try any hci tool.

名稱	修改日期	類型	大小
mbt.exe	2020/7/21 上午 1...	應用程式	50 KB
mbt_setup.ini	2020/7/21 下午 0...	組態設定	1 KB

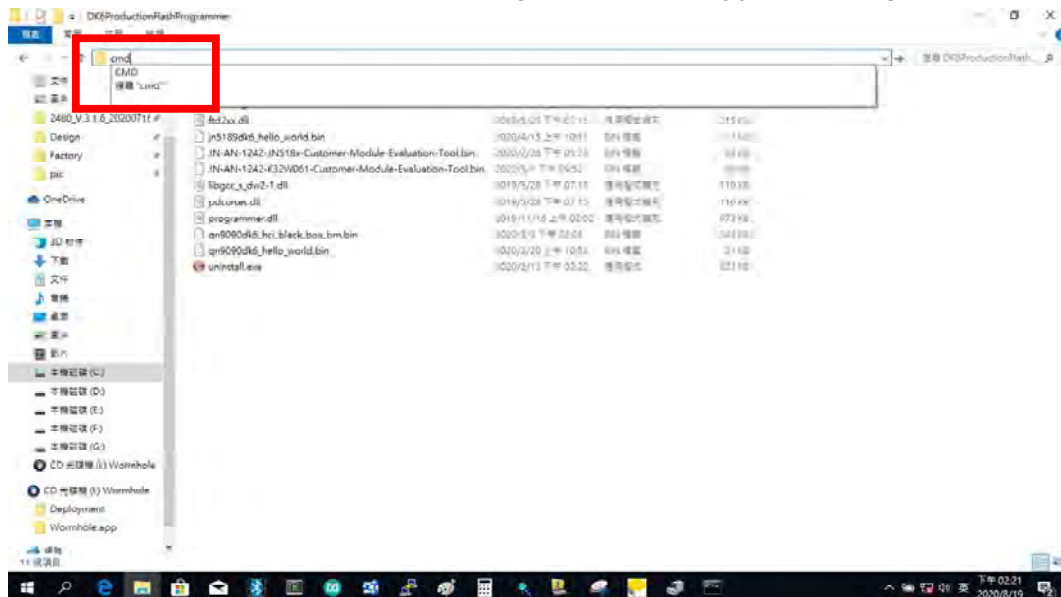
2. How to download the image

1. You must check the COM number (can check the value by the following picture)

Note: J9 for DUT COM port



2. Find the folder of DK6ProductionFlashProgrammer, and type cmd to get into the Dos window.



3. Key in

➤ ZIGBEE IMAGE:

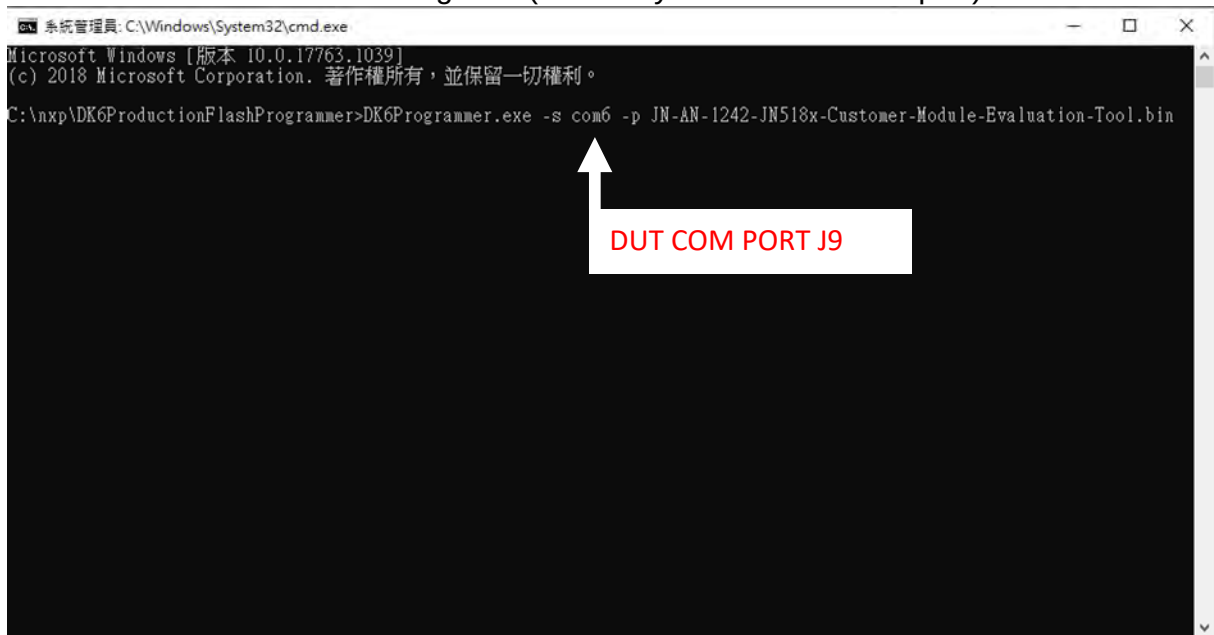
DK6Programmer.exe -s com6 -p JN-AN-1242-JN518x-Customer-Module-Evaluation-Tool.bin

➤ BLE IMAGE:

DK6Programmer.exe -s com6 -p qn9090dk6_hci_black_box_bm.bin

***You must note the step. If you key in the format before getting into download mode (DK6Programmer.exe -s com6 -p JN-AN-1242-JN518x-Customer-Module-Evaluation-Tool.bin), you need to keep holding the ISP button and Reset button, and then release the ISP button after releasing the reset button.**

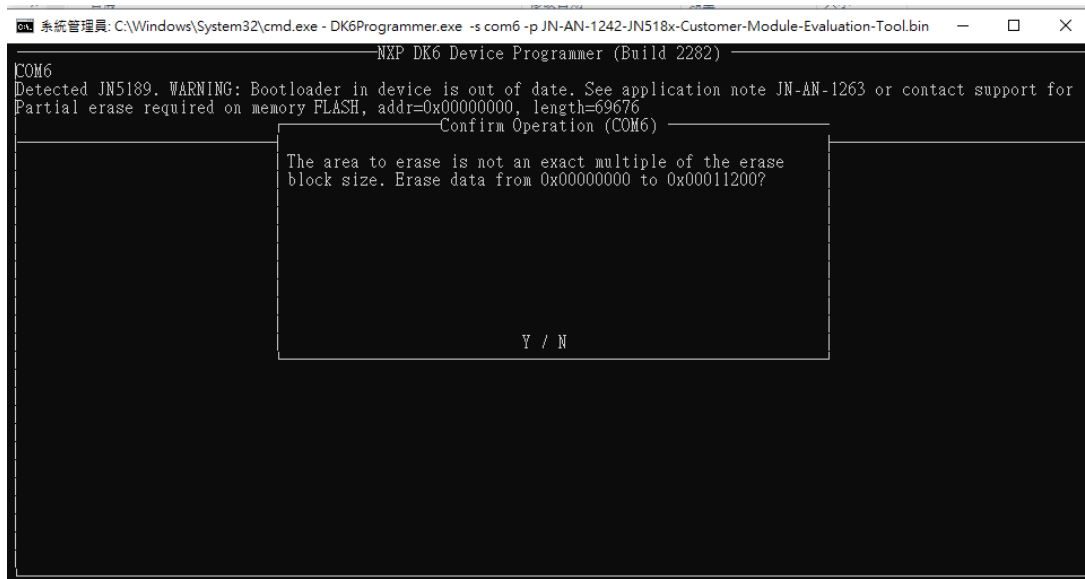
To open the tool and download the image file (com6 is your DUT J9 COM port)



```
Microsoft Windows [版本 10.0.17763.1039]
(c) 2018 Microsoft Corporation. 著作權所有，並保留一切權利。
C:\nxp\DK6ProductionFlashProgrammer>DK6Programmer.exe -s com6 -p JN-AN-1242-JN518x-Customer-Module-Evaluation-Tool.bin
```

DUT COM PORT J9

4. Select Y



```
-----NXP DK6 Device Programmer (Build 2282)-----
COM6
Detected JN5189. WARNING: Bootloader in device is out of date. See application note JN-AN-1263 or contact support for
Partial erase required on memory FLASH, addr=0x00000000, length=69676
Confirm Operation (COM6)
The area to erase is not an exact multiple of the erase
block size. Erase data from 0x00000000 to 0x00011200?
Y / N
```

5. Finish

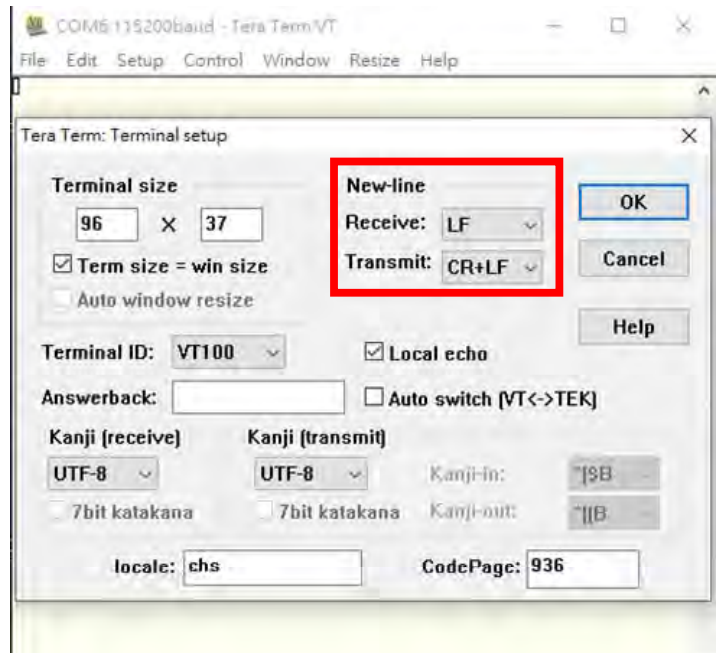
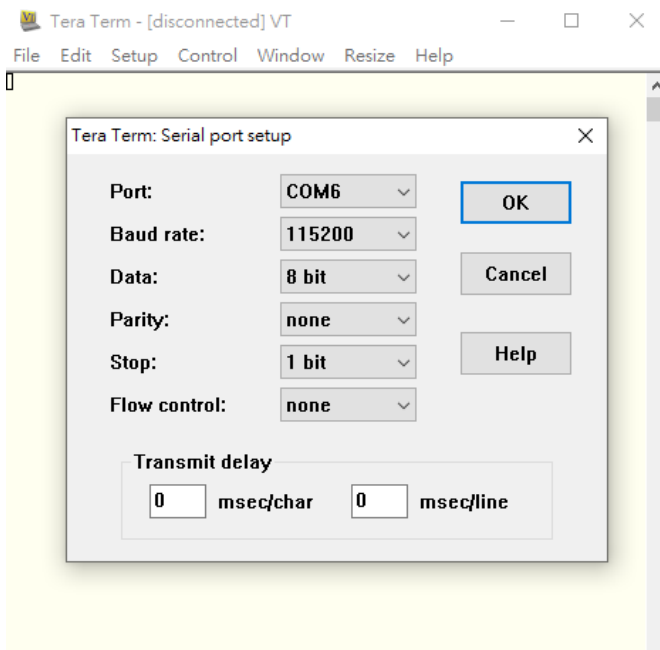
```
CA 系統管理員: C:\Windows\System32\cmd.exe - DK6Programmer.exe -s com6 -p JN-AN-1242-JN518x-Customer-Module-Evaluation-Tool.bin  — □ ×
NXP DK6 Device Programmer (Build 2282)
COM6
Detected JN5189. WARNING: Bootloader in device is out of date. See application note JN-AN-1263 or contact support for
Memory programmed successfully
[=====] 100%

Operations Complete
Press any key
```



3. Test mode(In Zigbee)

1. Open the Tera Term
2. Select setup → Serial port
 - Setting COM port (J9 com port)
 - Baud rate is 115200
3. Select setup → Terminal
 - Receive - select LF
 - Transmit - select CR+LF





AzureWave

AzureWave Technologies, Inc.

4. Select a) standard module

```
*****
*      Customer Module Evaluation Tool      *
*      Version 2038                        *
*      Compiled Feb 28 2020 10:23:14       *
*      Radio Test version 2041            *
*      Radio Driver version 2085          *
*      Chip ID 000e2111                   *
*****
```

```
a) Standard Module
b) High Power Module (RFTX/RFRX on PI04/5)
c) High Power Module (RFTX/RFRX on PI020/21)
/) Reset CMET
```

```
Please choose an option > A
Standard Module Selected
```

```
*****
*                      ZigBee Mode          *
*****
```

5. Select a) Regular

```
*****
*                      ZigBee Mode          *
*****
```

```
a) Regular
b) Proprietary 1
c) Proprietary 2
```

```
Please choose an option > A
ZigBee Regular Mode Selected
```





AzureWave

AzureWave Technologies, Inc.

6. Customer Module Evaluation Tool (main menu)

- Select "g" trigger packet test (Rx test)
- Select "l" transmit packet test (Tx test)

```
*****
*   Customer Module Evaluation Tool   *
*****
a) TX Power Test (CW)
b) TX Power Test (Modulated)
c) Receive Test
d) Oscillator Frequency Test
e) Current Measurement Test
f) RF Power Measurement
g) Trigger Packet Test
h) Receive Packets Test
i) Transmit Packets Test
j) Connectionless Packet Error Rate Test
k) CCA Test
l) LQI Test
m) Turnaround Tests
n) NTAG Tests
/) Return to root menu
Please choose an option >|
```

1. RX test (Select g)

- g → Start test (start to receive the package)
- +/- → Increment or decrement channel
- X → Return to main menu
- /→Reset

```
*****
*   Trigger Packet Test               *
*****
* Key      Function                    *
*-----*
* +      Increment Channel             *
* -      Decrement Channel             *
* ]      Increment Repetitions         *
* [      Decrement Repetitions         *
* >      Increase Trigger Delay        *
* <      Decrease Trigger Delay        *
* g      Go                           *
* x      Return to main menu           *
* /      Return to root menu          *
*-----*
* Note:                               *
* Connect pin DI02 to the trigger     *
* !!!!! Trig on RAISING edge !!!!!   *
* input on the signal generator       *
*****
Channel      11      (2.405 GHz)
Repetitions  100
Trigger delay 1 mS
```



2. TX test (Select i)

- +/- → Can control the channel
- F → Fast transmit rate (fast transmit can help modulation to catch signal)
- X → Return to main menu
- / → Reset

```
*****
* Transmit Packet Test In Progress *
* Slow Rate (~1 Pkt/sec) *
*****
* Key          Function *
* * * * *
* f  Faster transmit rate *
* l  Lower transmit rate  *
* +  Increment Channel    *
* -  Decrement Channel    *
* <  Reduce output power by 0.25 dBm *
* >  Increase output power by 0.25 dBm *
* p  Reduce power step    *
* P  Increase power step  *
* x  Return to main menu  *
* /  Return to root menu  *
* * * * *
*****

Channel      11      (2.405 GHz)
Power Level  10.00 dBm
MAC Address  00:15:8D:00:04:A5:A8:3F

Packets Sent 9■
```

3. NTAG tests(Select n)

Select Internal or External NTAG

- Select a) internal NTAG

NTAG Tests (Internal)

- Select a) read contents of EEPROM
- Select b) write data to EEPROM

```
*****
* Select Internal or External NTAG *
*****

a) Internal NTAG
b) External NTAG on DK6 (FD to PI01)

Please choose an option >A
*****
* NTAG Tests (Internal) *
*****

a) Read contents of EEPROM
b) Write data to EEPROM
c) Reset NTAG address to 0x55
d) Monitor FD pin
e) Test FD pin Wake up
x) Return to main menu
/) Return to root menu

Please choose an option >■
```

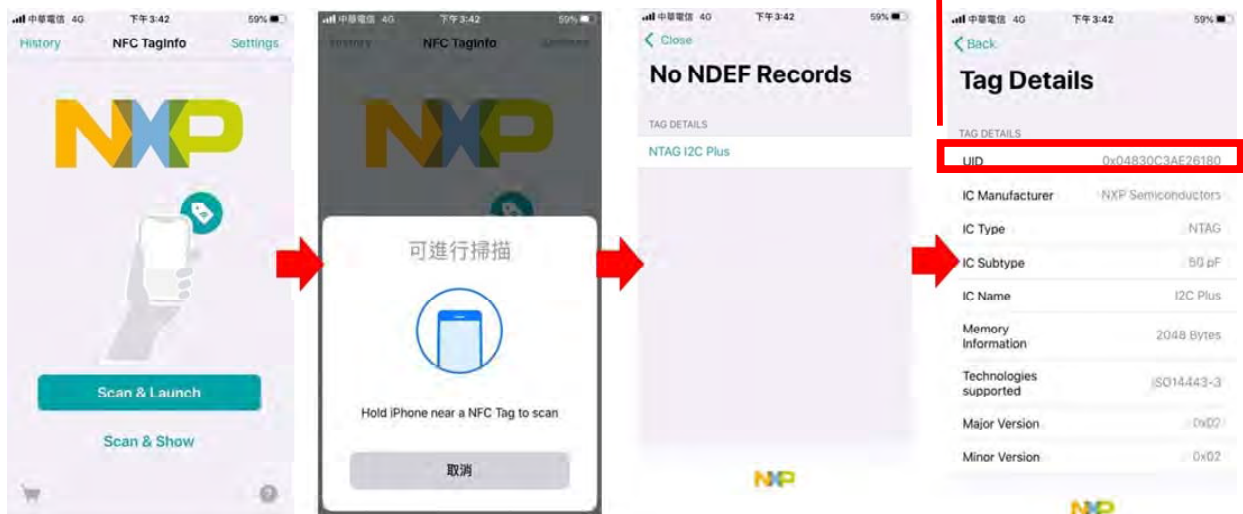
4. Read contents of EEPROM

Can read the NFC MAC in Block 0: 04830C3AE26180

```
COM6:115200baud - Tera Term VT
File Edit Setup Control Window Resize Help
* NTAG Tests (Internal) *
*****
a) Read contents of EEPROM
b) Write data to EEPROM
c) Reset NTAG address to 0x55
d) Monitor FD pin
e) Test FD pin Wake up
x) Return to main menu
/) Return to root menu

Please choose an option >A
Found NTAG 106
Block 0: 04 83 0c 3a e2 61 80 00 00 00 00 00 00 00 00 00
Block 1: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 2: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 3: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 4: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 5: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 6: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 7: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 8: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 9: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 10: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 11: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 12: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 13: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 14: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 15: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 16: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 17: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 18: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 19: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 20: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 21: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Open the NFC Taginfo on you smart phone, and scan the NFC, Then you will get the information from NFC.



5. Write data to EEPROM

Use this test to write data to EEPROM, Format is:

1:0 1 2 3 4 5 6 7 8 9 A B C D E F

Programs 0 to F in block 1

```
*****
* NTAG Tests (Internal) *
*****

a) Read contents of EEPROM
b) Write data to EEPROM
c) Reset NTAG address to 0x55
d) Monitor FD pin
e) Test FD pin Wake up
x) Return to main menu
/) Return to root menu

Please choose an option >
Using Address: 0x55
Enter Data to Program:1:0 1 2 3 4 5 6 7 8 9 0 A B C D E F
```

Check the Format again.

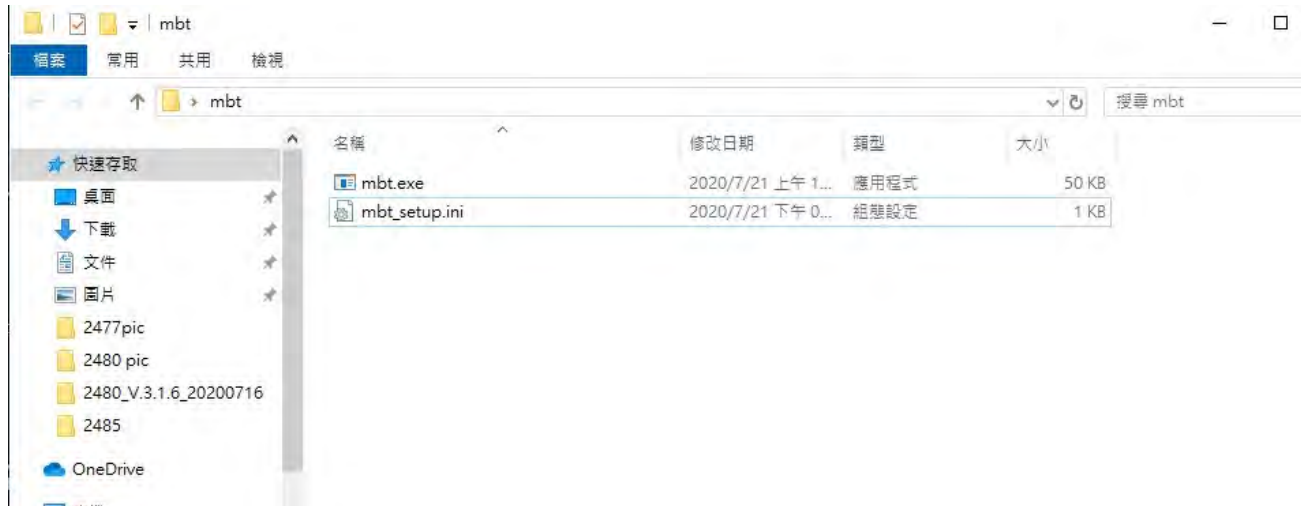
```
*****
* NTAG Tests (Internal) *
*****

a) Read contents of EEPROM
b) Write data to EEPROM
c) Reset NTAG address to 0x55
d) Monitor FD pin
e) Test FD pin Wake up
x) Return to main menu
/) Return to root menu

Please choose an option >
Found NTAG I2C address: 0x55
Block 0: 04 83 0c 3a e2 61 80 00 44 00 00 00 00 00 00 00
Block 1: 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f
Block 2: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 3: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 4: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Block 5: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

4. Test mode(InBLE)

1. Open the folder of mbt



2. Open the mbt_setup.ini

Setting MBT_TRANSPORT=COM3 (your DUT COM port J9)

DOWNLOAD_BAUDRATE=115200

APPLICATION_BAUDRATE=115200

Enable_Debug_Message=1

DOWNLOAD_DELAY = 50

[Solution]

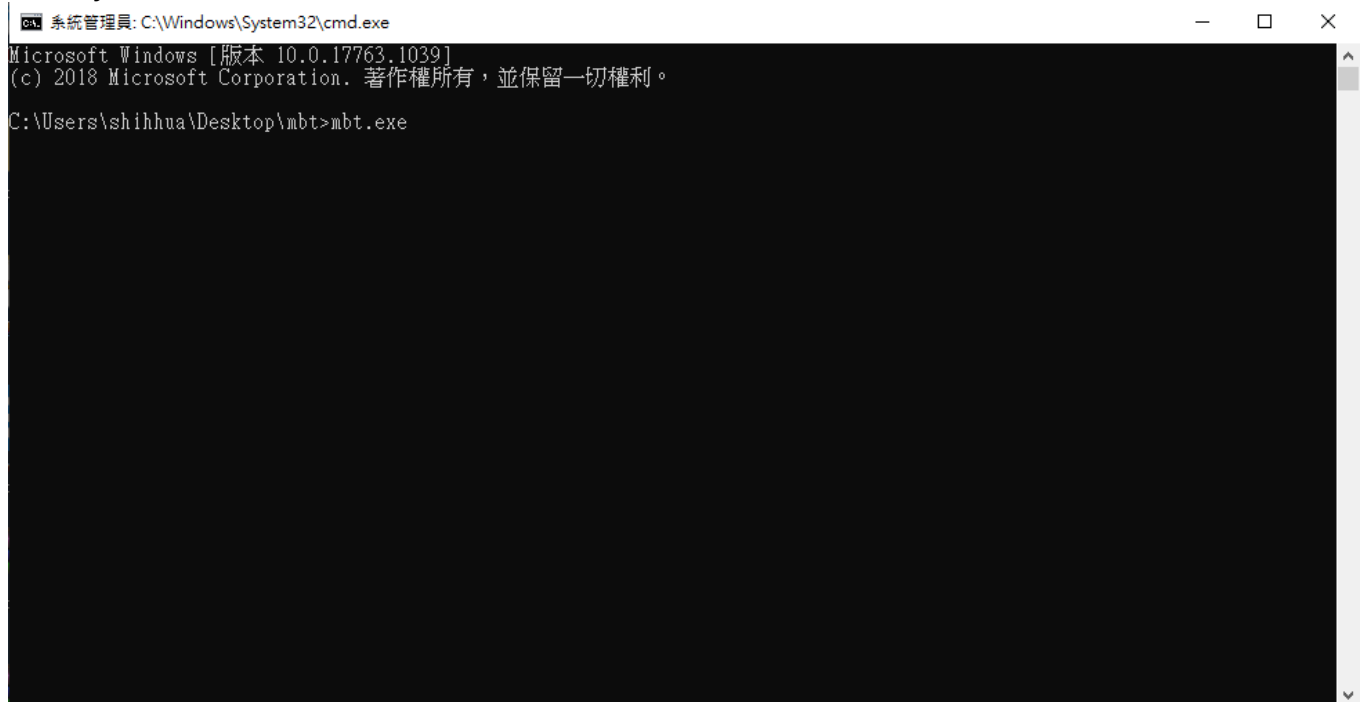
Type=2



3. And type cmd to get into the Dos window.



4. Key in mbt.exe



5. Main menu

If you need more information, please key in mbt help.

```
系统管理员: C:\Windows\System32\cmd.exe
Send HCI Success
Success
** mbt command finish **

C:\Users\shihhua\Desktop\mbt>mbt help
MBT_TRANSPORT: COM3
DOWNLOAD_BAUDRATE: 115200
APPLICATION_BAUDRATE: 115200
Usage: mbt help
Usage: mbt reset
Usage: mbt le_receiver_test <rx_channel>
Usage: mbt le_transmitter_test <tx_channel> <data_length> <packet_payload>
Usage: mbt le_test_end
Usage: mbt set_tx_frequency_arm <carrier on/off> <tx_frequency> <tx_mode> <tx_modulation_type> <tx_power>
Usage: mbt receive_only <rx_frequency>
Usage: mbt read_bd_addr
Usage: mbt write_bd_addr <bd_addr>
Usage: mbt radio_tx_test <bd_addr> <frequency> <modulation_type> <logical_channel> <bb_packet_type> <packet_length> <tx_
power>
Usage: mbt radio_rx_test <bd_addr> <frequency> <modulation_type> <logical_channel> <bb_packet_type> <packet_length>
Usage: mbt connectionless_dut_loopback_mode
Usage: mbt download <hcd_pathname>

Check Bluetooth Core 4.1 spec vol. 2 Sections 7.8.28-7.2.30
for details of LE Transmitter and Receiver tests
** mbt command finish **

C:\Users\shihhua\Desktop\mbt>
```

6. Key in mbt reset

Make sure the DUT have been reset.

```
C:\Users\shihhua\Desktop\mbt>mbt reset
MBT_TRANSPORT: COM3
DOWNLOAD_BAUDRATE: 115200
APPLICATION_BAUDRATE: 115200
Sending HCI Command:
0000 < 03 0C 00 >
Received HCI Event:
0000 < 0E 04 05 03 0C 00 >
Send HCI Success
Success
** mbt command finish **

C:\Users\shihhua\Desktop\mbt>
```



FCC Statement

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/TV technician for help.

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.

IMPORTANT NOTE:

This module is intended for OEM integrator. This module is only FCC authorized for the specific rule parts listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Additional testing and certification may be necessary when multiple modules are used.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: TLZ-CU484 ".

This device complies with Part 15 of 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.





Antenna Information

Ant.	Brand	Model Name	Antenna Type	Gain (dBi)
1	LYNwave	ALX20M-052AA1	PIFA Antenna	2.8

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs / récepteurs exempts de licence qui sont conformes au (x) RSS (s) exemptés de licence d'Innovation, Sciences et Développement économique Canada. L'opération est soumise aux deux conditions suivantes:

- (1) Cet appareil ne doit pas provoquer d'interférences.*
- (2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.*

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 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. Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains IC: 6100A-CU484 ".

The Host Model Number (HMN) must be indicated at any location on the exterior of the end product or product packaging or product literature which shall be available with the end product or online.

