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A module/product solution provider

WS2118/WS2119 EVB

AT CMD USER GUIDE

Version: 1.0.2

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Changed History

version	Date	Description	Author
1.0.0	2018.3.8	Initial version for AT command in WS2118 and WS2119 module.	Joshua Guo
1.0.1	2018.3.9	Added return value.	Joshua Guo
1.0.2	2018.3.14	Modified doc title as “WS2118/WS2119 EVB”	Austin Huang



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1 RELEASED NOTE

This document is AT command for BLE and Sigfox to UART. The AT command included BLE Peripheral role.

1. The firmware with UART baud rate 115200 as default.
2. FW file version.

FW version	Zone(Ref.2)	PCB(Ref.3)
WS2118_AT_CMD_3.1.1	ETSI(1)	D03
WS2118_AT_CMD_4.1.1	ETSI(1)	D04
WS2119_AT_CMD_3.1.1	FCC(2.4)	D03

1.1 LIMITATION

NONE

1.2 BUG/ISSUE FIXED

NONE

1.3 REFERENCE

WS2119E20A-UG-D01_20170802.pdf

2 FW PROGRAMMING

2.1 PROGRAMMER TOOL

- **STLINK debugger/programmer**

Download Link: <http://www.st.com/en/development-tools/st-link-v2.html>

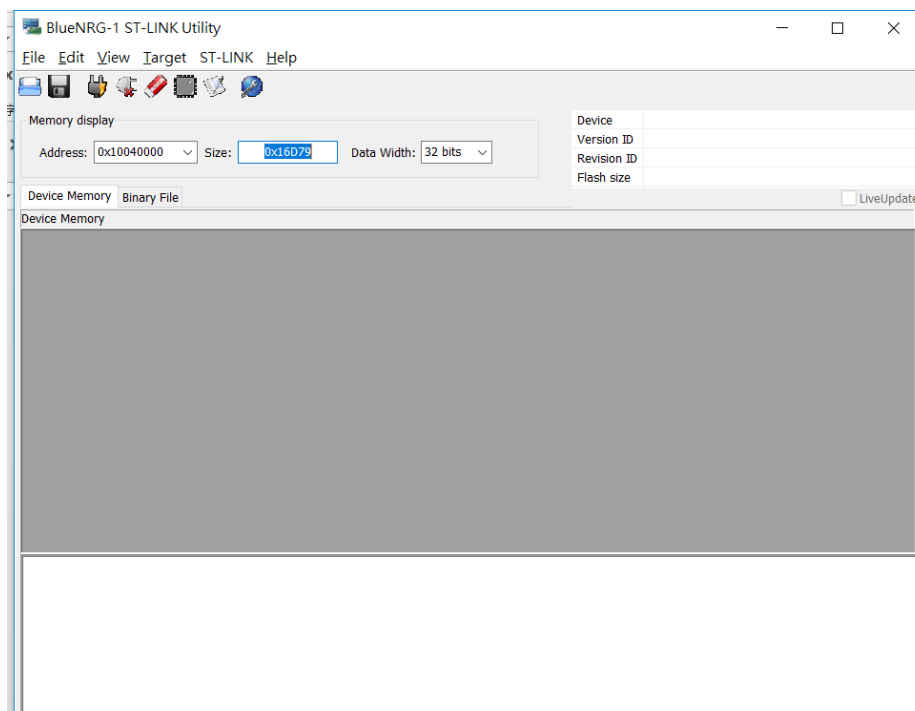


- **STSW-BNRG1STLINK**






Download Link: <http://www.st.com/en/embedded-software/stsw-bnrg1stlink.html>

User Guide:

http://www.st.com/content/ccc/resource/technical/document/user_manual/group0/70/72/18/26/b7/51/47/f2/DM00326881/files/DM00326881.pdf/jcr:content/translations/en.DM00326881.pdf

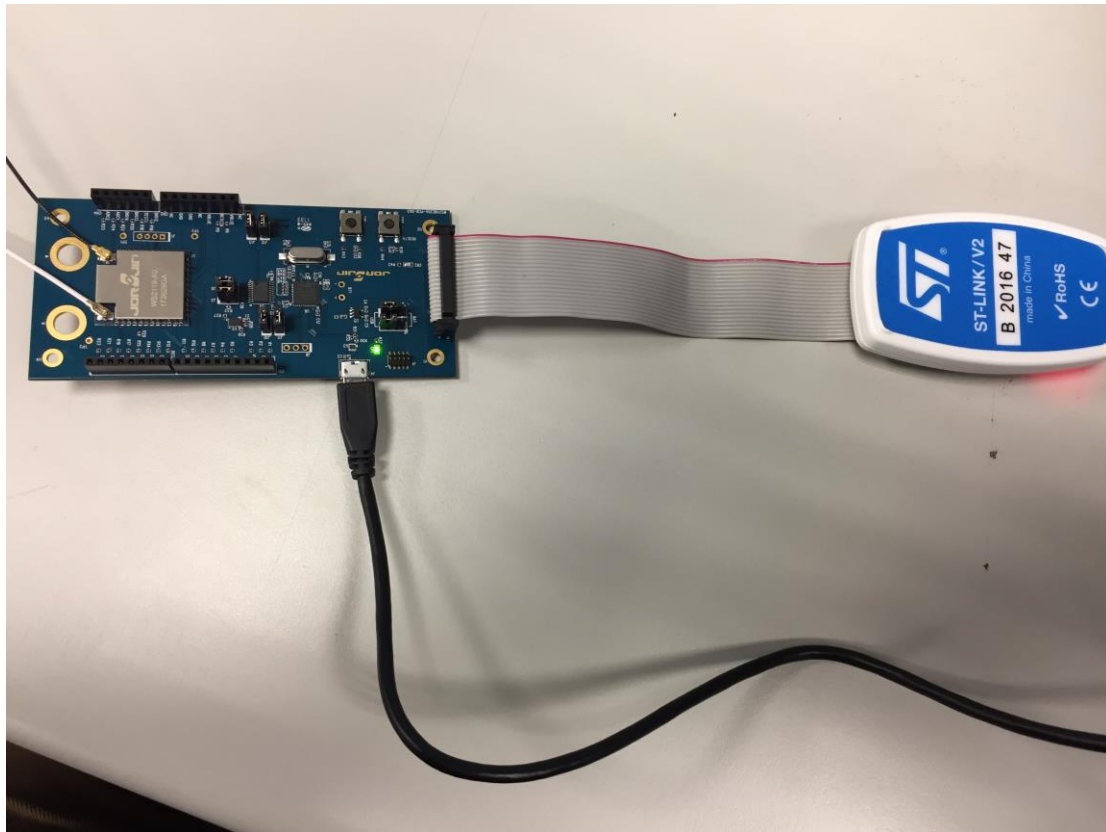


Tool bar

Figure					
Description	Open file	Connect	Disconnect	Full chip erase	Program verify

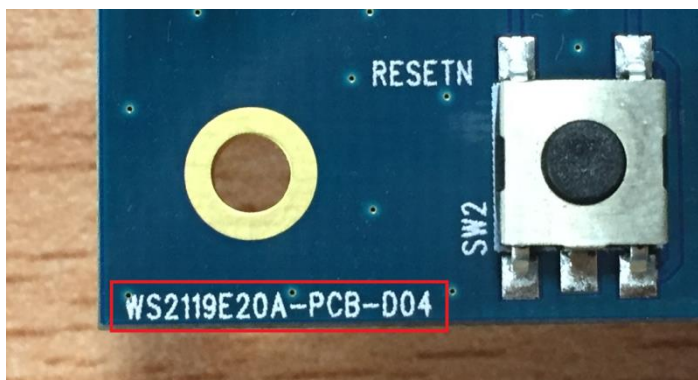
2.2 WS2119 EVB SETUP

Connect the power and ST-link then open BlueNRG-1 ST-LINK Utility.



2.3 PROGRAMMING BY ST-LINK (PCB-D04 ONLY)

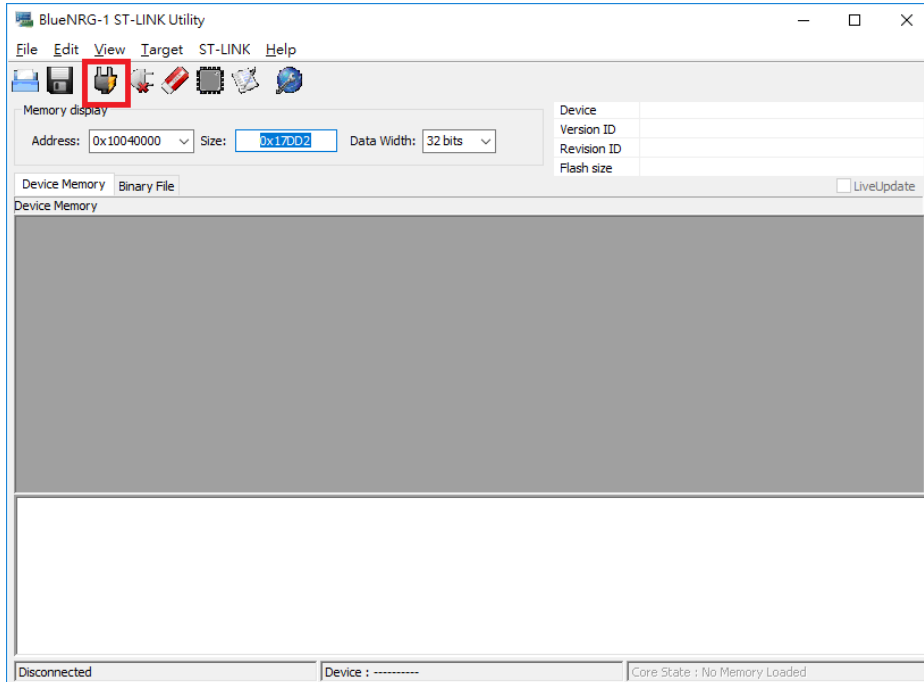
1. Make sure PCB version



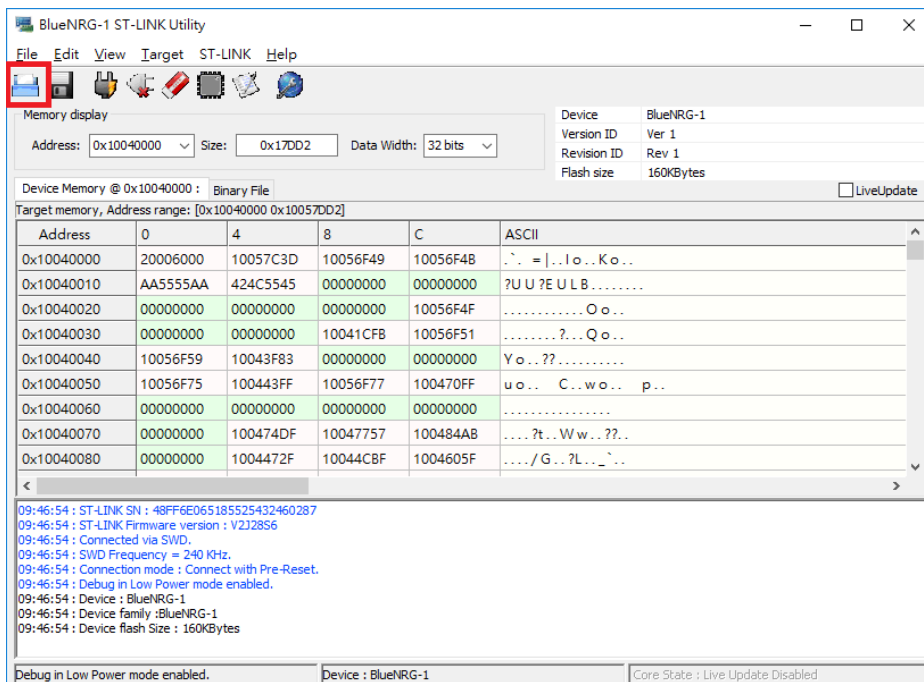
2. Open ST-link utility GUI



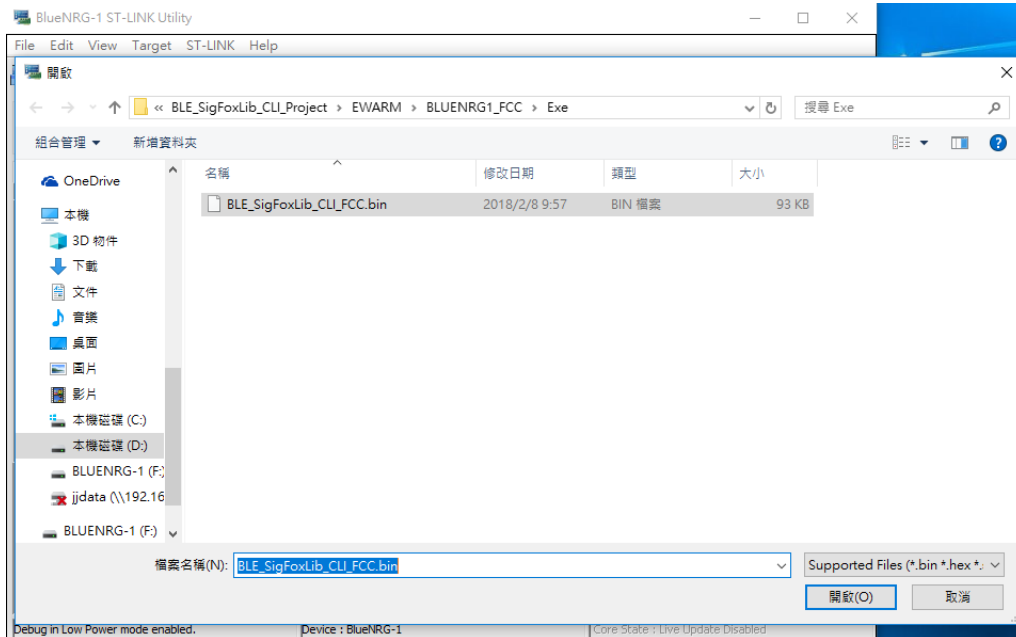
3. Click “Connect” button.



4. Click “Open file” button.

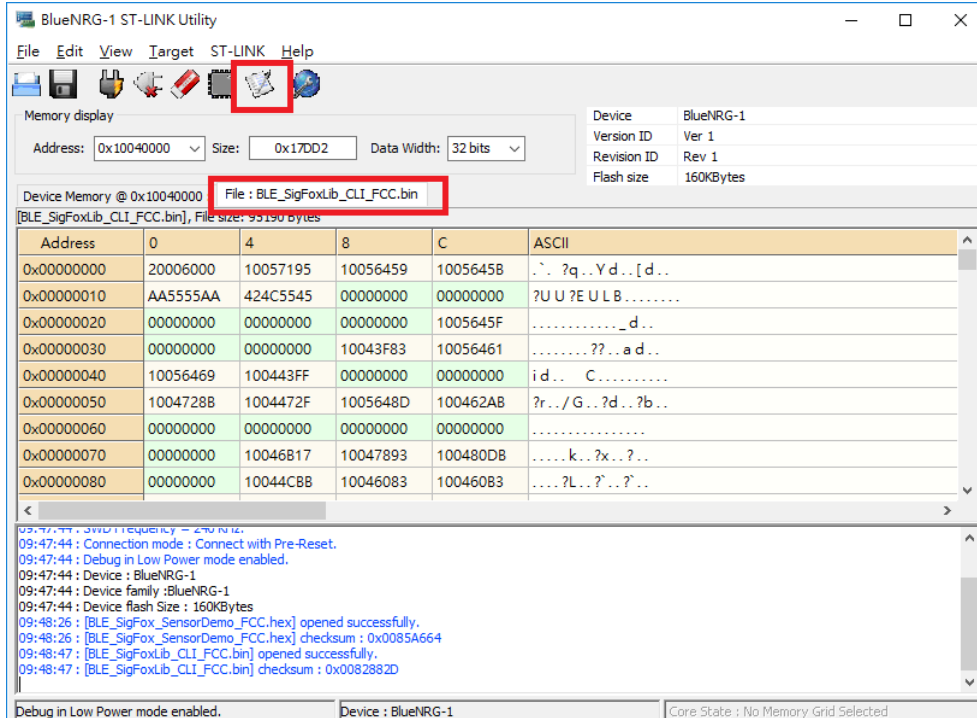


5. Select the file which is going to program.



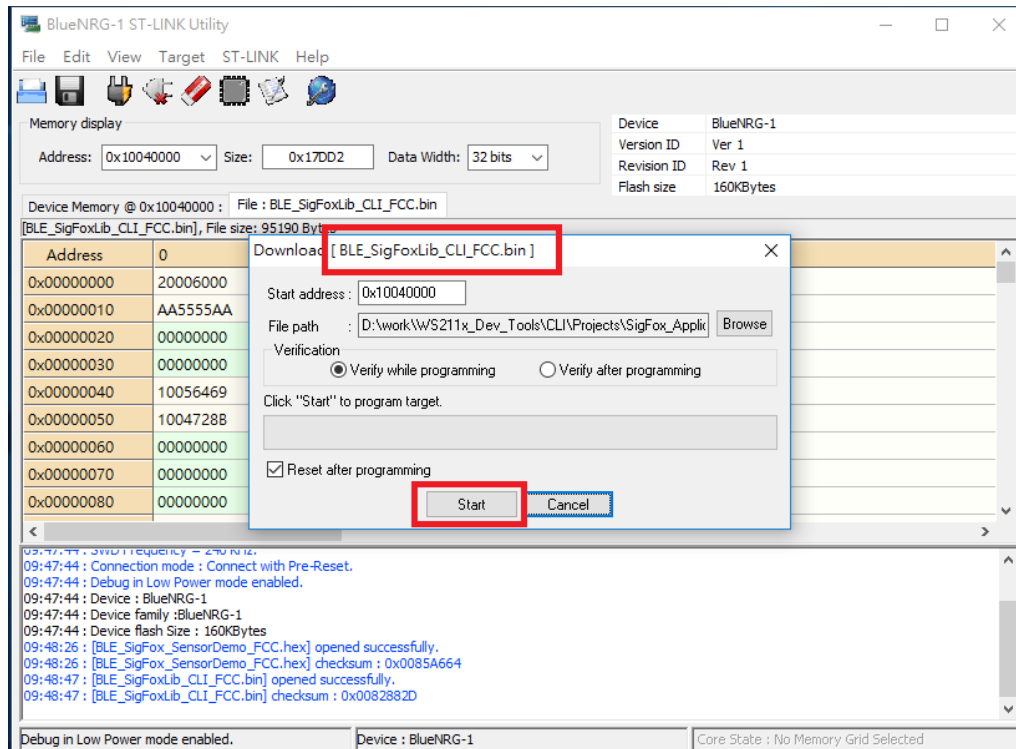
6. Ensure the file name.

Click the “Program verify” button.

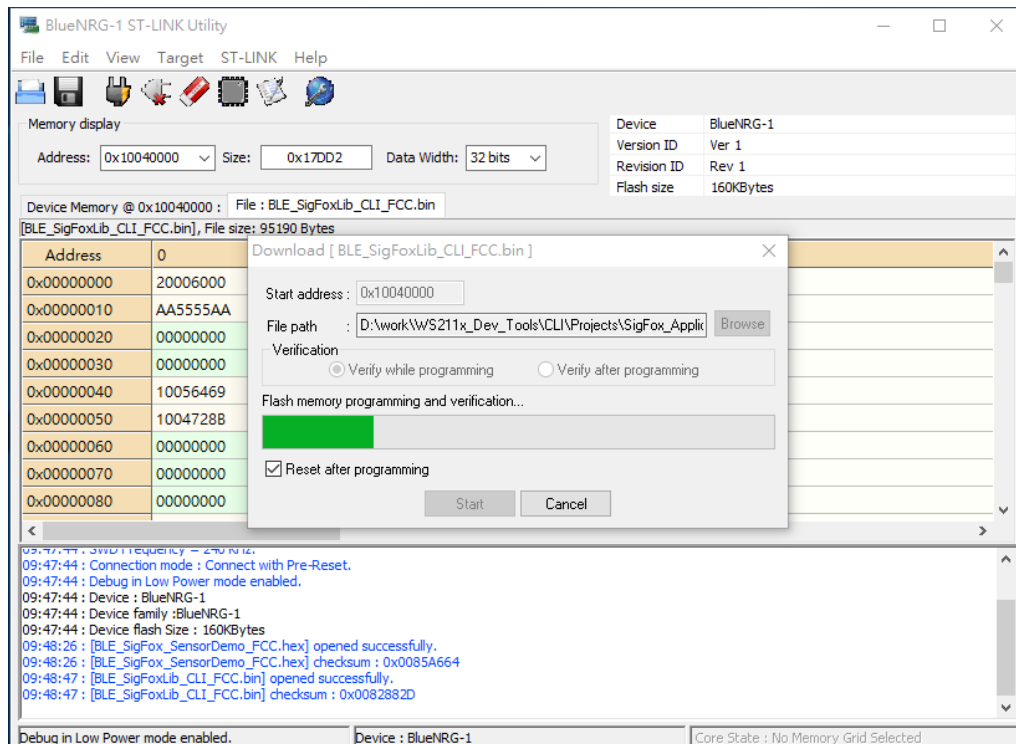


7. Ensure the file name.

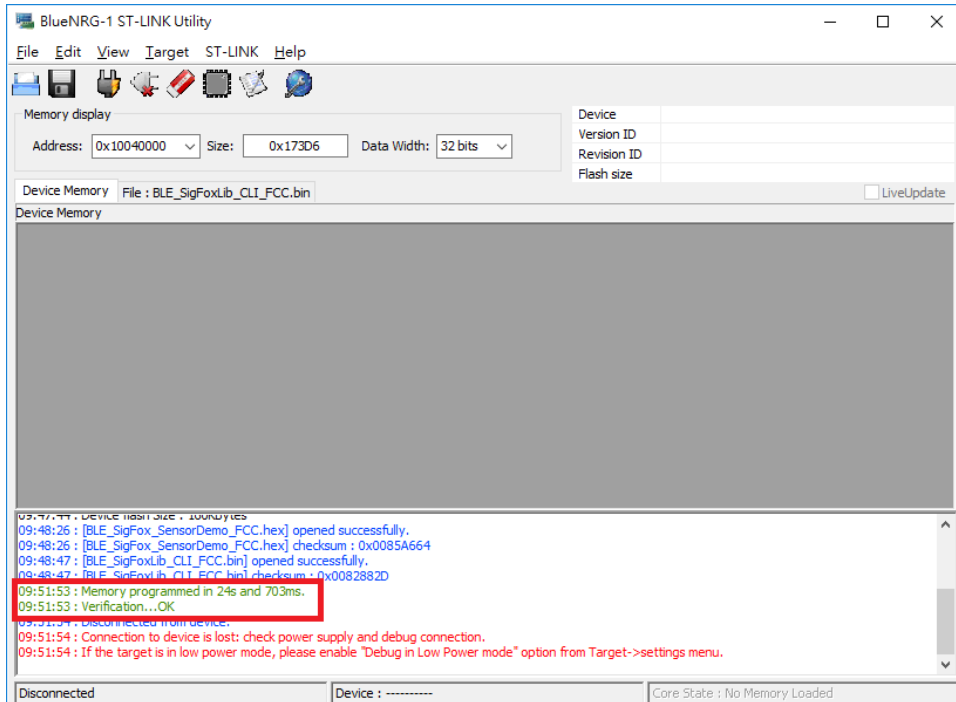
Click “Start”.



8. Programming.

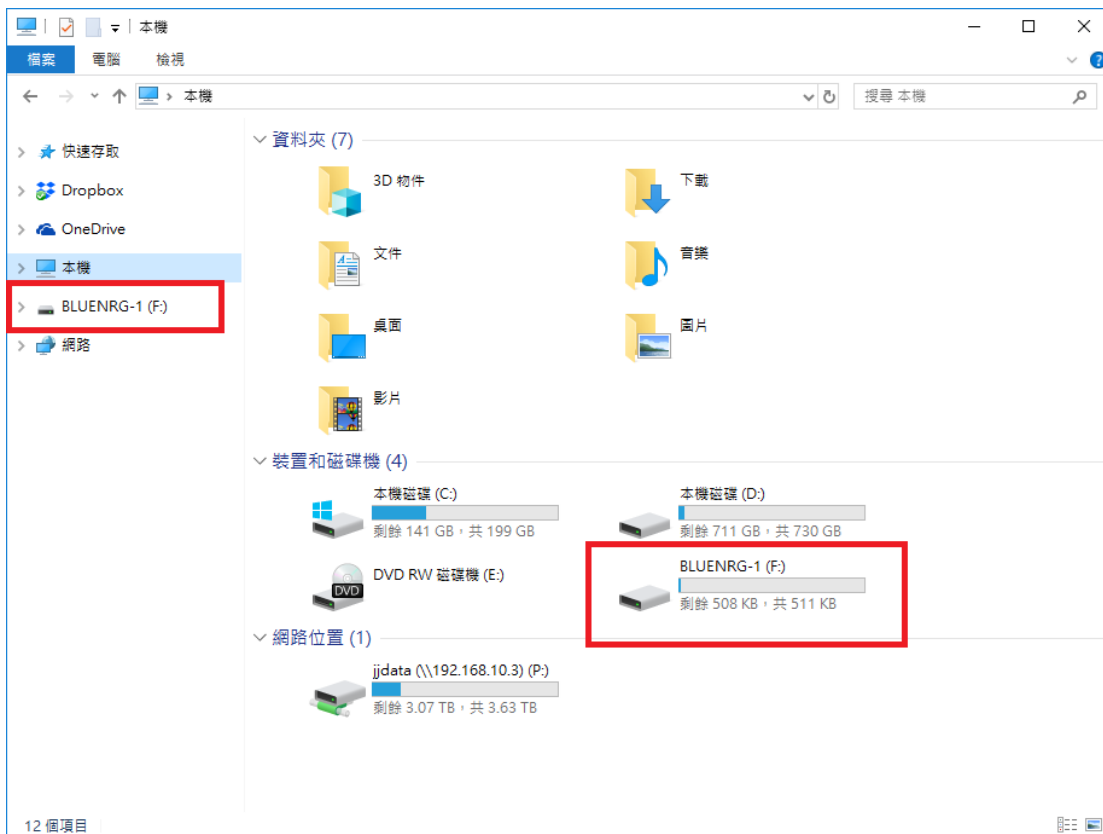


9. Success log

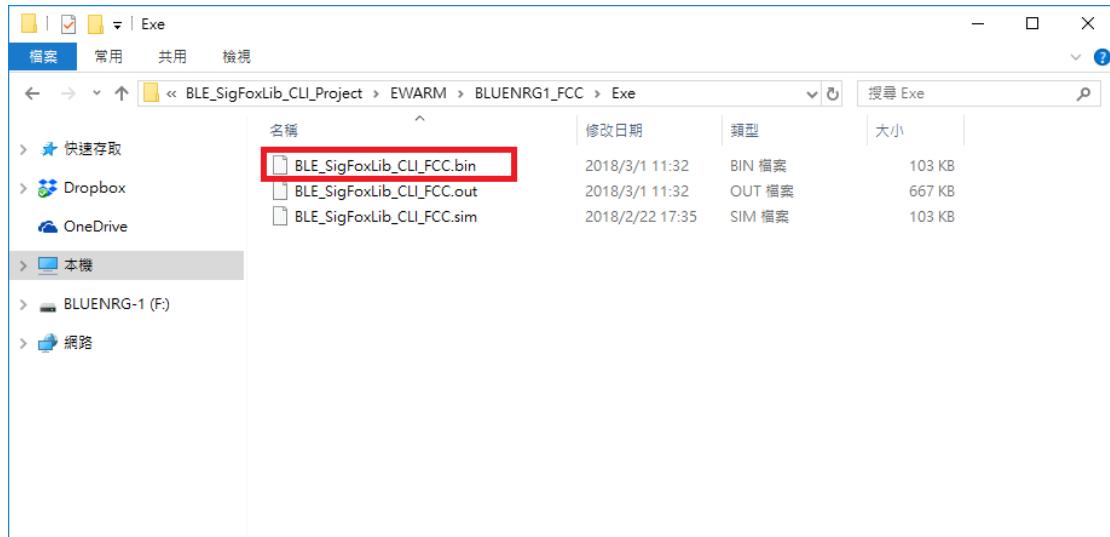


2.4 PROGRAMMING BY USB (WINDOWS ONLY)

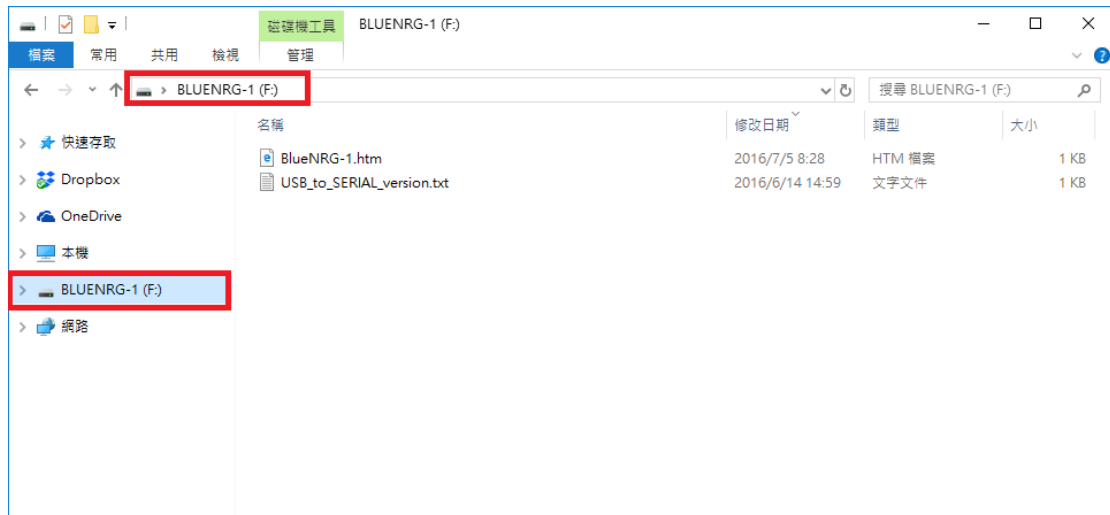
1. Connected USB will show removable device.



2. Copy the firmware file.

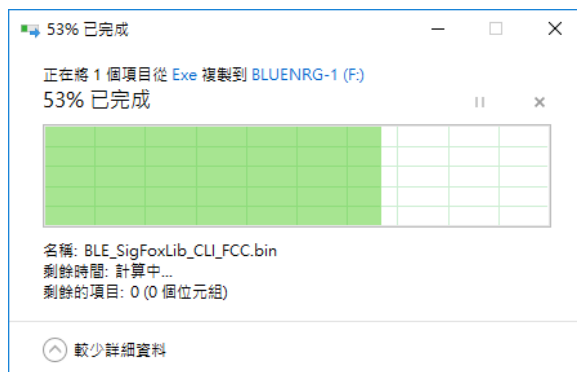


3. Paste in the BLUENRG



4. Programming

Must have this block, it will flash successful.





Doc No: WS2xxx BLE/Sigfox AT CMD doc-01

5. Check built date to confirm firmware version. Please check the release note.

```
NAT+REBOOT
Jorjin WS211x application ** Mar  1 2018 14:24:57 **
MAC = 001994FFFFFF
BLE Stack Initialized
Frequency offset = -2758
DeviceID = FEDCBA98
Key Saved.
PAC = E74E3ECB0720057F
Sigfox RCZ4

Ready...
```

3 AT COMMAND LIST

3.1 COMMAND FORMAT

- Command With data (parameter > 0):
AT+COMMAND {X1X2X3X4}<CR>
Parameter format is hex. ASCII table (Ref.1).
- Command Without data (parameter = 0):
AT+COMMAND<CR>
- Response code format:
Success message: OK<CR>

3.2 COMMON COMMAND

AT Command	Description	Result/Return Value
HELP	Display command list	Command list
fwVersion	Display FW version	FW version

3.3 DEVICE SETTING COMMAND:

AT Command	Description	Result/Return Value
AT+SETDEVICEID	Write Sigfox ID. Parameter length 4 bytes. If ID is 0xFEDCBA98. Ex: AT+SETDEVICEID {FEDCBA98} If ID is 0x0000BA98. Ex: AT+SETDEVICEID {0000BA98} MUST reboot after set device ID.	OK 0
AT+SETSIGFOXKEY	Write Sigfox private key. Parameter length 16 bytes. Ex: AT+SETSIGFOXKEY {00112233445566778899AABBCCDDEEFF}	OK 0
AT+SETSIGFOXPAC	Write Sigfox PAC. Parameter length 8 bytes. If ID is 0x7A7EE94E51A4A31B. Ex: AT+SETSIGFOXPAC {7A7EE94E51A4A31B} If ID is 0x000000051A4A31B. Ex: AT+SETSIGFOXPAC {000000051A4A31B}	OK 0

AT+SETDEVMAC	Set MAC address. Parameter length 6 bytes. Ex: AT+SETDEVMAC {001994FFFFFF} MUST reboot after set mac address.	Current MAC and rebooting request 0
AT+READSIGFOXPAC	Read Sigfox PAC.	Sigfox PAC
AT+READDEVMAC	Read active BLE MAC address.	MAC address
AT+SETSIGFOXRCZ	(Only for FCC) MUST reboot after set rcz. Zone 2. Ex: AT+SETSIGFOXRCZ 2 Zone 4. Ex: AT+SETSIGFOXRCZ 4	OK ERROR
AT+REBOOT	Reboot module.	Reboot and display booting message

3.4 PERIPHERAL BLE COMMAND LIST

AT Command	Description	Result/Return Value
AT+STA	Check BLE status. (Default STA=1)	0(Standby) 1(Advertising) 2(Connected)
AT+ADV	Start advertising (STA=1). If device has connected it won't change status (STA=2).	OK
AT+STOP	Stop advertising (STA=0). If device has connected it will disconnect and stop advertising.	OK
AT+SAVEBLESTA	Save BLE using status. When boot to enable standby/advertising status.	OK
AT+DISCON	Disconnect from current connection.	OK
AT+NAME	Update the information for new device name. 8 bytes limit, if exceed 8 bytes it will read top 8 bytes only. Default name is "WS211x", to return default name input AT+NAME {FFFFFFFFFFFFFFFF} Ex: AT+NAME {575332313139} 0x575332313139(hex) = WS2119(ASCII)	OK 0
AT+NOTIFY	Send packet through BLE. 20 bytes limit, if exceed 20 bytes it will read top 20 bytes only. Ex: AT+NOTIFY {4A4F524A494E} 0x4A4F524A494E(hex) = JORJIN(ASCII)	OK 0

3.5 SIGFOX COMMAND

AT Command	Description	Result/Return Value
AT+SENDSIGFOX	Send Sigfox frame. 12 bytes limit, if exceed 12 bytes it will read top 12 bytes only. Ex: AT+SENDSIGFOX {4A4F524A494E}	OK 0
AT+PUBLICKEY	Use private key. Ex: AT+PUBLICKEY 0 Use public key. Ex: AT+PUBLICKEY 1	OK

3.6 RETUEN VALUE

Return Value	Description
OK	Success.
ERROR	RCZ is not 2 or 4.
0	Input parameter is null.
wrong number of arguments	There has no parameter.
argument syntax error	Parameter format is wrong.
no such command	Command format is wrong.

3.7 SIGFOX PUBLIC KEY

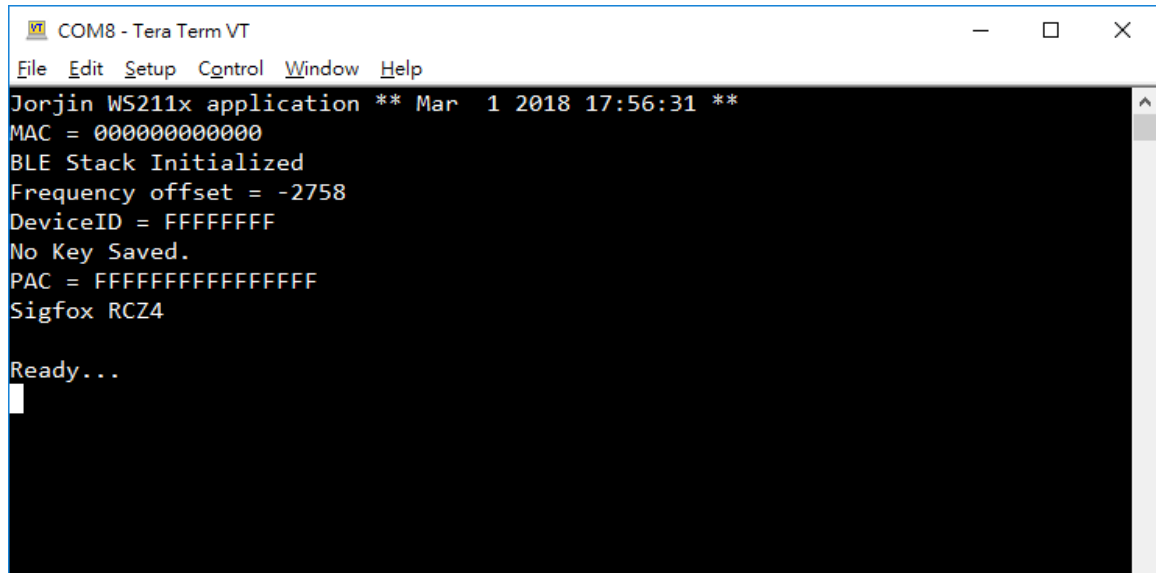
How to use Public key:

1. Hold SW1
2. Pressed and released SW2
3. Released SW1
4. Check the log as below



3.8 AT COMMAND SAMPLE

- Booting log without sigfox ID/KEY/PAC

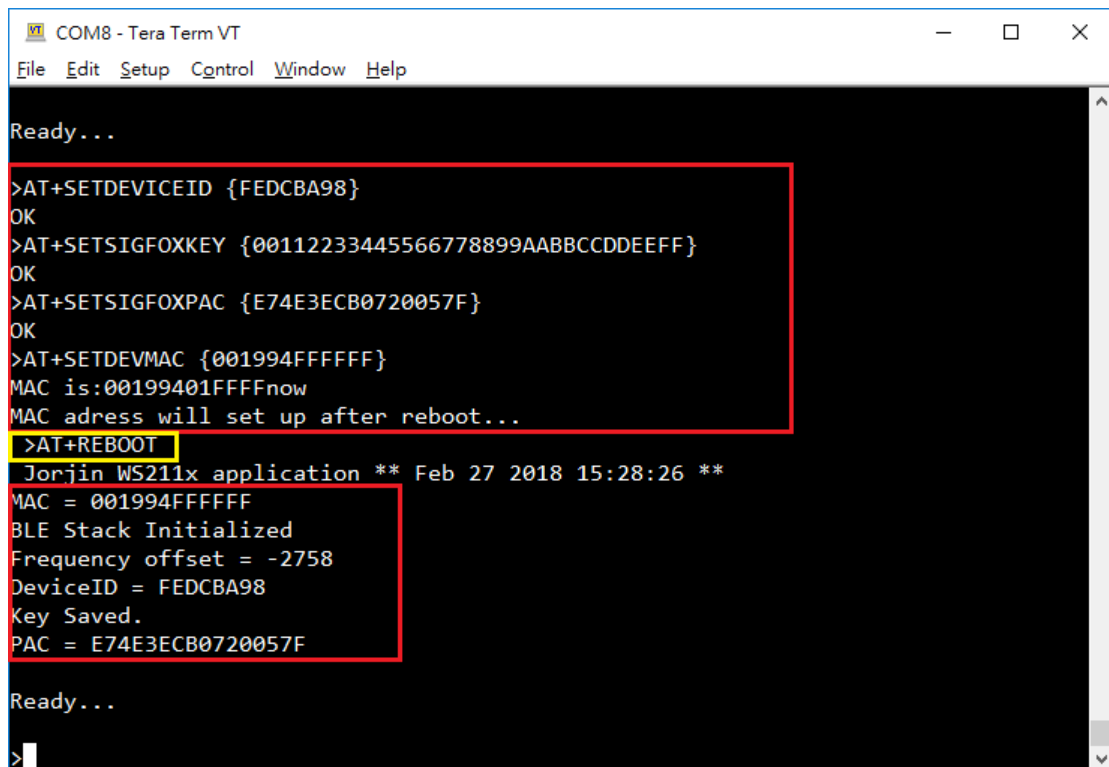


```

COM8 - Tera Term VT
File Edit Setup Control Window Help
Jorjin WS211x application ** Mar  1 2018 17:56:31 **
MAC = 000000000000
BLE Stack Initialized
Frequency offset = -2758
DeviceID = FFFFFFFF
No Key Saved.
PAC = FFFFFFFFFFFFFFFF
Sigfox RCZ4

Ready...
  
```

- Example of device setting command



```

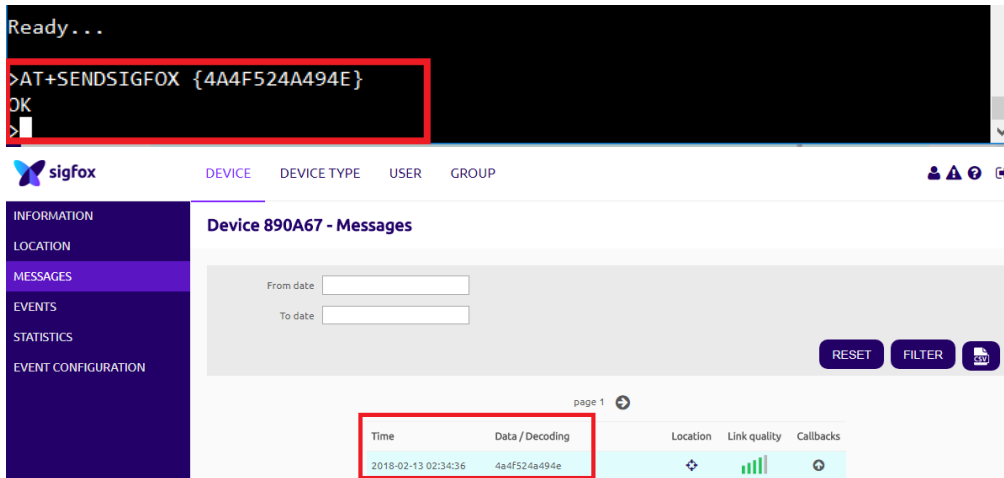
COM8 - Tera Term VT
File Edit Setup Control Window Help

Ready...

>AT+SETDEVICEID {FEDCBA98}
OK
>AT+SETSIGFOXKEY {00112233445566778899AABBCCDDEEFF}
OK
>AT+SETSIGFOXMAC {E74E3ECB0720057F}
OK
>AT+SETDEVMAC {001994FFFFFF}
MAC is:00199401FFFFnow
MAC adress will set up after reboot...
>AT+REBOOT
Jorjin WS211x application ** Feb 27 2018 15:28:26 **
MAC = 001994FFFFFF
BLE Stack Initialized
Frequency offset = -2758
DeviceID = FEDCBA98
Key Saved.
PAC = E74E3ECB0720057F

Ready...
>
  
```


● AT+SENDSIGFOX



Ready...

```
>AT+SENDSIGFOX {4A4F524A494E}
OK
>
```

sigfox

DEVICE DEVICE TYPE USER GROUP

INFORMATION
LOCATION
MESSAGES
EVENTS
STATISTICS
EVENT CONFIGURATION

Device 890A67 - Messages

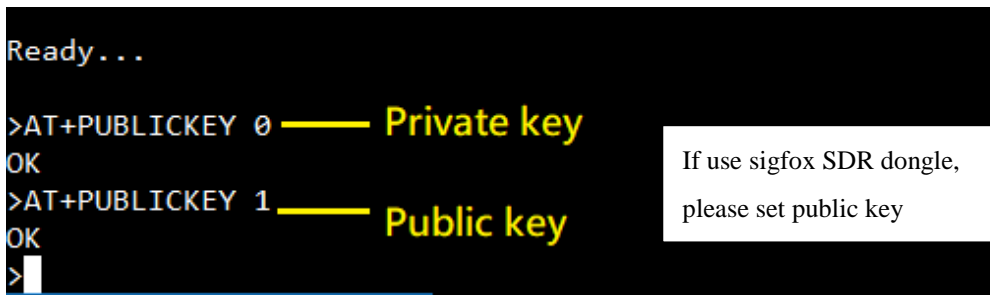
From date:
To date:

RESET FILTER

page 1

Time	Data / Decoding	Location	Link quality	Callbacks
2018-02-13 02:34:36	4a4f524a494e			

● AT+SETPUBLICKEY

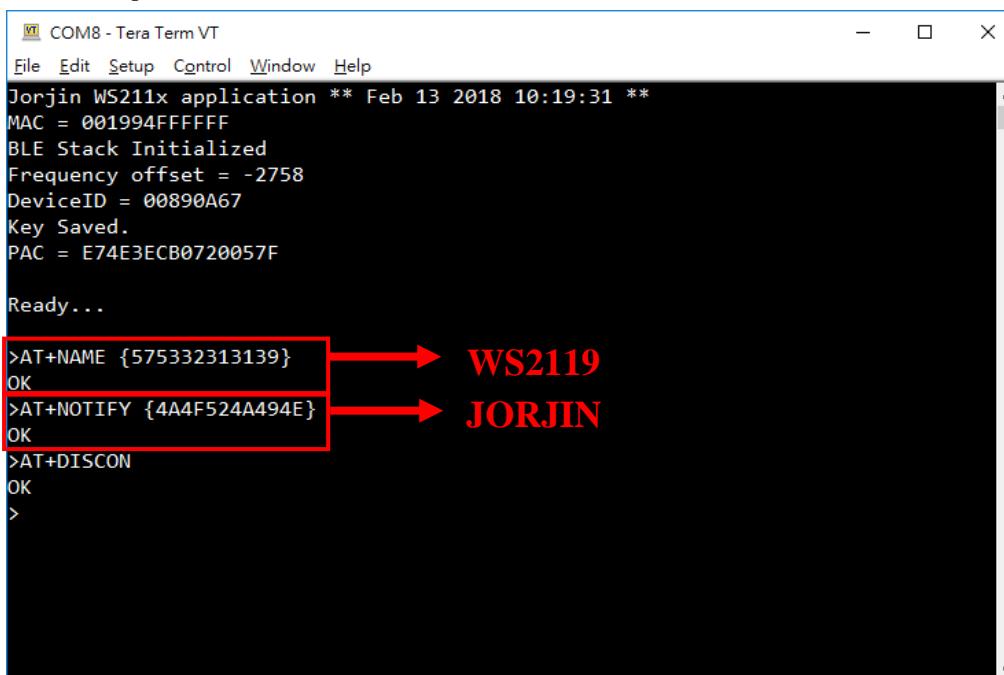


Ready...

```
>AT+PUBLICKEY 0 ——— Private key
OK
>AT+PUBLICKEY 1 ——— Public key
OK
>
```

If use sigfox SDR dongle,
please set public key

● Example of BLE command:



COM8 - Tera Term VT

File Edit Setup Control Window Help

Jorjin WS211x application ** Feb 13 2018 10:19:31 **

MAC = 001994FFFFFF

BLE Stack Initialized

Frequency offset = -2758

DeviceID = 00890A67

Key Saved.

PAC = E74E3ECB0720057F

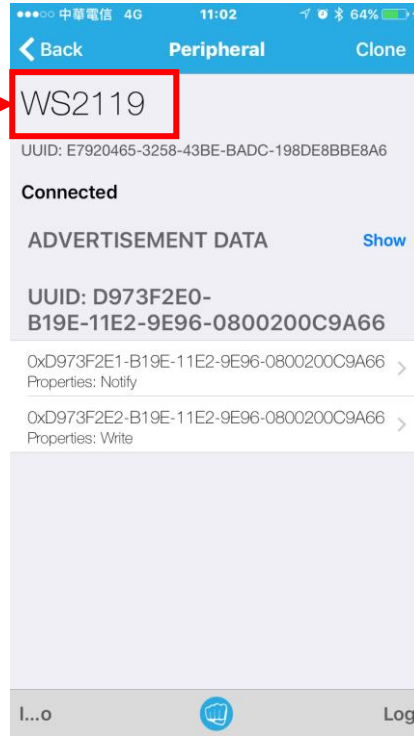
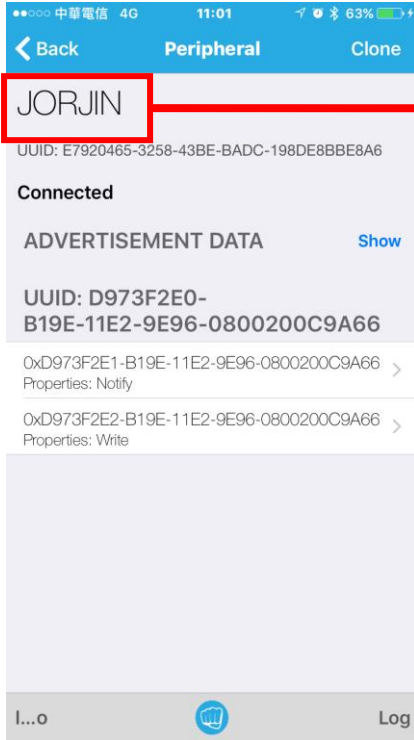
Ready...

```
>AT+NAME {575332313139}
OK
>AT+NOTIFY {4A4F524A494E}
OK
>AT+DISCON
OK
>
```

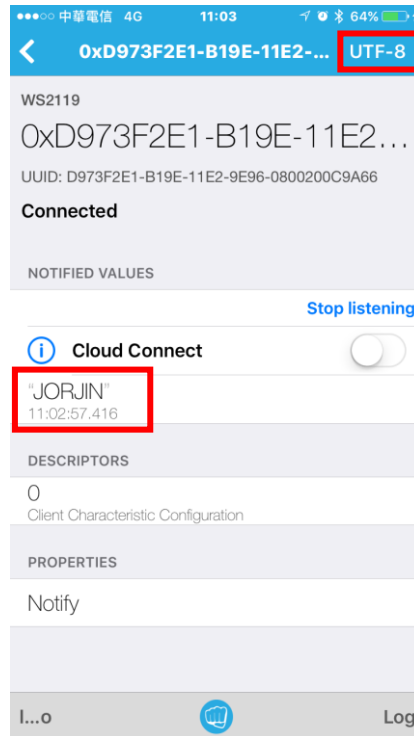
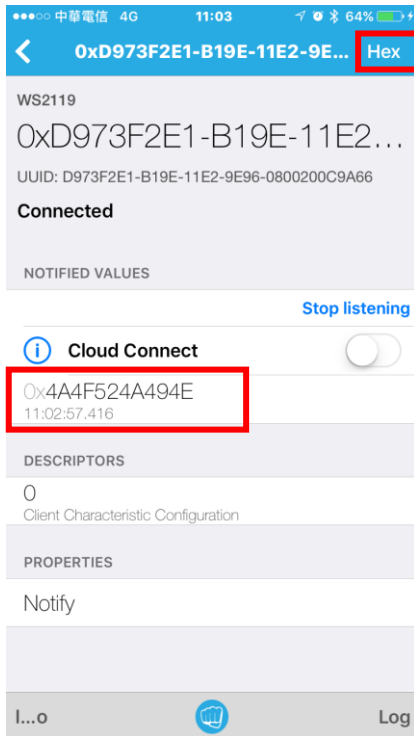
WS2119

JORJIN

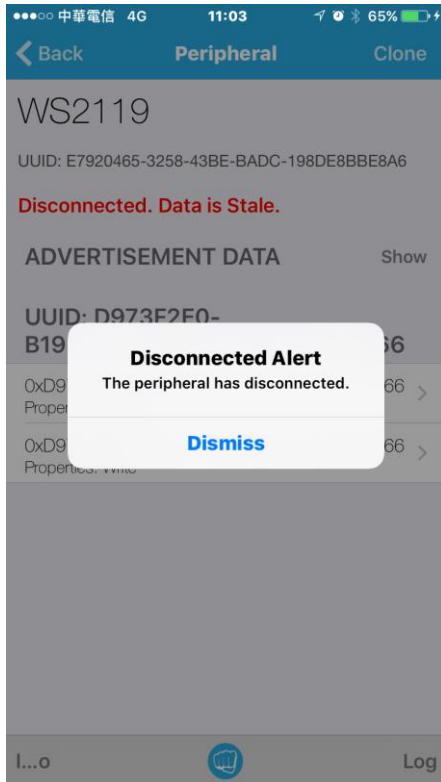
● AT+NAME



● AT+NOTIFY



- AT+DISCON



- AT+STA
- AT+ADV
- AT+STOP
- AT+SAVEBLESTA

```

COM8 - Tera Term VT
File Edit Setup Control Window Help

>Jorjin WS211x application ** Mar 1 2018 17:56:31 **
MAC = 001994FFFFFF
BLE Stack Initialized
Frequency offset = -2758
DeviceID = FEDCBA98
Key Saved.
PAC = E74E3ECB0720057F
Sigfox RCZ4

Ready...

>AT+STA
1
>AT+STOP
OK
>AT+STA
0
>AT+SAVEBLESTA
OK
>AT+REBOOT
Jorjin WS211x application ** Mar 1 2018 17:56:31 **
MAC = 001994FFFFFF
BLE Stack Initialized
Frequency offset = -2758
DeviceID = FEDCBA98
Key Saved.
PAC = E74E3ECB0720057F
Sigfox RCZ4

Ready...

>AT+STA
0

```

```

COM8 - Tera Term VT
File Edit Setup Control Window Help

>AT+REBOOT
Jorjin WS211x application ** Mar 1 2018 17:56:31 **
MAC = 001994FFFFFF
BLE Stack Initialized
Frequency offset = -2758
DeviceID = FEDCBA98
Key Saved.
PAC = E74E3ECB0720057F
Sigfox RCZ4

Ready...

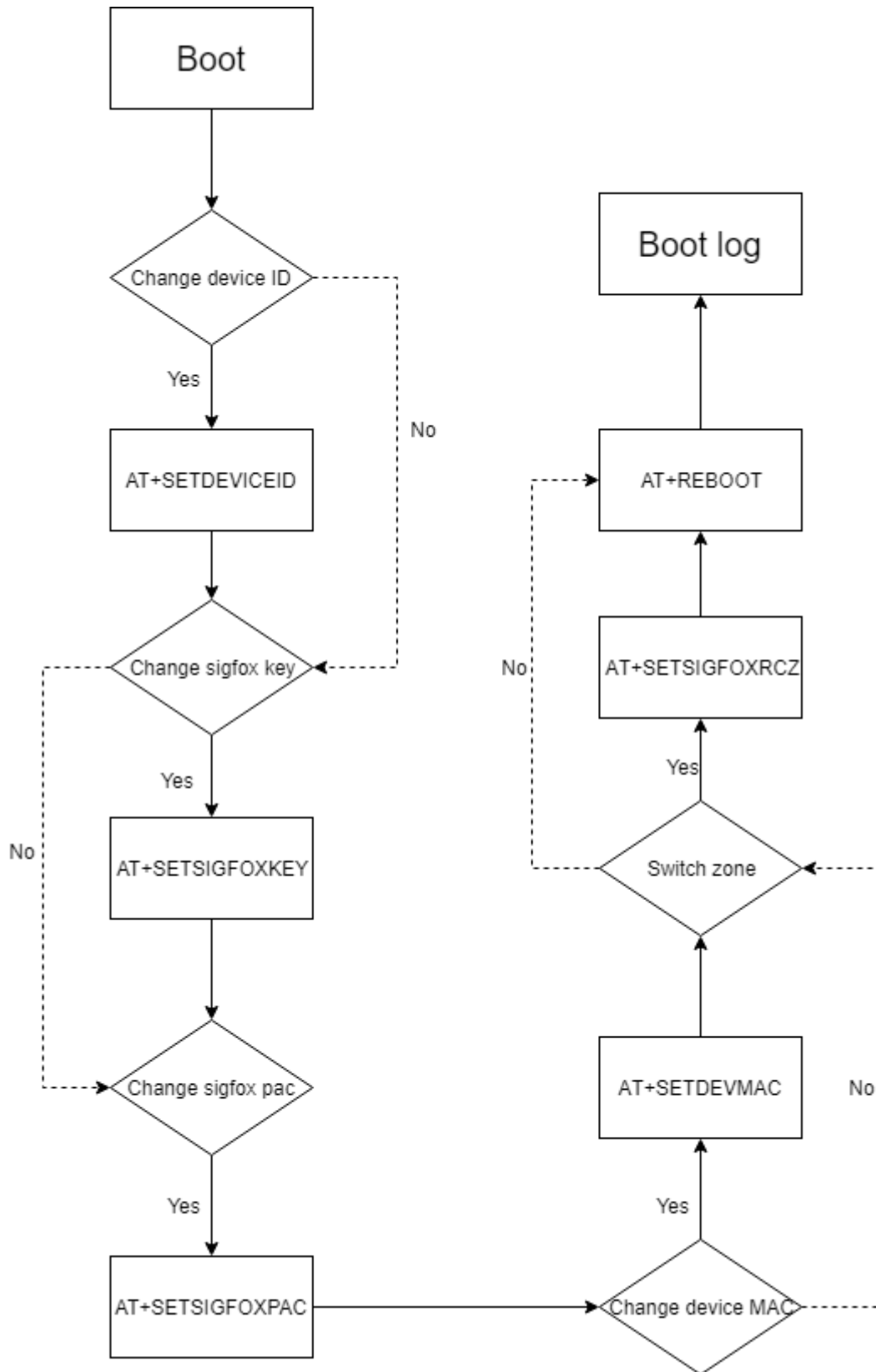
>AT+STA
0
>AT+ADV
OK
>AT+STA
1
>AT+SAVEBLESTA
OK
>AT+REBOOT
Jorjin WS211x application ** Mar 1 2018 17:56:31 **
MAC = 001994FFFFFF
BLE Stack Initialized
Frequency offset = -2758
DeviceID = FEDCBA98
Key Saved.
PAC = E74E3ECB0720057F
Sigfox RCZ4

Ready...

>AT+STA
1

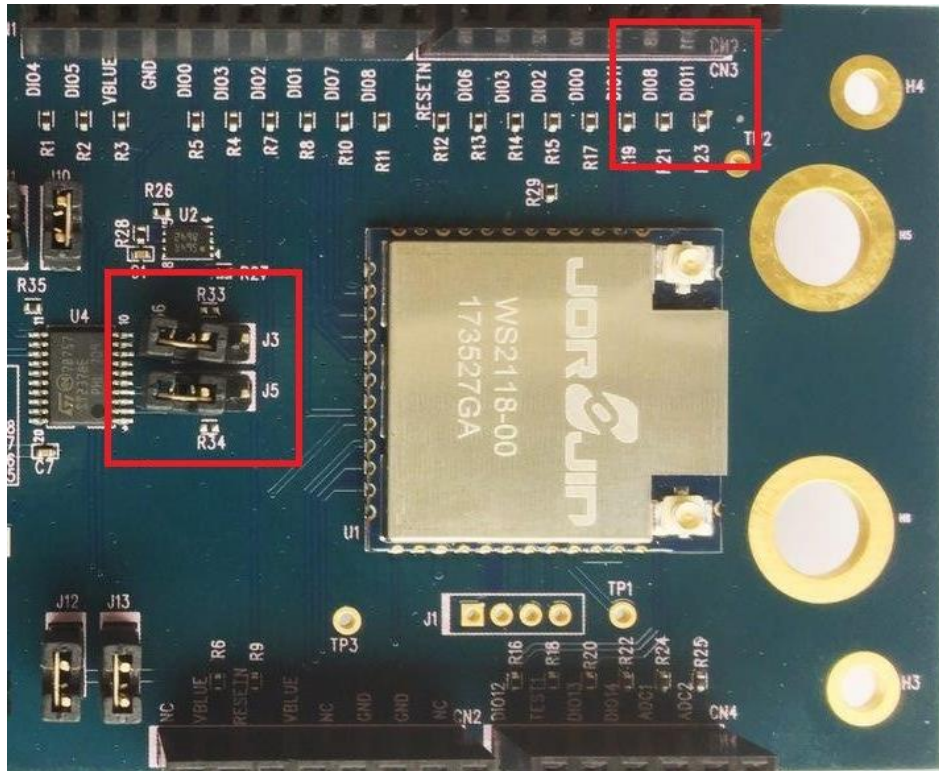
```

- Command flow chart



4 HW PIN DEFINATION

- UART pins on Module:
UART TX: DIO 8
UART RX: DIO 11
- How to jump wired UART on EVB
Remove jumpers J3 and J5 to use UART from host MCU.



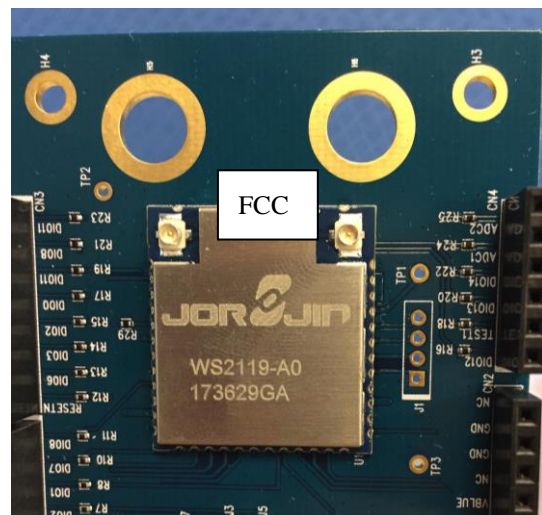
5 REFERENCE

1. ASCII Table

Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char
32	20	[SPACE]	64	40	@	96	60	`
33	21	!	65	41	A	97	61	a
34	22	"	66	42	B	98	62	b
35	23	#	67	43	C	99	63	c
36	24	\$	68	44	D	100	64	d
37	25	%	69	45	E	101	65	e
38	26	&	70	46	F	102	66	f
39	27	'	71	47	G	103	67	g
40	28	(	72	48	H	104	68	h
41	29	)	73	49	I	105	69	i
42	2A	*	74	4A	J	106	6A	j
43	2B	+	75	4B	K	107	6B	k
44	2C	,	76	4C	L	108	6C	l
45	2D	-	77	4D	M	109	6D	m
46	2E	.	78	4E	N	110	6E	n
47	2F	/	79	4F	O	111	6F	o
48	30	0	80	50	P	112	70	p
49	31	1	81	51	Q	113	71	q
50	32	2	82	52	R	114	72	r
51	33	3	83	53	S	115	73	s
52	34	4	84	54	T	116	74	t
53	35	5	85	55	U	117	75	u
54	36	6	86	56	V	118	76	v
55	37	7	87	57	W	119	77	w
56	38	8	88	58	X	120	78	x
57	39	9	89	59	Y	121	79	y
58	3A	:	90	5A	Z	122	7A	z
59	3B	;	91	5B	[	123	7B	{
60	3C	<	92	5C	\	124	7C	|
61	3D	=	93	5D	]	125	7D	}
62	3E	>	94	5E	^	126	7E	~
63	3F	?	95	5F	_	127	7F	[DEL]

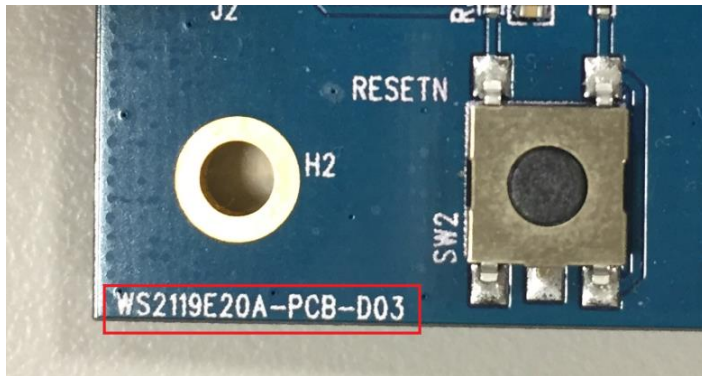
2. Module kinds

WS2118 module is for ETSI, WS2119 module is for FCC.



3. PCB versions

D03



D04

