



Sigfox Monarch Module WSG309S

Compact-sized
With Ultra-low Power
Consumption

WSG309S_IPEX



WSG309S_RF_PAD



Sigfox Support (Monarch)



RC1/2/3/4/5/6/7



AT Commands



Extended Temperature
Range: -30°C to +85°C



Ultra-Low Power Consumption
(6.17uA @ sleep mode)

WSG309S RC 1/2/3/4/5/6/7 is a Sigfox +BT5.0 modem module for the low power wide area network (LPWAN) market. It is designed with STM's system S2-LP+BLUENRG248 MCU

The module was designed for high performance, high quality, low cost, small form factor and most importantly. The Sigfox application is running on BLUENRG2 MCU at high efficiency executed at high efficiency using its internal 32bit core Cortex-M0 processor.

Every module is preloaded with Sigfox application software, module specific ID/KEY/PAC as referring to Sigfox network system. The preloaded software also includes a bootloader which allows software update or future user application development.

◆ SIGFOX VERIFIED CERTIFICATE



Sigfox Verified™ Certificate

M_004E_0C85_01

Congratulations LiteOn, the following product is now Sigfox Verified™ certified:



PRODUCT MODEL NAME:	WSG309S
RADIO CONFIGURATION:	RC1, RC2, RC3, RC4, RC5, RC6, RC7 CORP-13447_RC1_UDL_MON CORP13447_RC2_UDL_MON CORP-13447_RC3C_UDL_MON CORP13447_RC4_UDL_MON CORP-13447_RC5_UDL_MON CORP13447_RC6_UDL_MON 60394140-001
TEST REPORT:	
LAYOUT VERSION:	V01
SCHEMATIC VERSION:	V01
BOM VERSION:	V01
FIRMWARE VERSION:	V2.1.0.2
SIGFOX LIB:	V2.8.1_FDL_MON_ADDON_V0.6.0
MESSAGE ROLLOVER COUNTER: ..	4096
SIGFOX REFERENCE:	BUIL-917
CERTIFICATION DATE:	15/07/2020
SIGFOX FEATURES:	
DOWNLINK.....	✓
PAYLOAD ENCRYPTED.....	✓
MONARCH.....	✓

This certificate is valid for this product only. Any change to the certified product has to be reported to Sigfox as it may lead to a renewal of the RF & protocol Tests.
The Sigfox Verified™ logo must be used in respect of Sigfox branding guidelines.



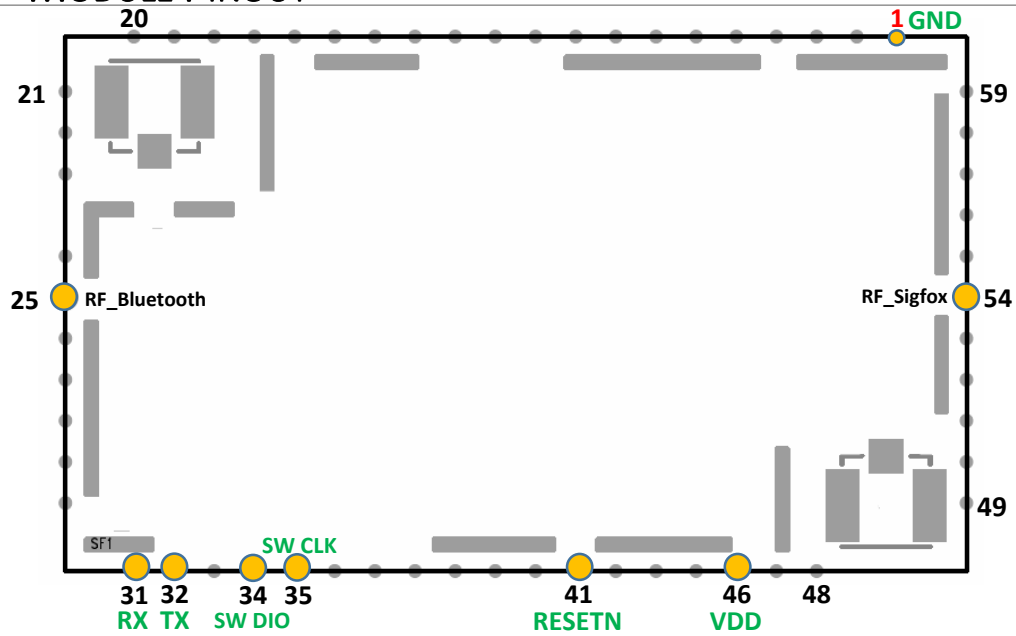
◆ General Feature

- General Sigfox module for Smart City, Smart Agriculture , Smart Industry, IOT Application
- Compact Form Factor: 28.5 x 16.5 x 3.0 mm
- 59 Pin Stamp Pad for PCB SMT mounting
- Interface : I2C*1/UART*1/GPIO*12/ADC*2/SWD*1
- Temperature range: -30°C to +85°C
- Supply voltage: 2.1 ~ 3.6V
- Preloaded Sigfox application with ID/KEY/PAC
- Bluetooth Profile Support list : GAP, GATT, ATT, SM, L2CAP

◆ Product Specifications

WSG309S		
Standard	Sigfox Network System	Bluetooth5.0
Interface	I2C/UART/GPIO/ADC/SWD/DIO	
Transmit Output Power	22dBm(RC2/4) 14dBm(RC1/6/7) 13dBm(RC3/5)	8dBm
Data Rate	Uplink: 100bps Downlink: 600bps	1Mbps
Modulation Techniques	Uplink - DBPSK Downlink – GFSK	GFSK
Frequency bands	RC 1/2/3/4/5/6/7	2400 to 2483.5MHz
Operating Voltage	2.1 ~ 3.6V	
Operating Temperature	-30 ~ 85 degree C	
Current consumption	121mA Tx at 22dBm (peak current with Sigfox packet transmission) 33mA Tx at 14dBm (peak current with Sigfox packet transmission) 31mA Tx at 13dBm (peak current with Sigfox packet transmission) 22mA Tx at 4dBm with BT packet transmission 6.17uA at sleep mode	

◆ **MODULE PINOUT**



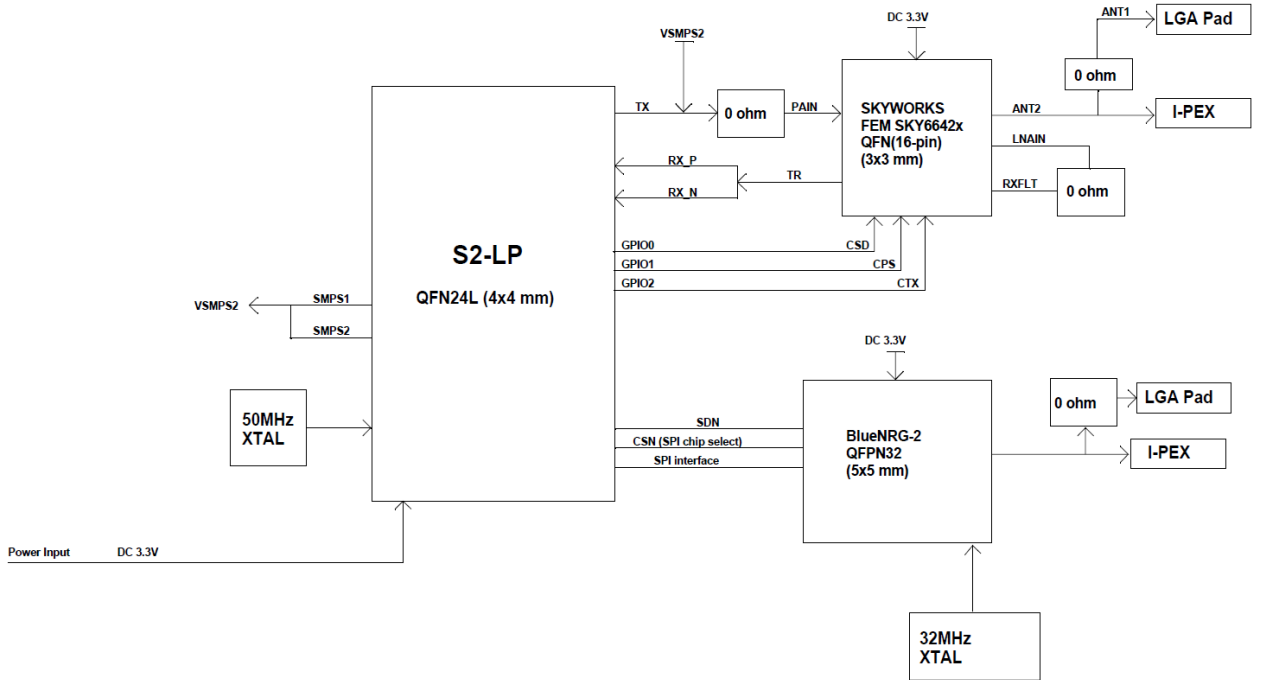
◆ **PIN DEFINITION**

No.	Name	I/O	Function
1	GND	GND	Ground
2	GND	GND	Ground
3	GND	GND	Ground
4	GND	GND	Ground
5	GND	GND	Ground
6	S2-LP SDO	I/O	Connect to BlueNRG-2_DIO3(Suggest to floating)
7	S2-LP SDI	I/O	Connect to BlueNRG-2_DIO2(Suggest to floating)
8	S2-LP SCLK	I/O	Connect to BlueNRG-2_DIO0(Suggest to floating)
9	S2-LP CSN	I/O	Connect to BlueNRG-2_DIO20(Suggest to floating)
10	DIO1	I/O	BlueNRG-2_DIO1
11	DIO17	I/O	BlueNRG-2_DIO17
12	S2-LP GPIO2	I/O	Connect to BlueNRG-2_DIO19(Suggest to floating)
13	S2-LP GPIO3	I/O	Connect to BlueNRG-2_DIO21(Suggest to floating)
14	S2-LP SDN	I/O	Connect to BlueNRG-2_DIO25(Suggest to floating)
15	GND	GND	Ground
16	GND	GND	Ground
17	DIO16	I/O	BlueNRG-2_DIO16
18	DIO15	I/O	BlueNRG-2_DIO15
19	ADC1	I/O	BlueNRG-2_ADC1
20	ADC2	I/O	BlueNRG-2_ADC2
21	GND	GND	Ground
22	DIO14	I/O	BlueNRG-2_DIO14
23	GND	GND	Ground
24	GND	GND	Ground
25	BT Antenna	RF	Only work on WSG309S_RF_PAD version

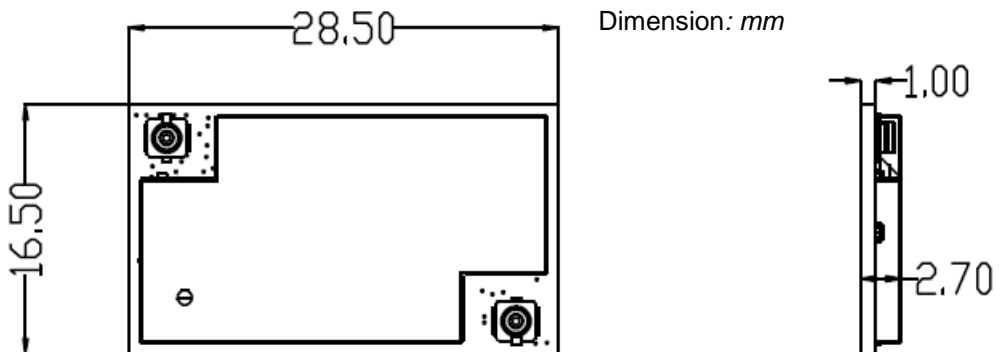
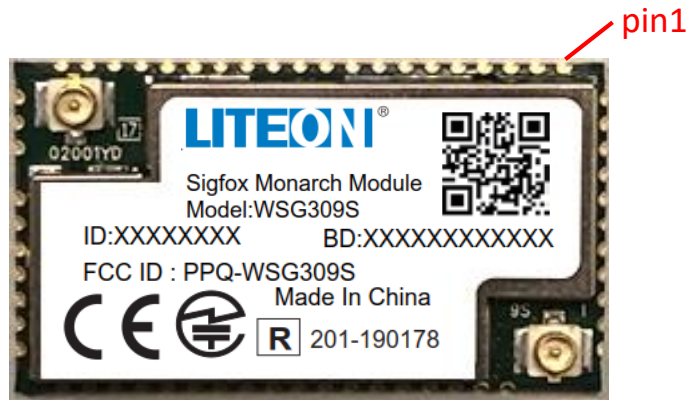
◆ PIN DEFINITION

No.	Name	I/O	Function
26	GND	GND	Ground
27	GND	GND	Ground
28	GND	GND	Ground
29	DIO13	I/O	BlueNRG-2_DIO13
30	GND	GND	Ground
31	UART_RX	I/O	BlueNRG-2_DIO11 (115200bps)
32	UART_TX	I/O	BlueNRG-2_DIO8 (115200bps)
33	DIO7	I/O	BlueNRG-2_DIO7 (boot load module internal pull low 100K)
34	JTMS-SWTDIO	I/O	SW DIO (BlueNRG-2_DIO10) SWD data signal (MCU debugger and programing)
35	JTMS-SWTK	I/O	SW CLK (BlueNRG-2_DIO9) SWD clock signal (MCU debugger and programing)
36	DIO12	I/O	BlueNRG-2_DIO12
37	DIO6	I/O	BlueNRG-2_DIO6
38	DIO18	I/O	BlueNRG-2_DIO18
39	NC		No connect on module
40	I2C2_DAT	I/O	BlueNRG-2_DIO5 (module internal pull high 10K)
41	RESETN	I/O	BlueNRG-2 RESETN (module internal pull high 100k, Low Active)
42	NC		No connect on module
43	I2C2_CLK	I/O	BlueNRG-2_DIO4 (module internal pull high 10K)
44	XI	I	Reserve for external RTC 32.768k
45	XO	O	Reserve for external RTC 32.768k
46	VDD	P	Power input
47	GND	GND	Ground
48	GND	GND	Ground
49	GND	GND	Ground
50	GND	GND	Ground
51	GND	GND	Ground
52	GND	GND	Ground
53	GND	GND	Ground
54	Sigfox Antenna	RF	Only work on WSG309S_RF_PAD version
55	GND	GND	Ground
56	GND	GND	Ground
57	GND	GND	Ground
58	GND	GND	Ground
59	GND	GND	Ground

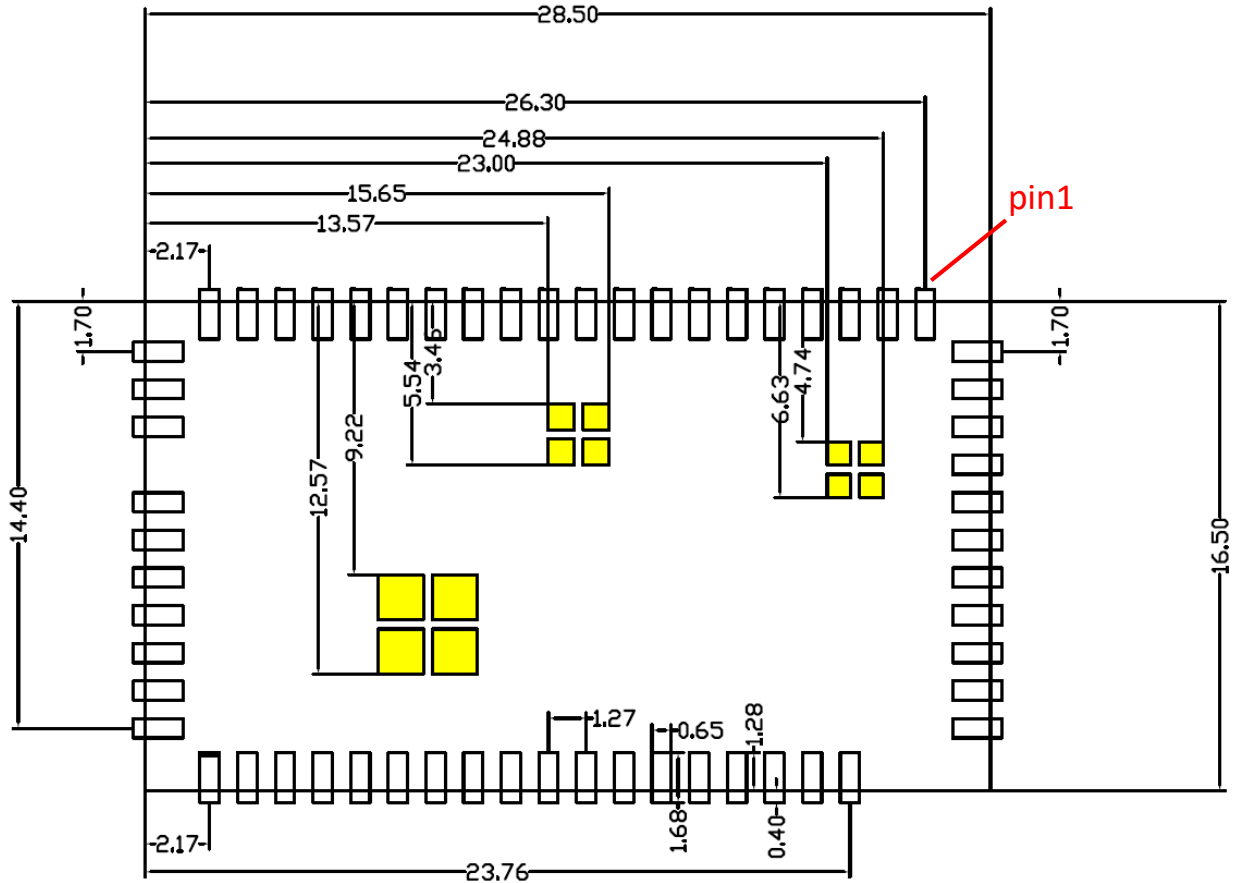
◆ **BLOCK DIAGRAM**



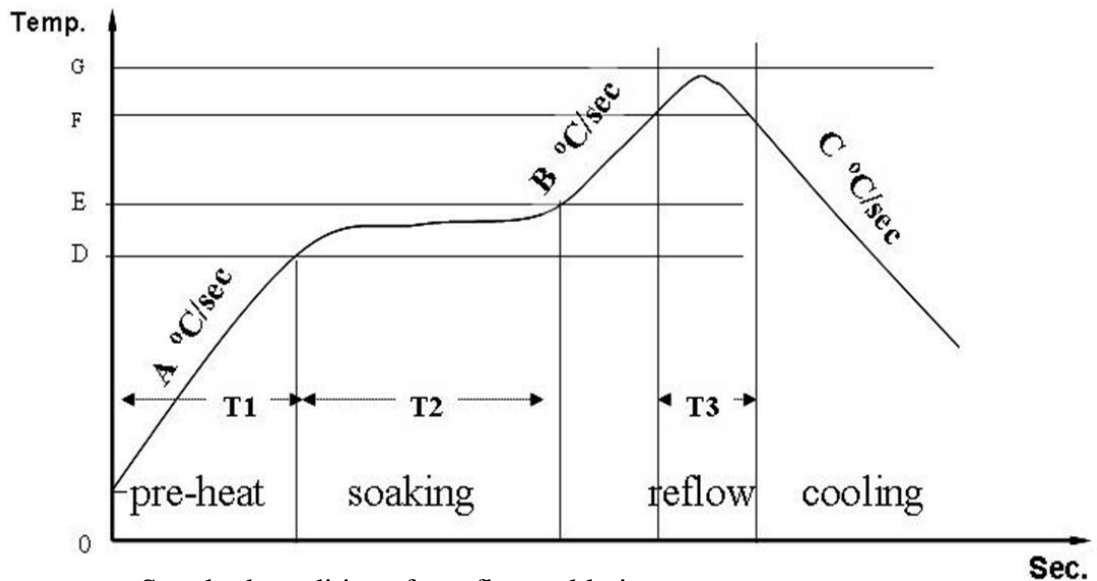
◆ **MODULE DIMENSION**



◆ RECOMMENDED FOOTPRINT



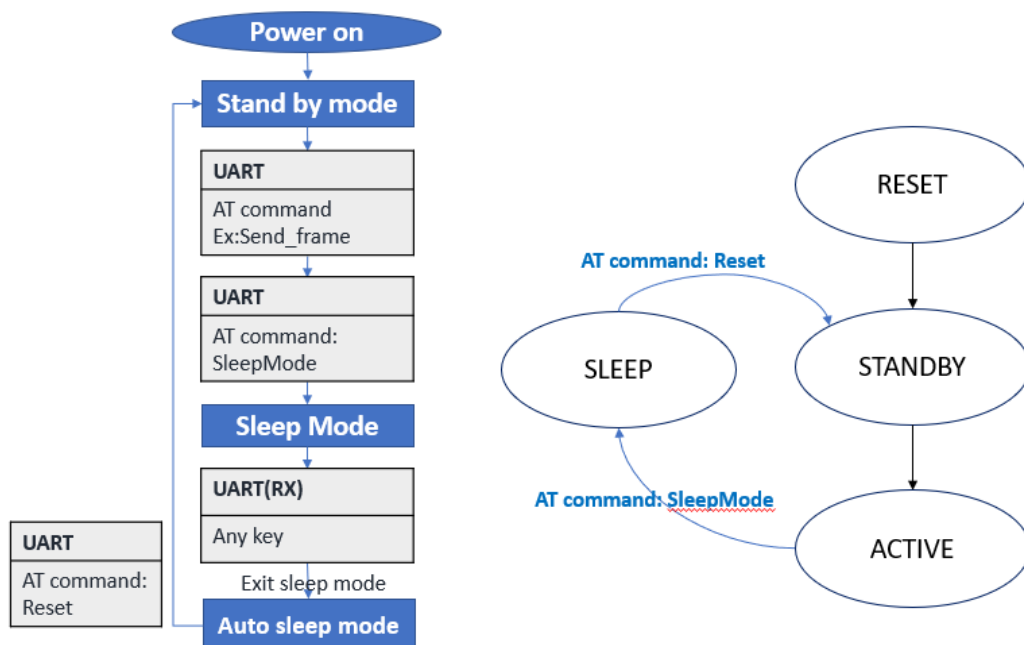
◆ RECOMMENDED REFLOW PROFILE



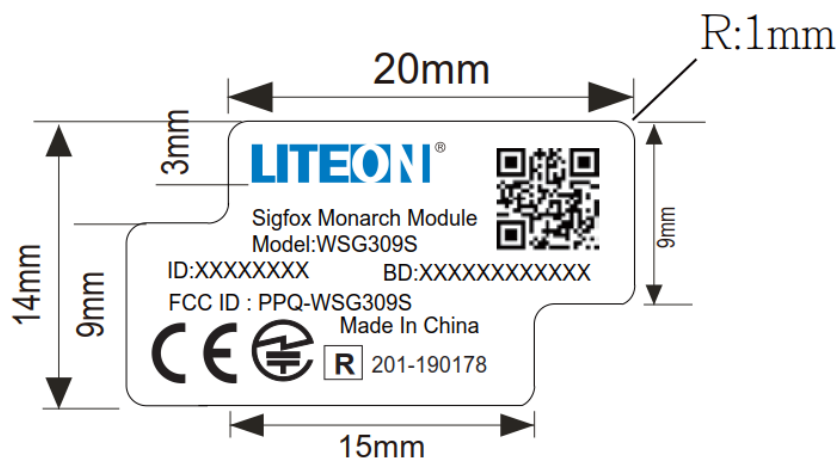
Standard conditions for reflow soldering:

- a. Pre-heating Ramp (A) (Initial temperature: 150°C): 1~2.5°C/sec;
- b. Soaking Time (T2) (150°C~180°C): 60sec~100sec;
- c. Peak Temperature (G): 230~250°C;
- d. Reflow Time (T3) (>220°C): 30~60 sec;
- e. Ramp-up Rate (B): 0~2.5°C/ sec;
- f. Ramp-down Rate (C): 1~3°C/ sec.

◆ FLOW OF STANDBY/SLEEP MODE



◆ LABEL DRAWING



备注：

条码使用二维码QR CODE 等级为B级以上，尺寸为5*5mm

条码显示内容为三行（由业务提供）

XXXXXXXX(8码ID)

XXXXXXXXXXXXXXXXXXXX(16码PAC)

XXXXXXXXXXXX(12码BD)

◆ CHANGE LIST

Rev	Date	Author	Change List
V1.0	2019.03.26	Kaysa Lee	Preliminary (official)
V1.1	2019.06.28	Kelly Hsu	Update Sigfox Verified Certificate
V1.2	2019.08.02	Kelly Hsu	Modify Module Pinout and Pin Definition Add Flow of Standby/Sleep mode Add Label Drawing
V1.3	2019.12.18	Kelly Hsu	Update Sleep Mode Power Consumption Add Bluetooth Profile Support List Update Product Specifications Update AT Command List Update Label Drawing
V1.4	2020.05.04	Kelly Hsu	Modify Pin Definition
V1.5	2020.08.13	Kelly Hsu	Modify Sigfox Verified Certificate