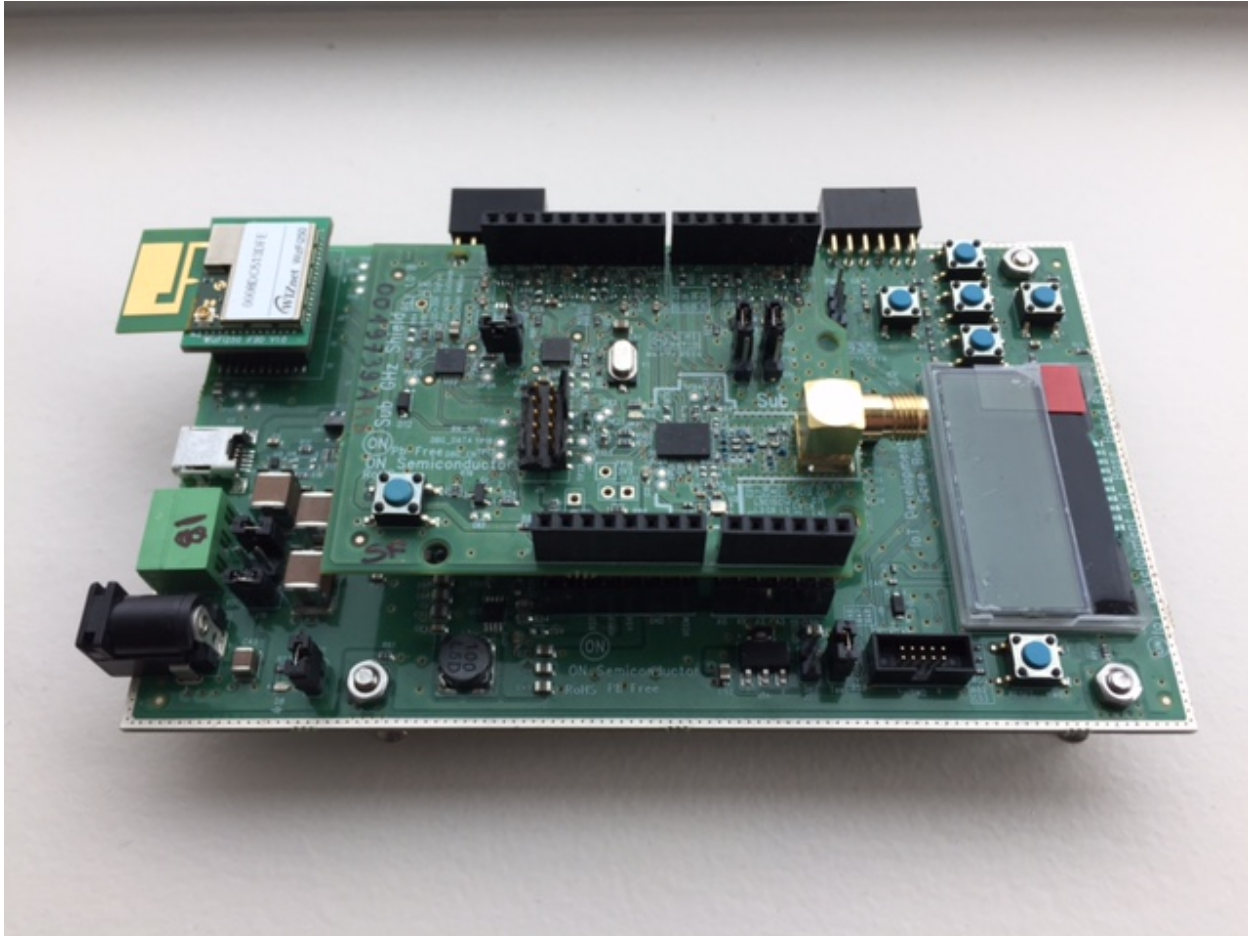




Test Procedure for the SIGFOX-GEVB Evaluation Board

Step 1:

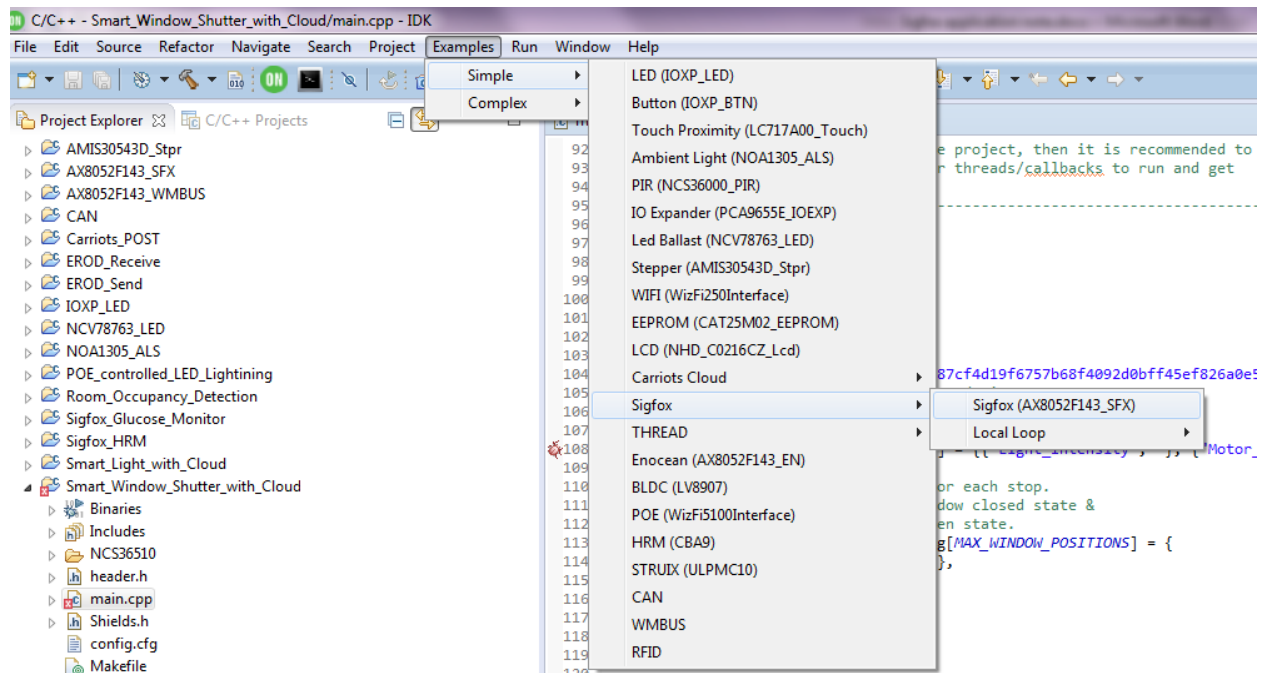
Connect the ON Semiconductor Sigfox shield on top of a ON Semiconductor Base Board.





Step 2:

Follow instruction to get the Sigfox example Software loaded in the IDE:





Step 3:

The firmware should include the read_out for PAC and Device_ID info readout.
(PAC is a 16 digits Hexadecimal number; DEVICE ID is a 8 digits Hexadecimal Number)

// GET PAC Info

```
sfx.getChipInfo(PAC, sfxBuff, USR_BUFFER_SIZE);
sprintf(dataBuf, "PAC = %s\r\n", sfxBuff);
lcd.displayString(dataBuf);
pc.printf("Sigfox PAC = %s\r\n", sfxBuff);
sfx.cleanBuffer(dataBuf, USR_BUFFER_SIZE);
sfx.cleanBuffer(sfxBuff, USR_BUFFER_SIZE);
wait(2);
```

// GET DEVICE_ID Info

```
sfx.getChipInfo(DEVICE_ID, sfxBuff, USR_BUFFER_SIZE);
sprintf(dataBuf, "DEVICE_ID = %s\r\n", sfxBuff);
lcd.displayString(dataBuf);
pc.printf("Sigfox DEVICE_ID = %s\r\n", sfxBuff);
sfx.cleanBuffer(dataBuf, USR_BUFFER_SIZE);
sfx.cleanBuffer(sfxBuff, USR_BUFFER_SIZE);
wait(2);
```

Comment out the following transmission section as your account has not yet been activated:

```
75 //Max number of messages that can be sent to sigfox cloud is 140
76 //This limit of 140 messages is limited by sigfox protocol and not the application
77 //the application or library
78 // while (count < MAX_SFX_TX) {
79 //     sprintf(dataBuf, "ONsemi %d", count);
80 //     lcd.displayString(dataBuf);
81
82 //param1: Const char data(max of 12 bytes), param2: downlink(1)/no downlink(0)
83 //param3: buffer to contain downlink if expected, param4: size of downlink buffer
84 //Max bytes to be sent is restricted by the AT command of sigfox firmware and not
85 //the library/application
86 // sfx.sendFrame(dataBuf, 0, sfxBuff, USR_BUFFER_SIZE);
87 // count++;
88 // wait(2);
```

On LCD:

[illegible]



Step 4 (Optional: Should have been completed by default):

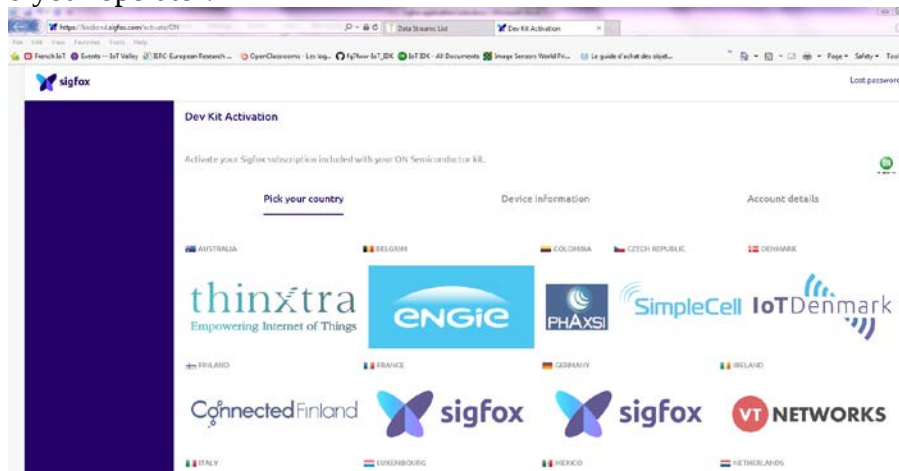
Ask your ON Semiconductor marketing contact to get your device activated through Sigfox by providing your representative with the PAC and Device_ID information.

Step 5:

Once activation confirmed by Sigfox (through ON Semiconductor Marketing) create and activate your Sigfox account.

<https://backend.sigfox.com/activate/ON>

Select country and your operator:



Enter Device ID and PAC info when prompted:

Complete registration information and submit.



A password creation link will be sent to you for next log on.





Step 6:

Back to the Firmware and the IoT Kit:

In order to avoid consumption of your daily 140 message maximum (6 Messages per hour)

Modify the code so that messages are only sent twice per reset of the board:

```

31 #include "mbed.h"
32 #include "Shields.h"
33
34 #define USR_BUFFER_SIZE      128
35 #define SFX_RET_SUCCESS      0
36 #define DATA_BUFFER_SIZE    12
37 #define MAX_SFX_TX           2 // Note : the maximum Frame per days is 140 and the max Frame per hour is 6
38

```

At the send frame section re-establish code section and modify the frame to be sent with "0011223344"

```

74
75 //Max number of messages that can be sent to sigfox cloud is 140
76 //This limit of 140 messages is limited by sigfox protocol and not the application
77 //the application or library
78 while (count < MAX_SFX_TX) {
79     sprintf(dataBuf, "ONsemi %d", count);
80     lcd.displayString(dataBuf);
81
82     //param1: Const char data(max of 12 bytes), param2: downlink(1)/no downlink(0)
83     //param3: buffer to contain downlink if expected, param4: size of downlink buffer
84     //Max bytes to be sent is restricted by the AT command of sigfox firmware and not
85     //the library/application
86     sfx.sendFrame("0011223344", 0, sfxBuff, USR_BUFFER_SIZE);
87     count++;
88     wait(2);
89 }
90
91 lcd.displayString("Max.Msg:2. Exiting....\r\n");
92 pc.printf("Maximum message limit of 2 reached. Exiting....\r\n");
93 return SFX_RET_SUCCESS;
94 }
95

```

Flash it to the shield:

```

D:\OnSemiconductor\IDK\Flash_utility.exe
opening port : \\.\COM7
open_serial_port : opening of serial port successful
Please reset the board : 98
Board detected
Started flashing
.....
flash Upgraded -> Reset the board
opening port : \\.\COM7
open_serial_port : opening of serial port successful

```



Step 7:

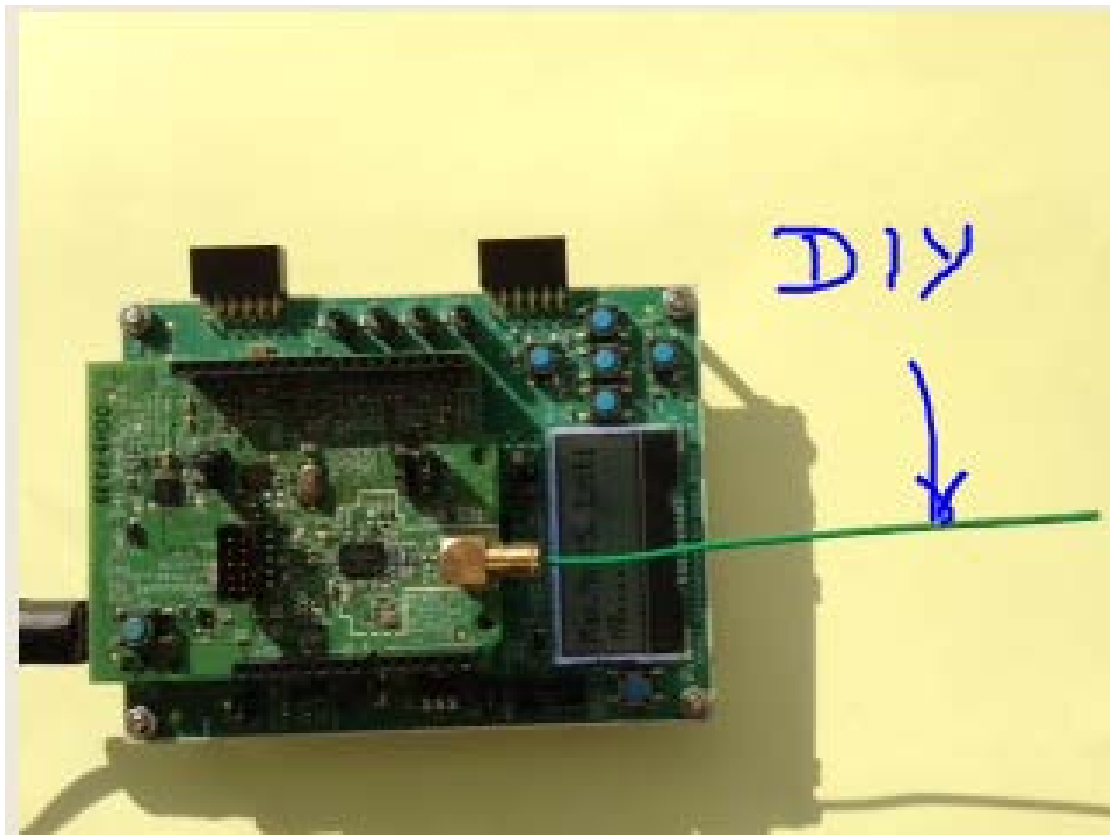
Make your DIY $\frac{1}{4}$ wave antenna:

$F = 867\text{MHz} \Rightarrow \text{Lambda} = 34\text{cm}$

Cut a piece of electric wire with section similar to the SMA connector central hole.

Wire length is 9cm and remove 5mm of plastic envelope:

This antenna is only 1dB less efficient than of-the-shelf products so it should not affect the connection capability of the kit.





Step 8:

Reset the Board; Communication is started (2 loops)

Step 9:

Log to the Sigfox Backend web site: <https://backend.sigfox.com/welcome/news>

Using the credentials established in [step 5](#).

Go to DEVICE TAB and select your device:

Sigfox - Reinvent radio communication

DEVICE DEVICE TYPE USER GROUP

Device - List

Id

State

Average SNR (all)

Count: 2 / 2

page 1

Average Rssi	Communication status	Id	Last seen	Name	PAC	Product certificate	Protocol version
-120.63		197399	2017-02-08 13:32:00	Device 00197399			V1
-95.22		19739A	2017-02-07 18:01:06	Device 0019739A			V1

page 1

RSSI and SNR perf quasi identical to Commercial antenna show that your device has transmitted message to Sigfox infrastructure; Click on your device ID



Select the MESSAGE tab:

Device 19739A - Messages

From date

To date

page 1

Time	Data / Decoding	Location	Link quality	Callbacks
2017-02-08 13:44:59	4f4e53656d692039 ASCII: ONSemi 9			
2017-02-08 13:44:49	4f4e53656d692038 ASCII: ONSemi 8			
2017-02-08 13:44:39	4f4e53656d692037 ASCII: ONSemi 7			
2017-02-08 13:44:30	4f4e53656d692036 ASCII: ONSemi 6			
2017-02-08 13:44:20	4f4e53656d692035 ASCII: ONSemi 5			
2017-02-08 13:44:10	4f4e53656d692034 ASCII: ONSemi 4			
2017-02-08 13:44:00	4f4e53656d692033 ASCII: ONSemi 3			
2017-02-08 13:43:50	4f4e53656d692032 ASCII: ONSemi 2			
2017-02-08 13:43:40	4f4e53656d692031 ASCII: ONSemi 1			
	4f4e53656d692030			

Step 10:

View your message stored on SIGFOX Cloud:

To date

page 1

Time	Data / Decoding	Location	Link quality	Callbacks
2016-09-26 16:01:19	1234567890			
2016-09-26 16:01:03	1234567890			
2016-09-26 15:57:00	1234567890			
2016-09-26 15:56:45	1234567890			
2016-09-26 15:55:15	1234567890			
2016-09-26 15:54:59	1234567890			
2016-09-26 15:39:26	00112233ee			
2016-09-26 15:39:11	00112233ee			
2016-09-26 15:36:46	0011223344			
2016-09-26 15:36:30	0011223344			
2016-09-26 13:55:51	0011223344			
2016-09-26 13:55:40	0011223344			
2016-09-26 13:55:30	0011223344			
2016-09-26 13:55:19	0011223344			
2016-09-26 13:55:04	0011223344			

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Max, Msg:2. Exit!
n9.....

