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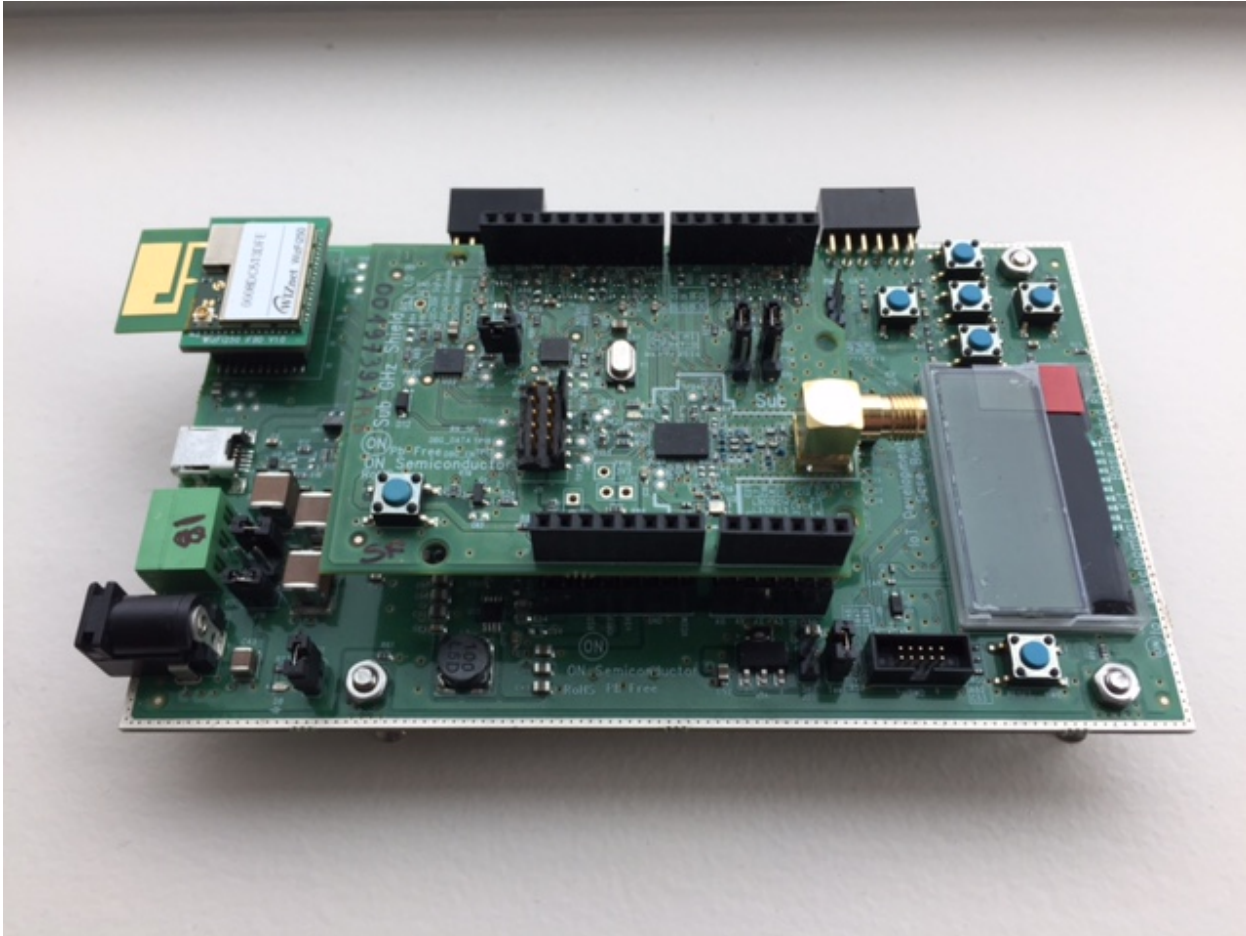




Test Procedure for the SIGFOX-GEVB Evaluation Board

Step 1:

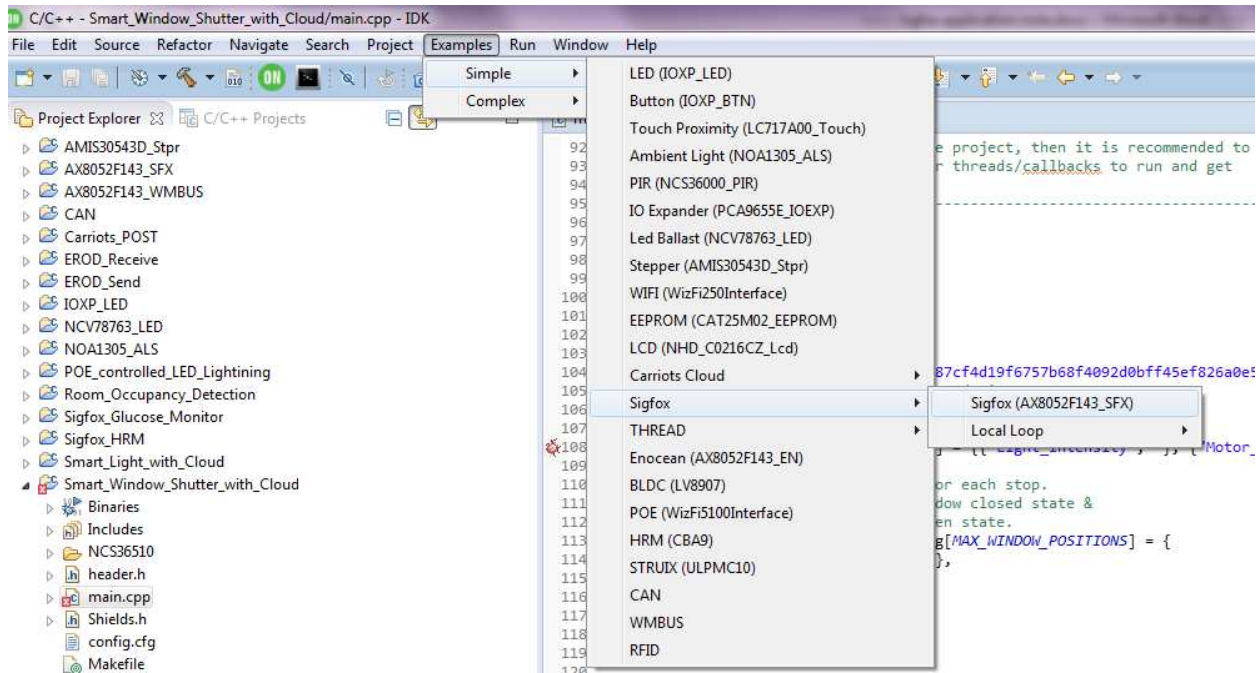
Connect the ON Semiconductor Sigfox shield on top of a ON Semiconductor Base Board.





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);
```



Flash the code to your device and enable it so that it will read out the codes:
On LCD:



(Alternatively) on Console:

```
open_serial_port : opening of serial port successful
Please reset the board : 94
Board detected
Started flashing
.....
Flash Upgraded -> Reset the board
opening port : \\.\COM7
open_serial_port : opening of serial port successful
" α~α~α~p~α~α~α~"Sample Sigfox program
SOFTWARE_VERSION = $ION = $ION = 0x 1.1.0-ETSI
Sigfox PAC - 6DD2923DAD
Sigfox DEVICE_ID - 00197399
-
41 #H0_C0216C2 lcd; //Initia
42
int main() {
```

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

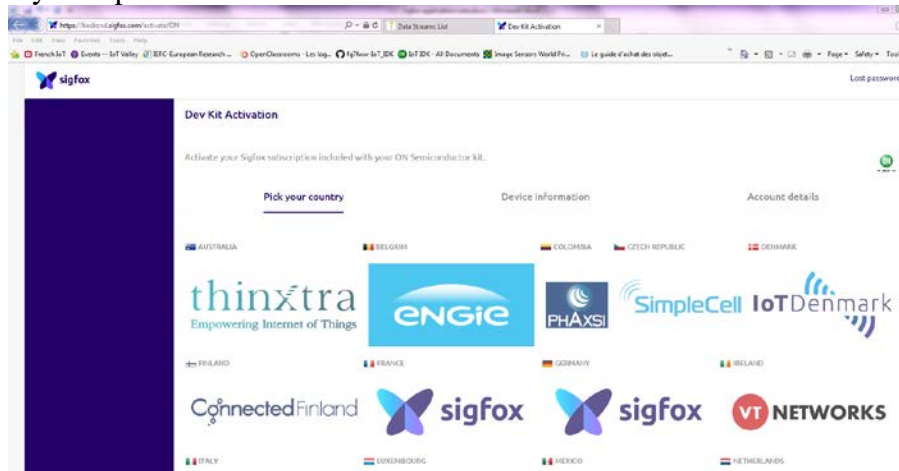
Ask your ON Semiconductor marketing contact to get your device activated through Sigfox by providing your representative with the PAC and Device_ID information.

Step 5:

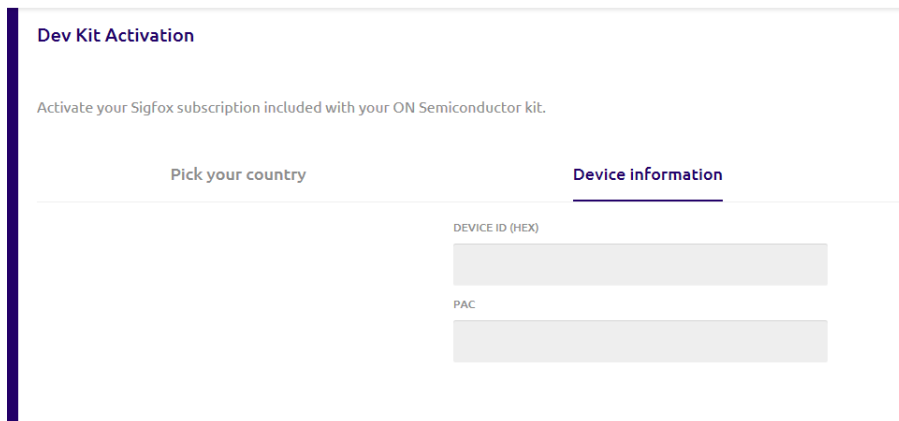
Once activation confirmed by Sigfox (through ON Semiconductor Marketing) create and activate your Sigfox account.

<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.

How to set your password
SIGFOX <backend-noreply@sigfox.com>
Sent: Mon 9/26/2016 1:38 PM
To: Bruno Damien

 **SIGFOX**
One network. A billion dreams.


Hi ,

To set your password, click on the following link :
[https://backend.sigfox.com/auth/change-evk-password?id=\[redacted\]e17-4d89-a97b-\[redacted\]](https://backend.sigfox.com/auth/change-evk-password?id=[redacted]e17-4d89-a97b-[redacted])

You will be asked to enter your new password.
This link is valid until 2016-09-27 11:38:03 (GMT +00:00). After this period, you can get a new one by clicking on the "Lost password" link.

Thanks,
SIGFOX Team

SIGFOX Cloud : <https://backend.sigfox.com>
Web site : <http://www.sigfox.com>


Bâtiment E-volution
425, rue Jean Rostand
31670 Labège, FRANCE



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:

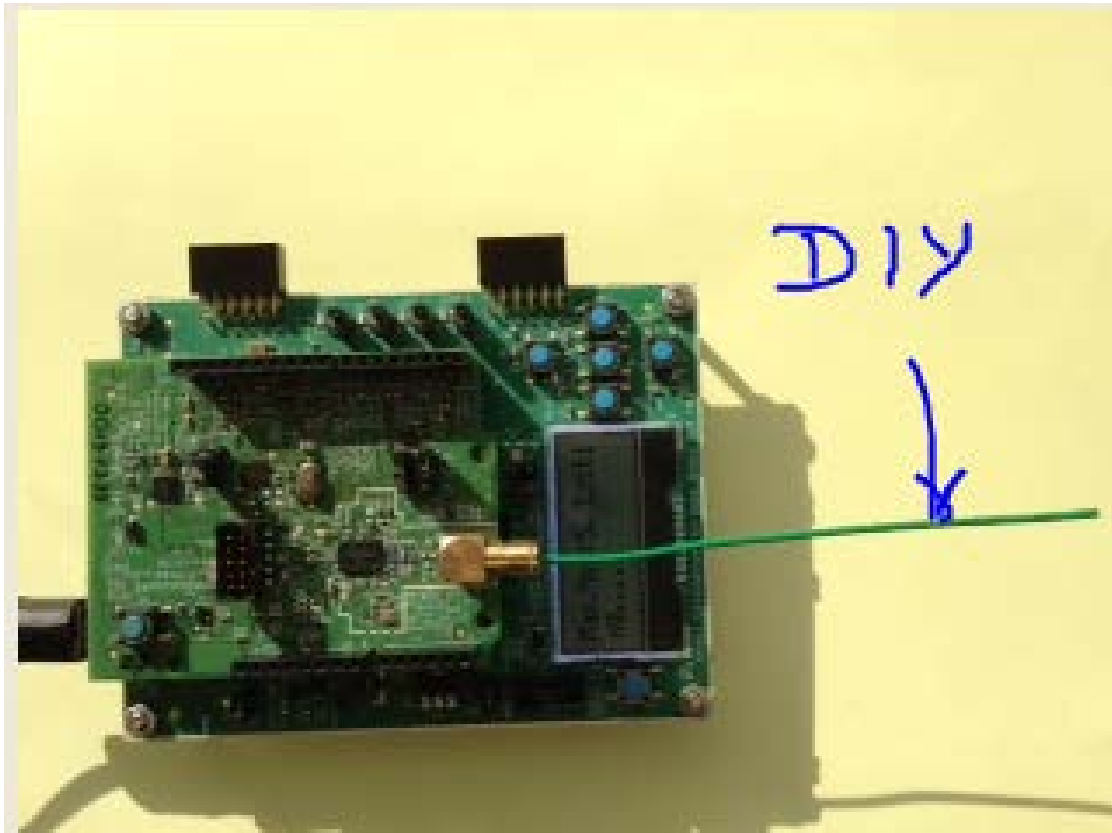
Make your DIY ¼ wave antenna:

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

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

sigfox

DEVICE DEVICE TYPE USER GROUP

Device - List

Id

State All

Average SNR (all) 5 dB 50 dB

Count: 2 / 2

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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

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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:

sigfox

DEVICE DEVICE TYPE USER GROUP

Device 19739A - Messages

From date

To date

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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

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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	001122330e			
2016-09-26 15:39:11	001122330e			
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: 12. Exit: 1
msg:

ON Semiconductor®

