iBeacon Demo User's Guide

iBeacon_Application_Getting_Started_Guide

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1. Overview

This document explains how to setup an iBeacon demo using SAML21 Xplained Pro and BM71-XPro. This document briefly talks about setting up hardware, building application, programming the firmware and running a demo.

The iBeacon-Demo application showcases a proof-of-concept example of using the **ble_host_sdk** to setup BM71-XPro modules as an iBeacon. The iBeacon-Demo application initializes the BM71-XPro module as a proximity beacon (iBeacon).

The iBeacon will be broadcasted for every 100 ms in all three advertising channels and it can be configured in application.h file. The proximity UUID, Major and Minor numbers can also be configured in application.h file.
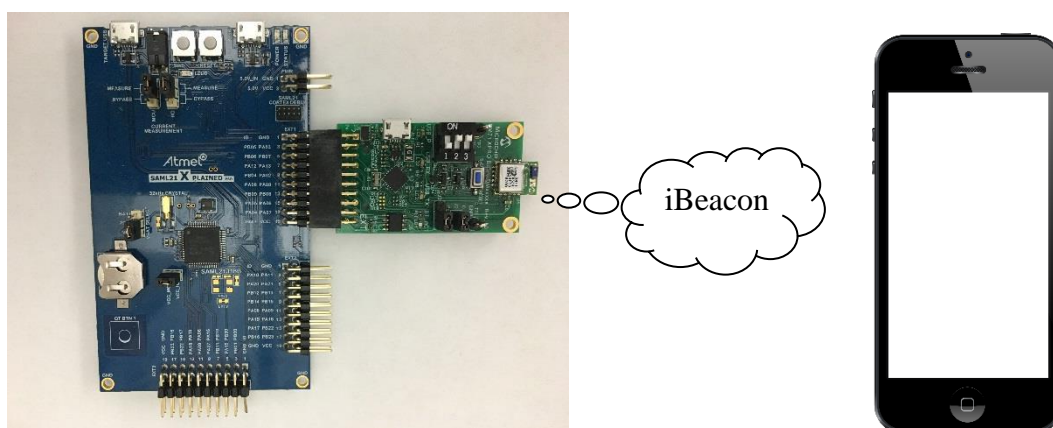

Figure 1: BM71-XPro sends iBeacon and SmartConnect APP scans iBeacon

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The following table provides the iBeacon parameter in detail,

Parameter	Value
Company ID	0x4c, 0x00
Beacon Type: Proximity UUID	0x02, 0x15
Proximity UUID	0x21, 0x8a, 0xf6, 0x52, 0x73, 0xe3, 0x40, 0xb3, 0xb4, 0x1c, 0x19, 0x53, 0x24, 0x2c, 0x72, 0xf4
Major	0x00, 0xBB
Minor	0x00, 0x45
Measured Power	0xc5

Note: Details about the iBeacon can be found in Proximity Beacon Specification from Apple.
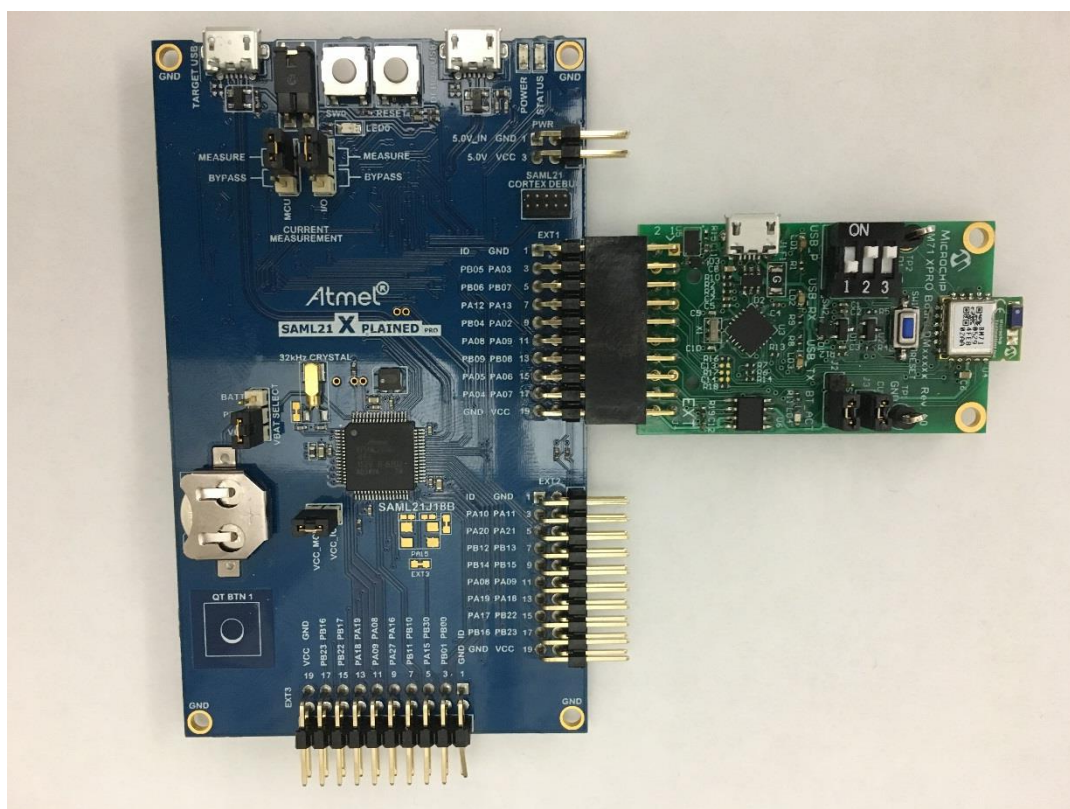
1.1. Hardware Setup

Figure 2: BM71-XPro connected on EXT1 of SAML21 Xplained Pro

1. Plugin the BM71-XPro board into EXT1 of SAML21 Xplained Pro board as shown in Figure 2.
2. Connect the SAML21 Xplained Pro board to the host PC using micro USB cable.

1.2. Smart Phone Application

You can download the Smart Connect App for Android or iOS phones, from the following links.

iOS: https://itunes.apple.com/us/app/microchip-smartconnect/id1240153044?mt=8

Android: https://play.google.com/store/apps/details?id=com.microchip.bleanalyser&hl=en

1.3. Console

The iBeacon application uses the Universal Asynchronous Receiver/Transmitter (UART) interface on SAML21 Xplained Pro board to send the status messages. Any serial application (ex: TeraTerm) can be used to interact with SAML21 Xplained Pro.

UART (COM port) settings.

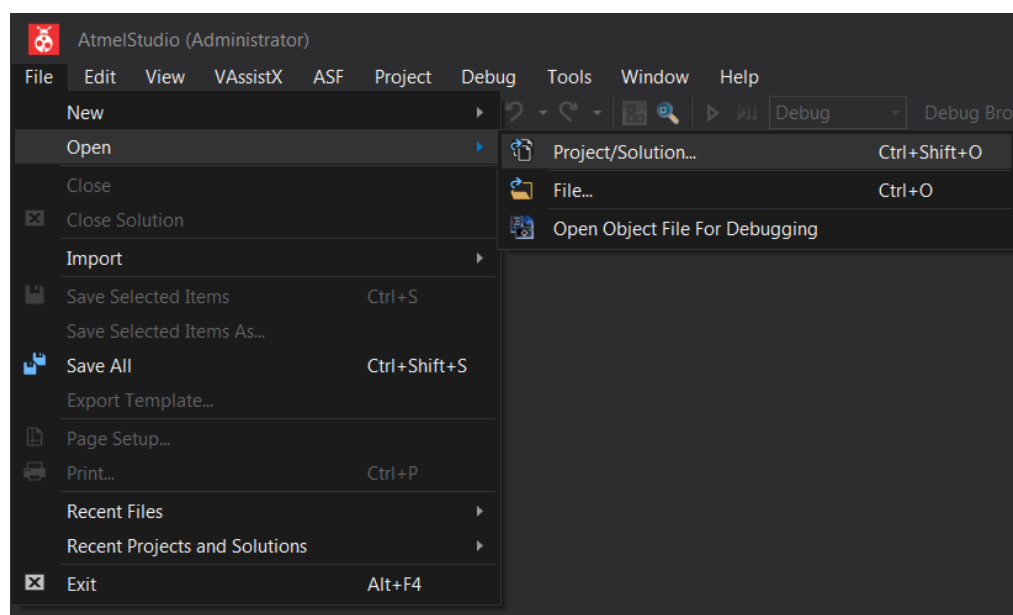|	
Baud rate	115200
Data	8 bits
Parity	none
Stop	1 bit
Flow control	none

2. Build Procedure

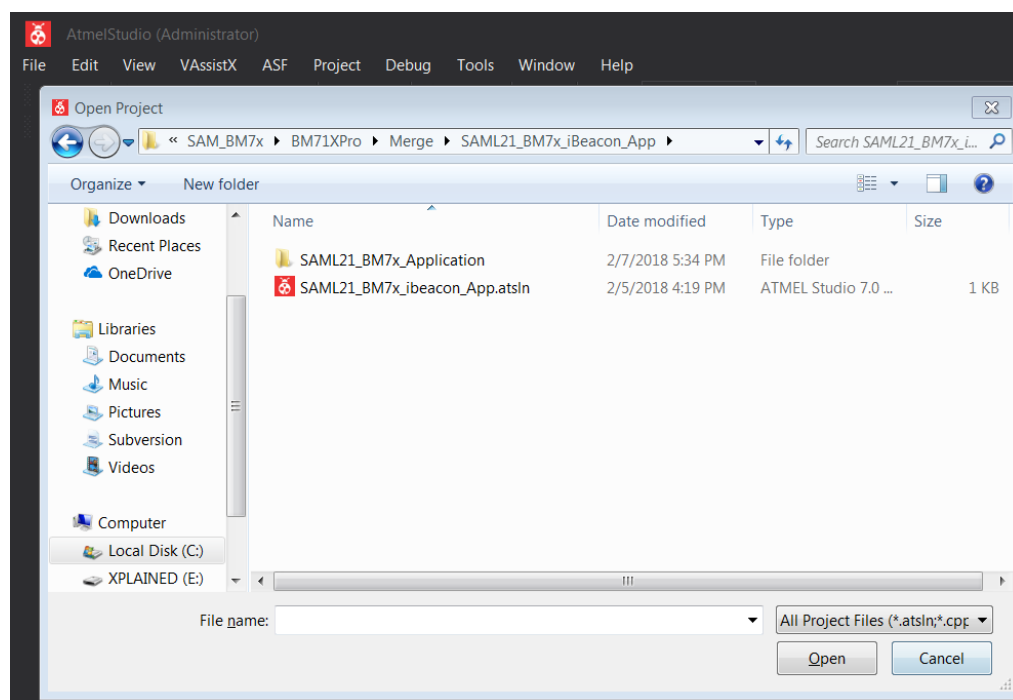This section describes the build procedure of iBeacon application on Atmel Studio 7.

2.1. Open Atmel Studio 7

2.2. Open iBeacon Application

1. Go to menu **File → Open → Project/Solution**

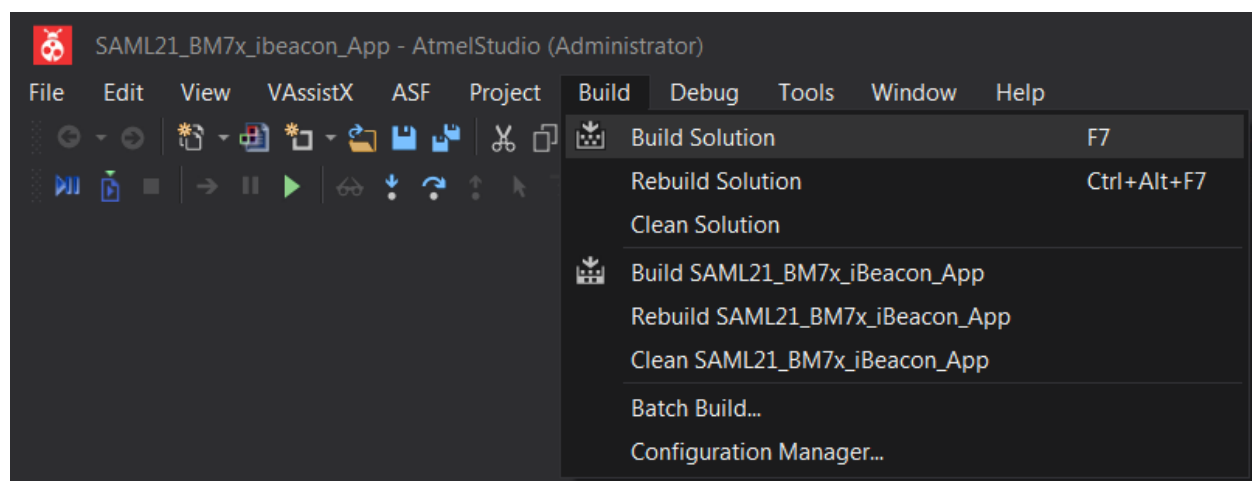2. Select "SAML21_BM7x_ibeacon_App.atsln" and press **Open**.
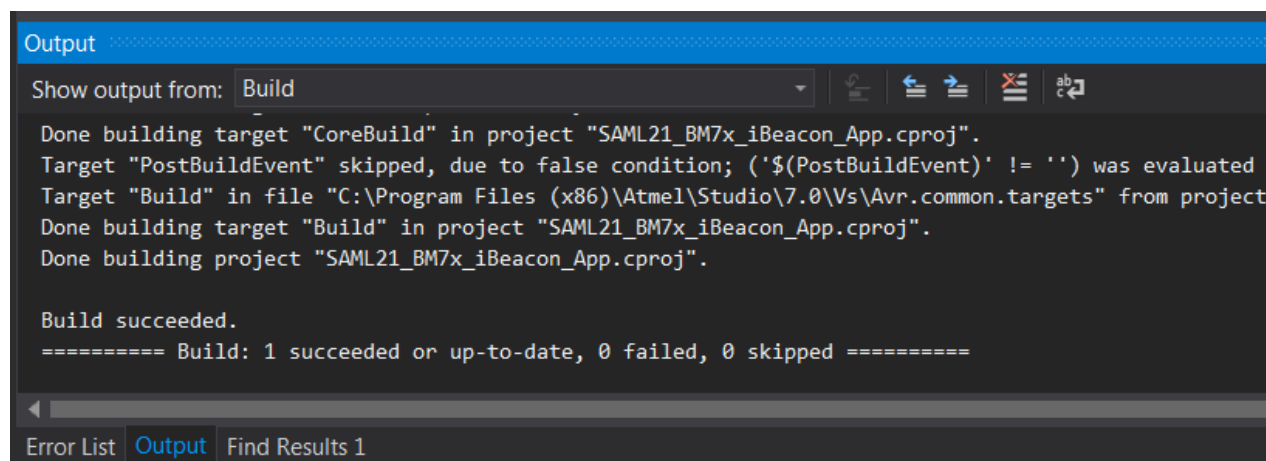
3. Once the project is opened, you can see the files attached to this project in Solution Explorer Window

2.3. Build iBeacon Application

1. Go to menu Build → Build Solution or Press F7

2. Build status can be checked in "Output" window

3. You can find the Hex images in "..\SAML21_BM7x_Application\Debug".

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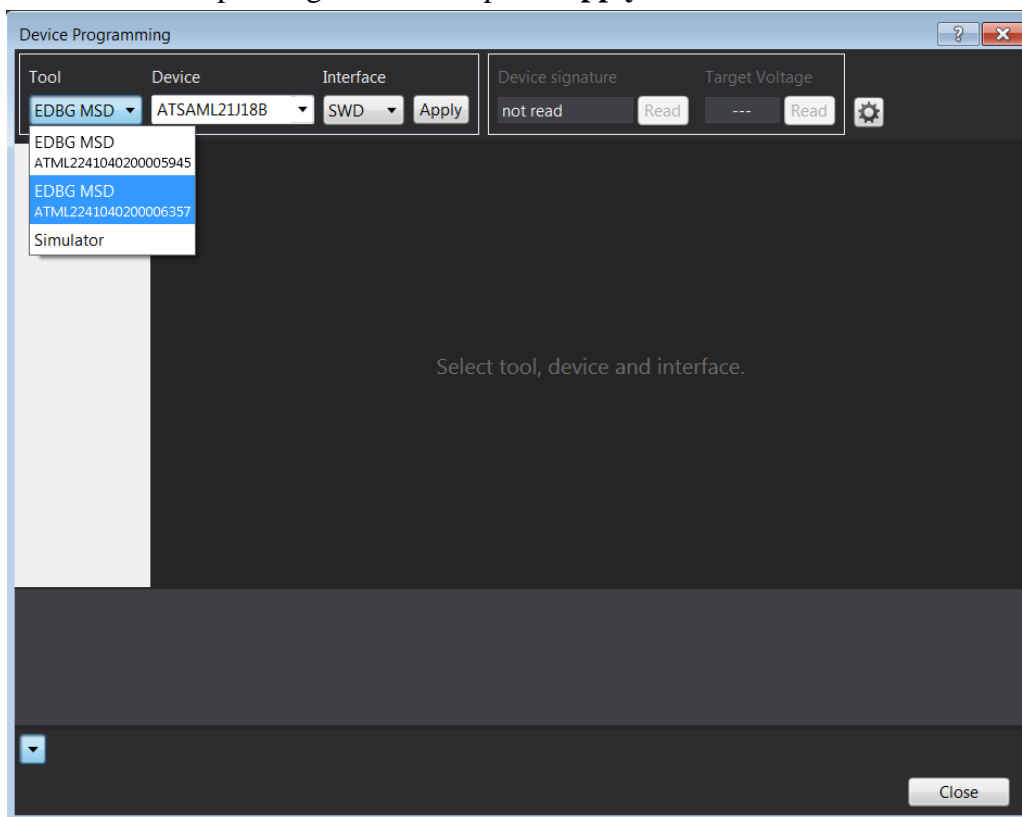
3. Programming Firmware

This section describes the procedure to program iBeacon firmware on SAML21 Xplained Pro board.

1. Connect the SAML21 Xplained Pro board to the host PC using micro USB cable. Perform the following steps:
    a. Verify that the virtual COM port is enumerated on the host PC.
    b. Make sure that POWER LED (green) is solid ON.
2. To program the HEX files into the SAML21, go to menu **Tools → Device Programming** or Press **Ctrl + Shift + P**.
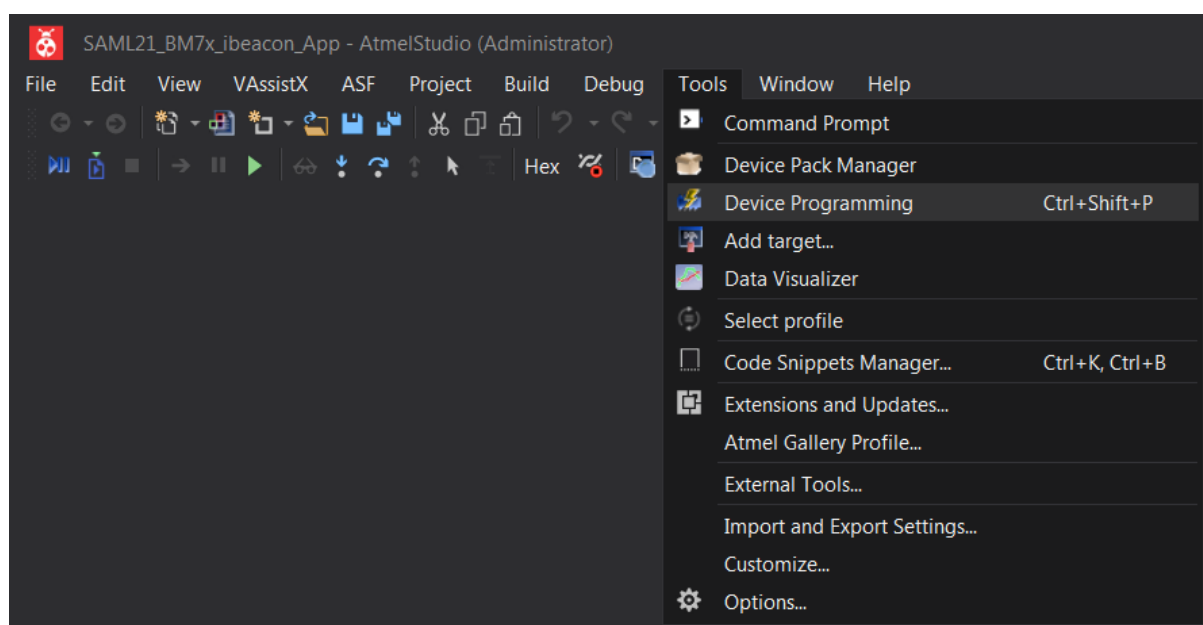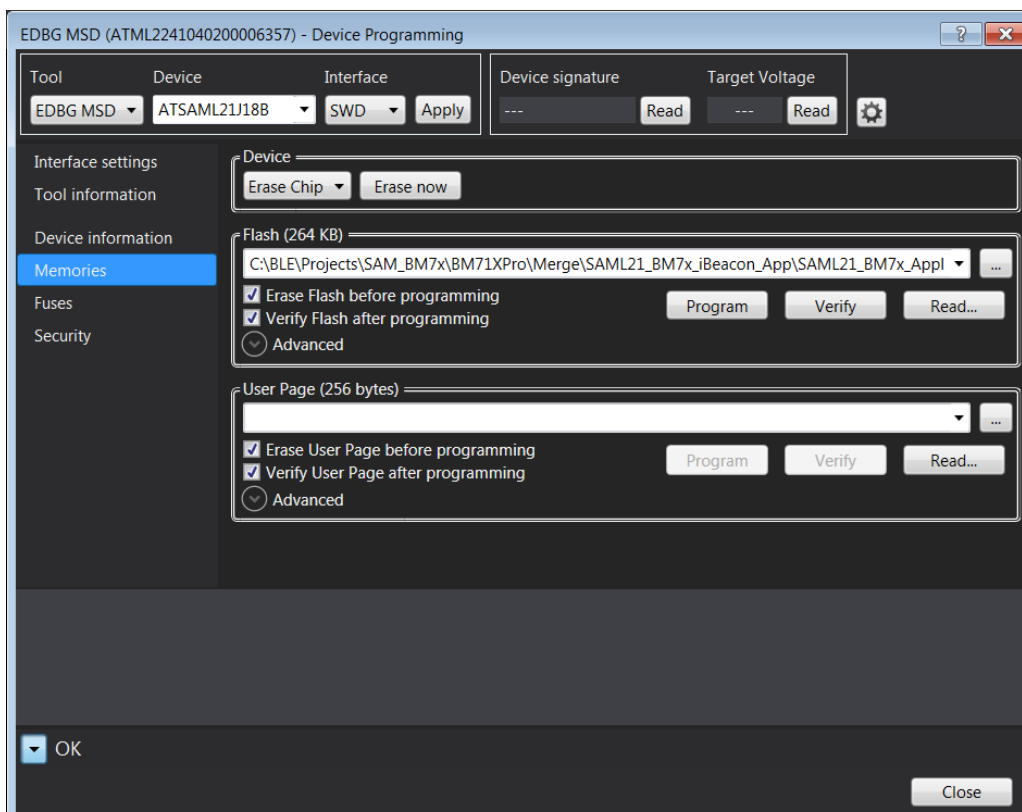
3. Select the corresponding **EDBG** and press **Apply**.

4. Go to Memories Tab and select Hex file.

5. Press Program, the tool will program SAML21. You can check the status of programming.
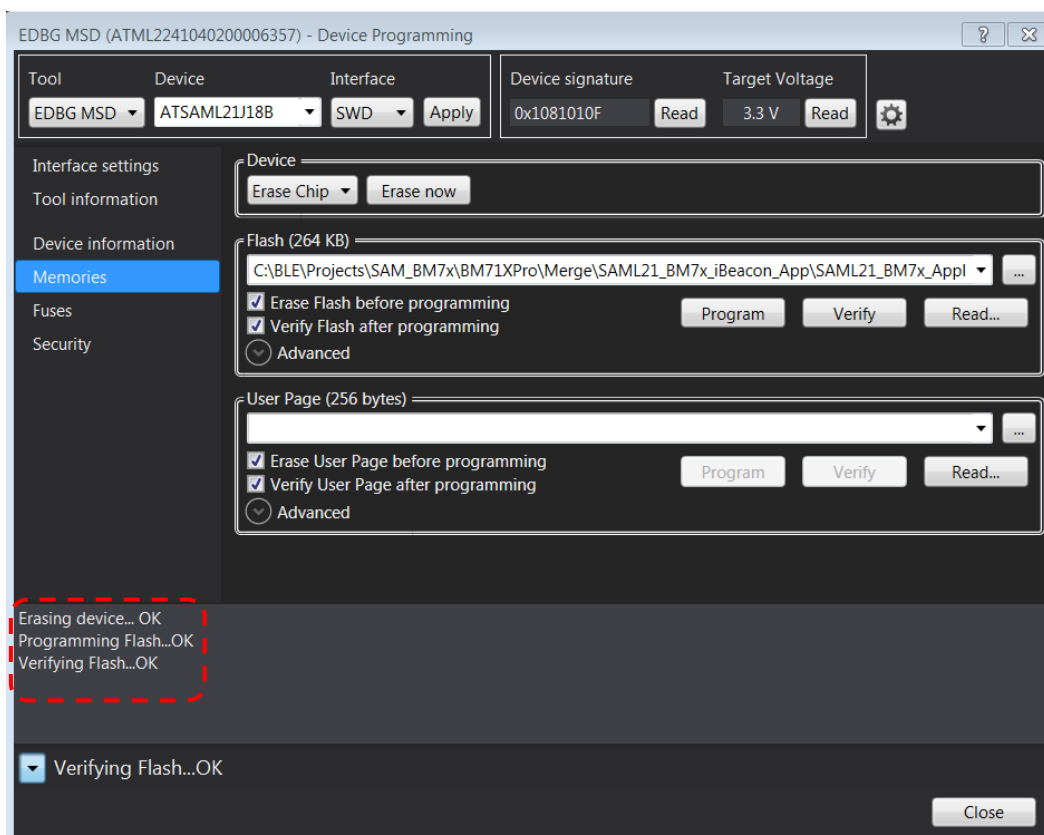
6. Once programming is done, close the Device Programming window.

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4. Running iBeacon Demo

This section describes the iBeacon demo procedures.

1. Connect BM71-XPro on EXT1 of SAML21 Xplained Pro board.
2. Connect the SAML21 Xplained Pro board to the host PC using micro USB cable. Perform the following steps:
   a. Verify that the virtual COM port is enumerated on the host PC.
   b. Open the enumerated COM port on a serial terminal application like TeraTerm with the following settings:

Baudrate	115200
Data	8 bits
Parity	none
Stop	1 bit
Flow control	none

   c. Make sure that POWER LED (green) is solid ON.
   d. Press Reset button and verify that LD4 (blue) on BM71-XPro is blinking at a regular interval.
3. Download and install the Microchip SmartConnect App on either the Apple or Android device using the links below:

   iOS: https://itunes.apple.com/us/app/microchip-smartconnect/id1240153044?mt=8

   Android: https://play.google.com/store/apps/details?id=com.microchip.bleanalyser&hl=en
4. Open the SmartConnect App to scan for the iBeacon
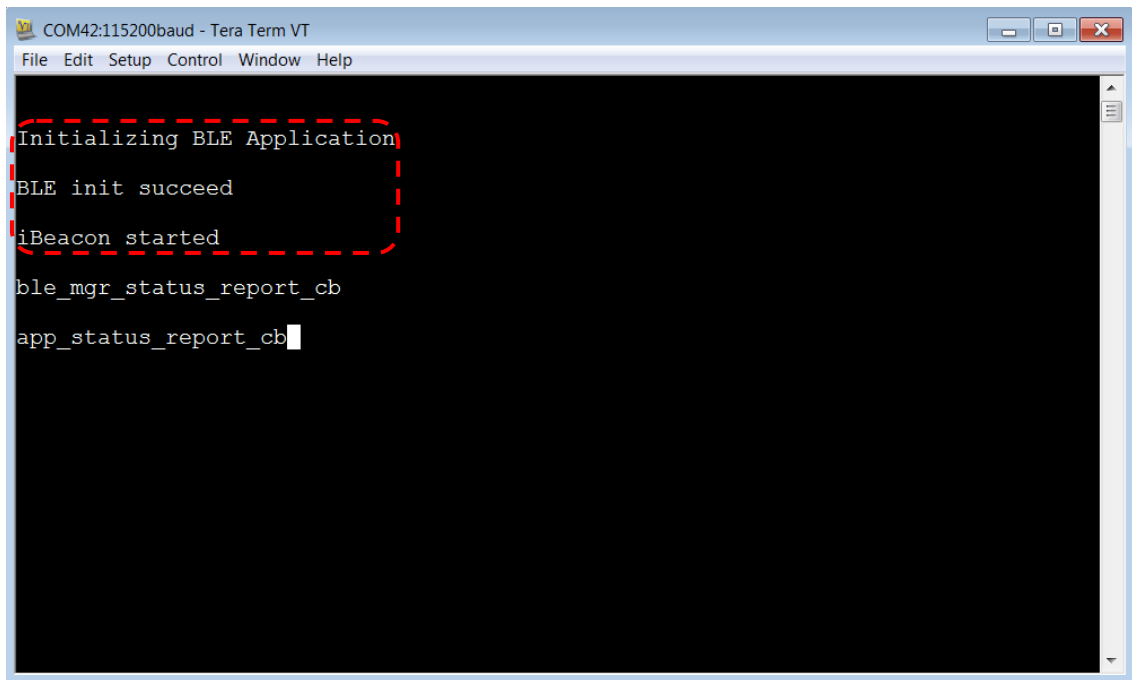
Bluetooth Smart   Beacon Ranging

5. Select Beacon Ranging to scan for iBeacon
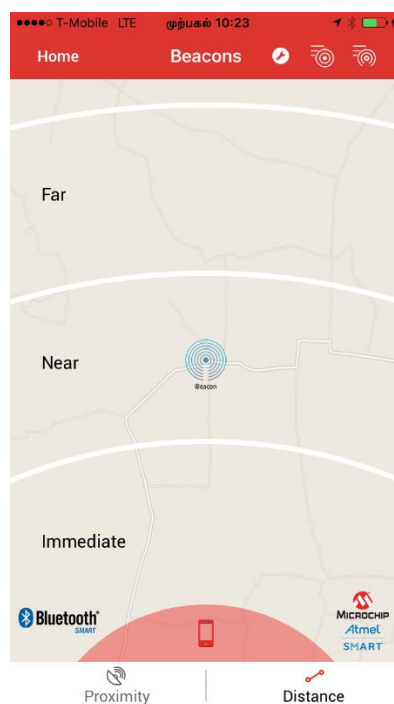6. Ensure that the iBeacon device is beaconing by checking the TeraTerm window for advertising status message.

7. Press Beacon Ranging on SmartConnect App, it will open up Beacon Radar and find the beacons in vicinity.
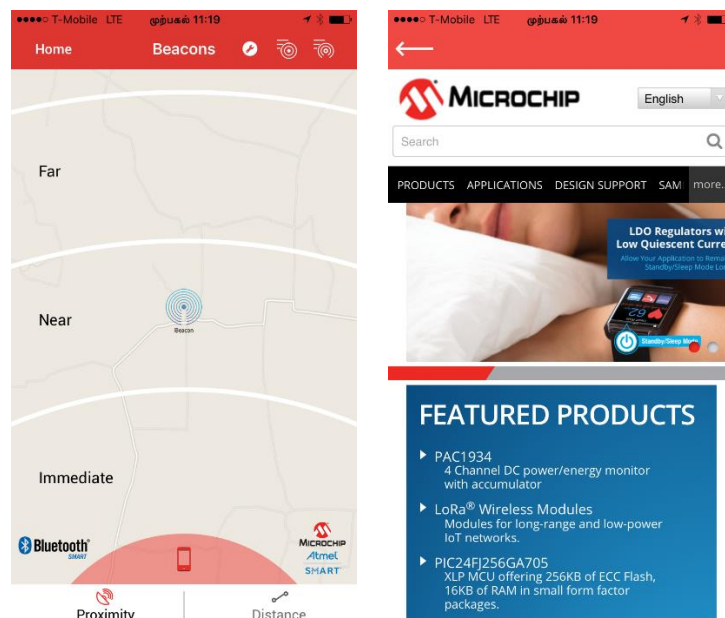
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8. Click on the beacon will show the UUID, Major, Minor and RSSI details
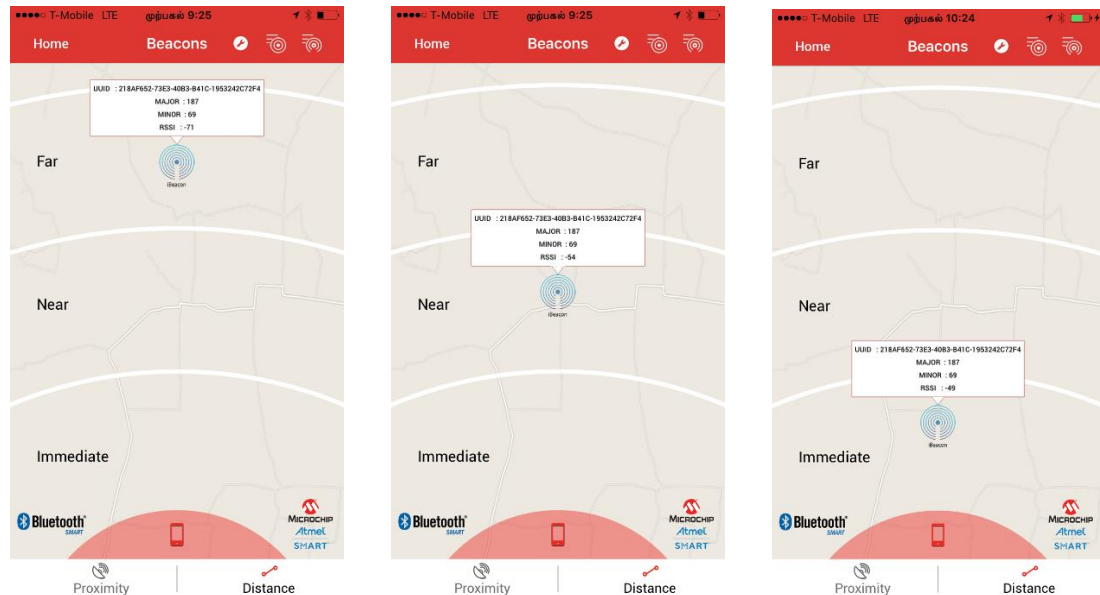
9. If the SmartConnect APP finds beacon in Immediate zone when it is in Proximity mode, then the it will reach out to Microchip website.

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