

# User Manual

## DA16600 EVK PRO

### UM-WI-041

#### **Abstract**

This document describes how to set-up and use the DA16600 EVK PRO (504-02-A) with the Wi-Fi IoT Power Profiler toolbox. This document explains the calibration process step-by-step for the DA16600 development kits.

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 DA16600 EVK PROEVK PRO

## Contents

<b>Abstract</b> .....	<b>1</b>
<b>Contents</b> .....	<b>2</b>
<b>Figures</b> .....	<b>2</b>
<b>1 Terms and Definitions</b> .....	<b>3</b>
<b>2 References</b> .....	<b>3</b>
<b>3 Current Measurement</b> .....	<b>4</b>
3.1 Test Setup .....	4
3.2 DA16600 EVK PRO (504-02-A) .....	5
3.3 Wi-Fi IoT Power Profiler .....	6
3.4 Wi-Fi IoT Power Profiler Setup .....	6
3.5 Measurements .....	8
3.6 Manual Calibration .....	9
<b>Revision History</b> .....	<b>11</b>

## Figures

Figure 1: Hardware Setup with DA16600 EVK PRO.....	4
Figure 2: Setup DA16600 EVK Jumper.....	4
Figure 3: DA16600 EVK PRO(504-02-A) .....	5
Figure 4: Virtual COM Port Selection Window .....	6
Figure 5: Power Profiler of SmartSnippets Toolbox Main Window .....	7
Figure 6: Power Profiler Configuration .....	7
Figure 7: Power Profiler Chart Settings .....	8
Figure 8: Free Running Capture.....	8
Figure 9: Consumption Measurement by Using Chart Controls.....	9
Figure 10: Setting Offset to Zero .....	9
Figure 11: Setting Calibration Offset .....	10

## 1 Terms and Definitions

DPM	Dynamic Power Management
AP	Access Point
USB	Universal Serial Bus
UART	Universal Asynchronous Receiver-Transmitter
RTC	Real Time Clock
WPS	Wi-Fi Protected Setup
SSID	Service Set Identifier
SDK	Software Development Kit
ARP	Address Resolution Protocol

## 2 References

- [1] DA16200, Datasheet, Dialog Semiconductor
- [2] UM-WI-023, DA16200, EVK User Manual, Dialog Semiconductor
- [3] UM-B-114, DA14531, Devkit Pro Hardware, User Manual, Dialog Semiconductor
- [4] UM-WI-026, DA16600, EVK User Manual, Dialog Semiconductor

### 3 Current Measurement

#### Current Measurement with DA16600 EVK PRO and Wi-Fi IoT Power Profiler Tool

##### 3.1 Test Setup

Figure 1 shows a typical test setup environment with DA16600 EVK PRO and Wi-Fi IoT Power Profiler Tool.

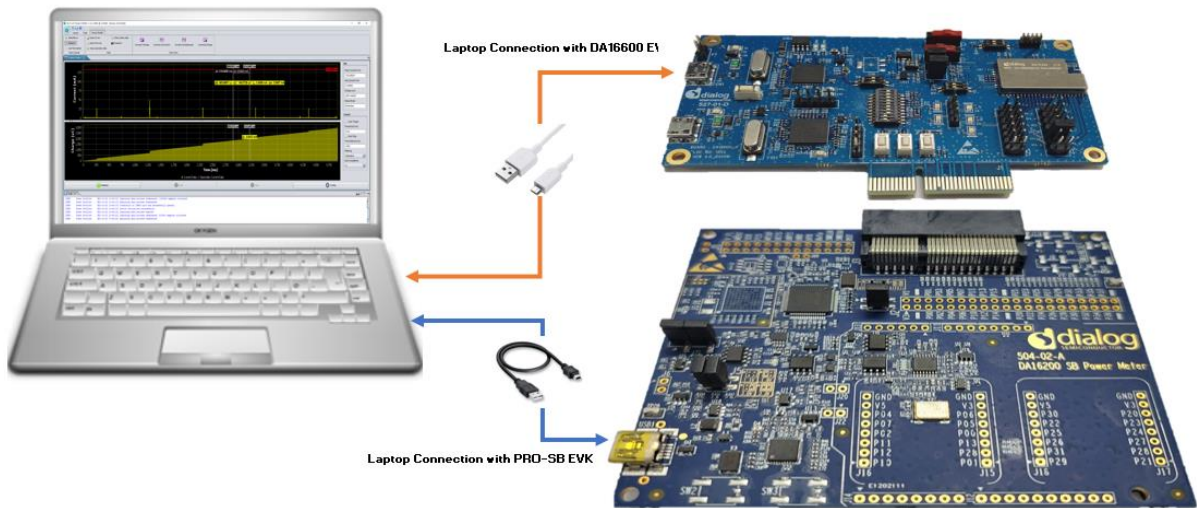


Figure 1: Hardware Setup with DA16600 EVK PRO

1. To measure current with DA16600 EVK PRO, connect the two boards via PCI connectors.
2. Change the jumper setting (P1 and P2) and switch (SW5) settings on the DA16600 EVK.
3. Open the DA16600 EVK's power two jumper caps as shown in Figure 2.

There is a selectable DIP Switch (SW5):

- If SW (1) moves to switch on, you can measure the current of WIFI chipset.
- If SW (2) moves to switch on, you can measure the current of the Bluetooth® LE chipset.

By switching on both, you can measure all current consumed by Bluetooth® LE and WIFI.

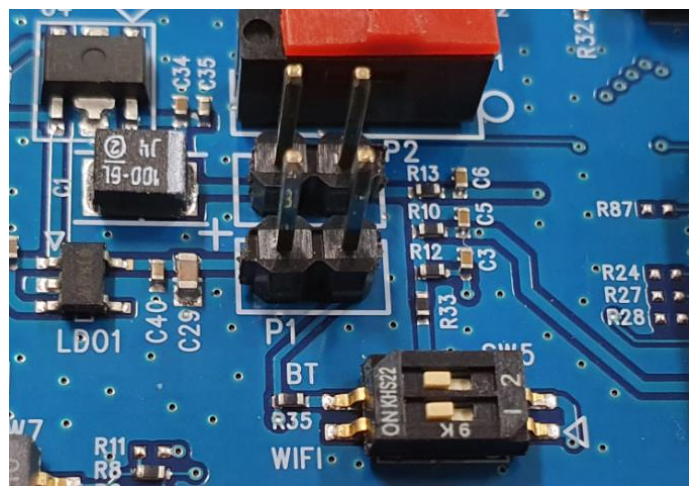


Figure 2: Setup DA16600 EVK Jumper

DA16600 EVK PROEVK PRO

3.2 DA16600 EVK PRO (504-02-A)

The actual component locations of the DA16600 EVK PRO are shown in Figure 3.

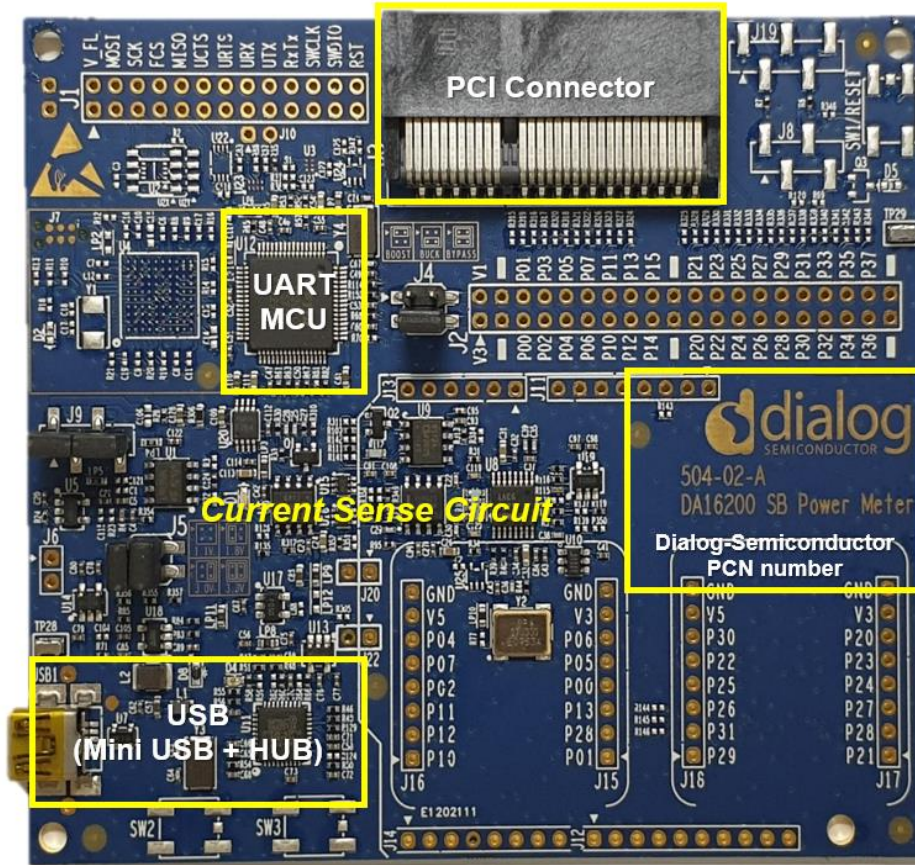


Figure 3: DA16600 EVK PRO(504-02-A)

Description

- PCI Connector: a connector on which to install the DA16600 EVK
- UART MCU: provides communication between DA16600 EVK PRO and PC. Also transfers the current measurement samples to the PC
- Current Sense Circuit: monitors the current of the DA16600 EVK
- USB Hub: USB interfaces to the PC

## DA16600 EVK PROEVK PRO

### 3.3 Wi-Fi IoT Power Profiler

Wi-Fi IoT Power Profiler uses the SPI port of a device connected via USB for communication. The user needs to select the SPI port to connect before using the Power Profiler tool.

To select the SPI port, simply click the checkbox next to the SPI port. The port might be preselected already since the application remembers the last selected SPI port. If necessary, use the **Refresh** button to update the list of available SPI ports for the devices connected via USB. If the device is connected but not listed, it is better to use a different USB port, wait a few seconds and then click the **Refresh** button again. Problems in identifying the FTDI device may indicate an invalid installation of the FTDI drivers.


The  button can be used to access the application's user guide, release notes, license and about info. When the user click the **OK** button to launch the main application window ([Figure 4](#)), the SmartSnippets Wi-Fi IoT Power Profiler tool can be downloaded from the customer support portal. Direct link: [windows](#).



Figure 4: Virtual COM Port Selection Window

### 3.4 Wi-Fi IoT Power Profiler Setup

When the proper COM port is selected ([Figure 4](#)), click **OK** button then the main window of the Power Profiler application in SmartSnippets Wi-Fi IoT Power Profiler Toolbox will pop up ([Figure 5](#)). Click the **Config** button at the bottom right and check that the configuration is correct ([Figure 6](#)).

DA16600 EVK PROEVK PRO

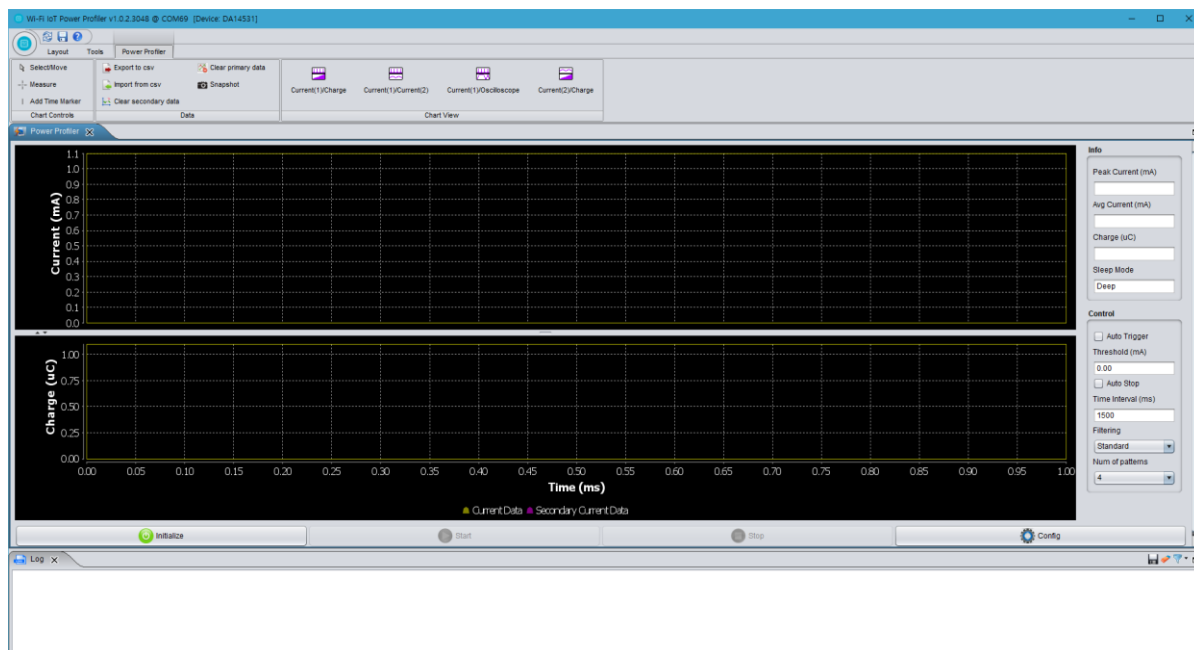


Figure 5: Power Profiler of SmartSnippets Toolbox Main Window

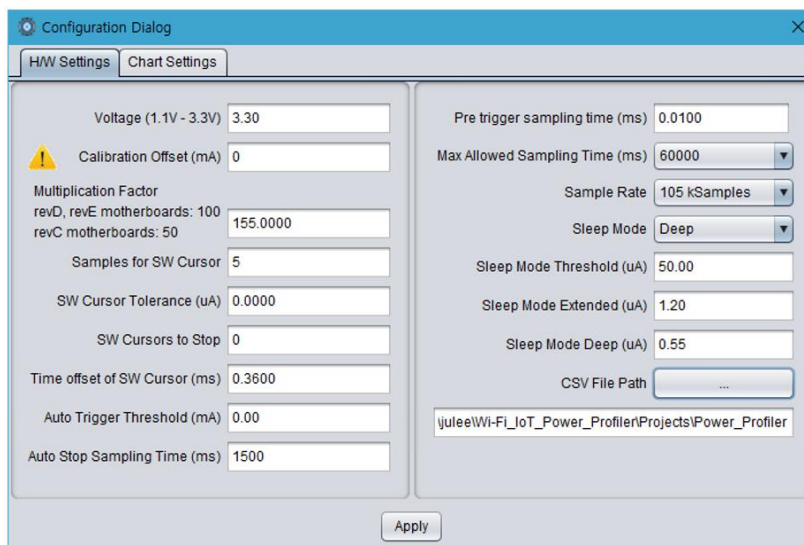


Figure 6: Power Profiler Configuration

In the H/W Settings tab of the new profile, the **Voltage (1.1 V - 3.3V)** field is typically empty and the **Calibration Offset (mA)** field is zero. Apply the correct voltage as configured in the Power Meter LDO (typically, it is 3.3 V). The Calibration offset (mA) will be filled automatically with a calculated value. This value is good enough to be able to measure with  $\pm 2\%$  accuracy, so in most cases we can leave it as is.

Check the multiplication factor. For DA16600 it should be **155**.

The user can set a maximum scale for the waveform window optionally, since there are large peaks on wakeup from sleep (charging capacitors) generally. So the useful part of the signal is compressed to a very small area. To set a maximum scale for the waveform window, open the **Chart Settings** tab (Figure 7) and for **Plot Current1**, set the **MAX** scale of **Current (mA)** to 10 mA. Note that this does not affect anything to the accuracy of the measurement. It can only zoom the waveform, which is presented in the viewer.

DA16600 EVK PROEVK PRO

Click **Apply** and return to the measurement window.

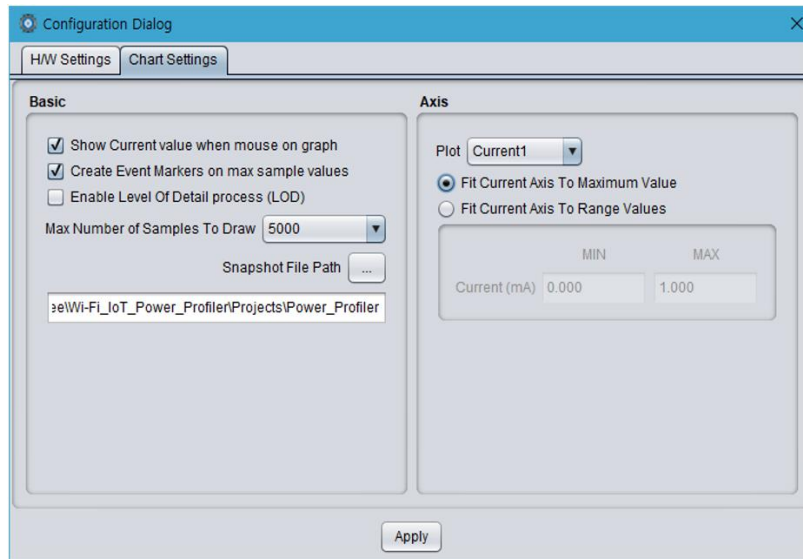


Figure 7: Power Profiler Chart Settings

### 3.5 Measurements

In the measurement window (Figure 8), click **Initialize** at the bottom left (this step is only needed at the first communication with the A/D converter).

Click **Start**.

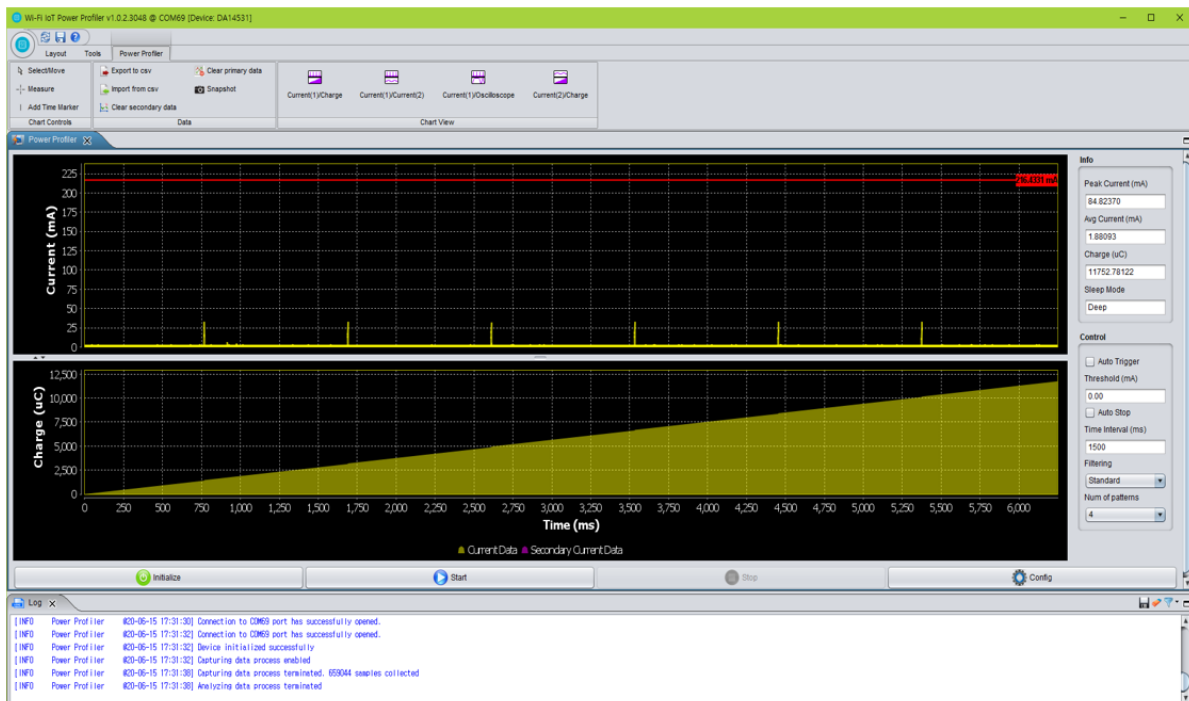


Figure 8: Free Running Capture



DA16600 EVK PROEVK PRO

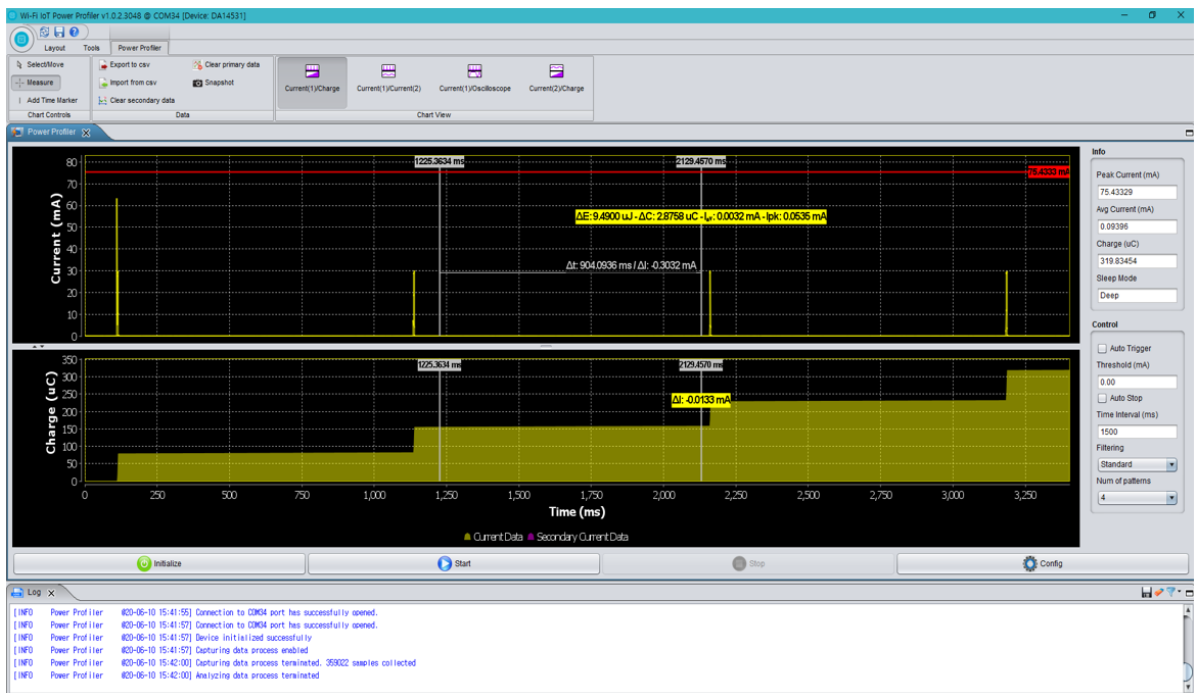


Figure 9: Consumption Measurement by Using Chart Controls

### 3.6 Manual Calibration

For the most accurate measurement, follow the manual calibration steps below:

1. Remove the daughterboard, i.e. the load, by physically disconnecting the DA16600 EVK from the motherboard.
2. In the main window of the Power Profiler, click **Config** and temporarily set the **Calibration Offset (mA)** field to zero (Figure 10).

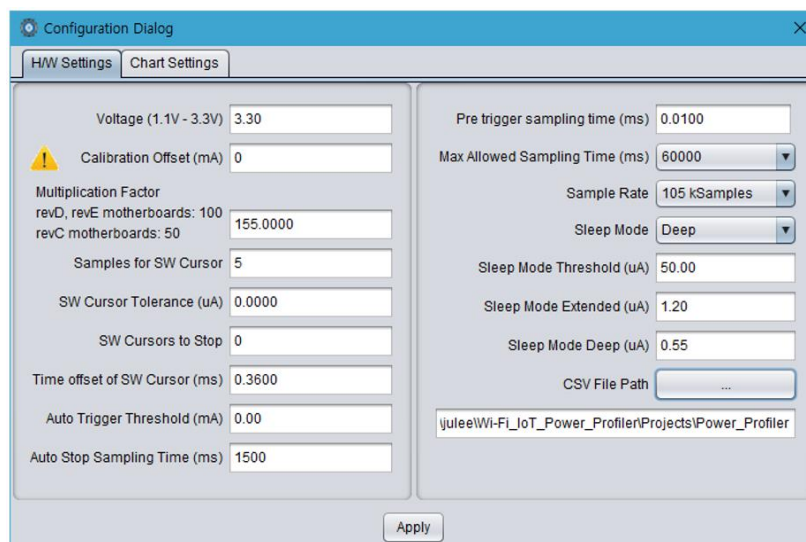
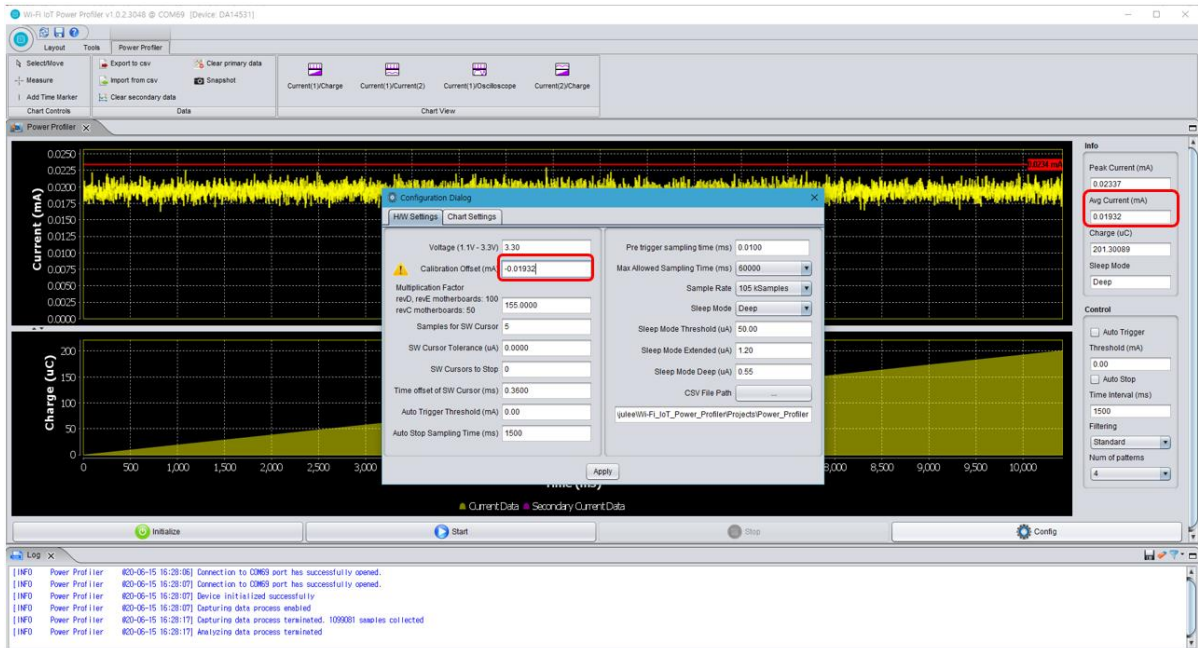


Figure 10: Setting Offset to Zero

3. Run a free running capture for a few seconds and note down the number in the **Avg Current (mA)** field (Figure 11). Note the last digits of the number keep changing slowly due to temperature drift. It is important to do the calibration steps periodically.
4. Finally, put this average value with a negative sign in the **Calibration Offset (mA)** field. CTRL-C and CTRL-V are also workable.(Figure 11).

# DA16600 EVK PROEVK PRO



**Figure 11: Setting Calibration Offset**

The user manual can be downloaded from the customer support portal. Link: <https://www.dialog-semiconductor.com/products/da16600-modules>

## Revision History

Revision	Date	Description
1.0	02-Feb-2021	First Release

## DA16600 EVK PROEVK PRO

### Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
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