User Manual

DA16200 EVK PRO

UM-WI-040

Abstract

This document describes how to set up and use the DA16200 EVK PRO (504-02-A) with the Wi-Fi IoT Power Profiler toolbox. This document details the calibration process for DA16200 development kits.

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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-002, DA16200, SDK Programmer Guide, User Manual, Dialog Semiconductor
[3] UM-B-114, DA14531, Devkit Pro Hardware, User Manual, Dialog Semiconductor
[4] UM-WI-012, DA16200 SPI SFlash Downloader, User Manual Rev 1v5, Dialog Semiconductor

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3 Current Measurement

Current measurement with DA16200 EVK PRO and Wi-Fi IoT Power Profiler Tool

3.1 Test Setup

Figure 1 shows a typical test setup environment with DA16200 EVK PRO and Wi-Fi IoT Power Profiler Tool.

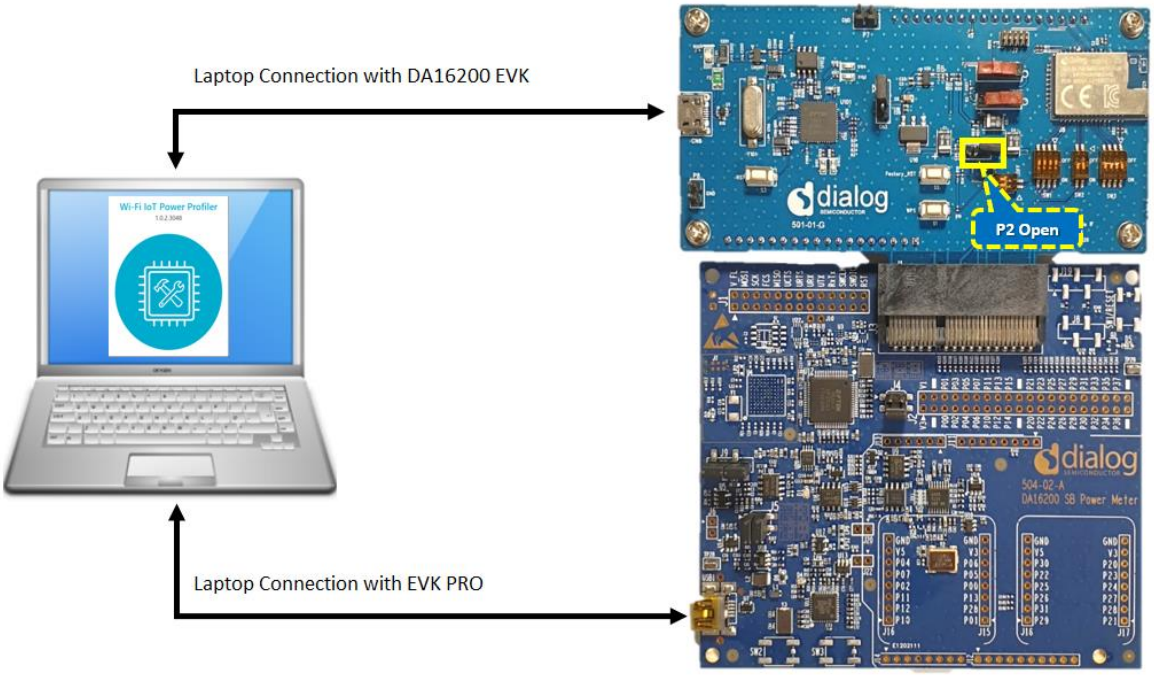


Figure 1: Hardware Setup with DA16200 EVK PRO

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3.2 DA16200 EVK PRO (504-02-A)

The actual component locations of the DA16200 EVK PRO are shown in Figure 2.

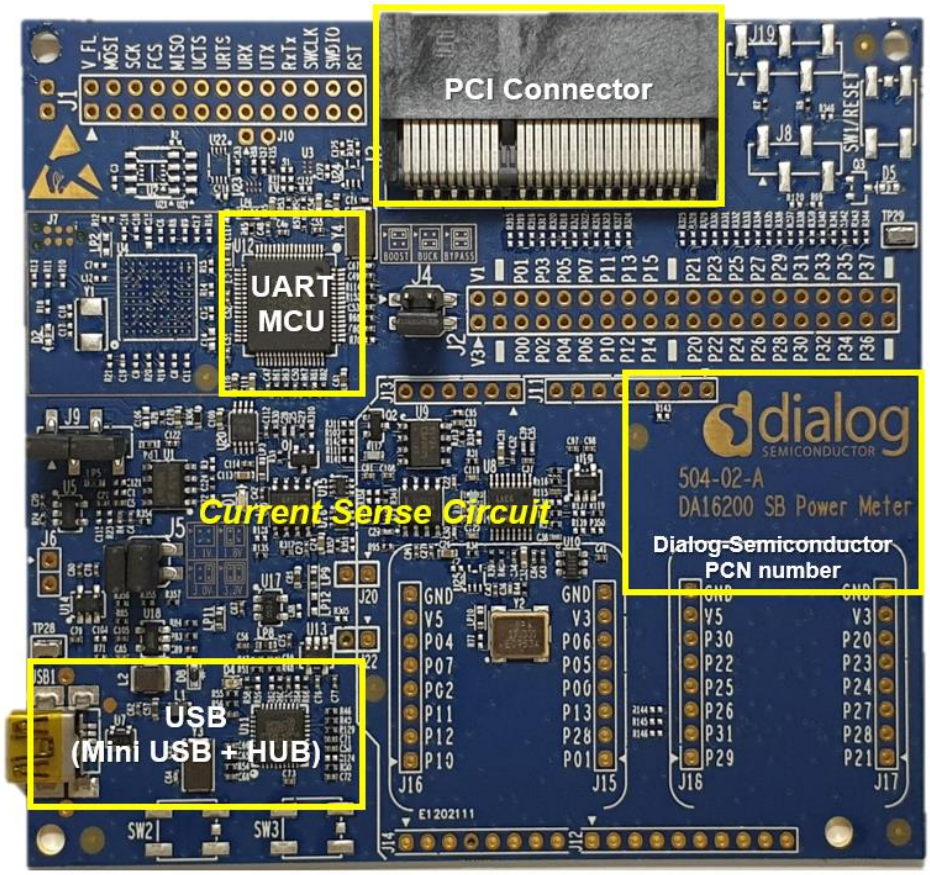


Figure 2: DA16200 EVK PRO(504-02-A)

- PCI Connector: a connector on which to install the DA16200 EVK board
- UART MCU: provides communication between DA16200 EVK PRO and PC. Also transfers the current measurement samples to the PC
- Current Sense Circuit: monitors the current of the DA16200 EVK board
- USB Hub: USB interfaces to the PC

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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.

To select an SPI port, simply click the checkbox next to the SPI port. The application remembers the SPI port selected the last time, so a port may already be preselected. If necessary, use the **Refresh** button to update the list of available SPI ports for the devices connected via USB. If a device is connected but not listed, the user is advised 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 can click the **OK** button to launch the main application window (Figure 3), the SmartSnippets Wi-Fi IoT Power Profiler tool can be downloaded from the customer support portal. Direct link: windows.

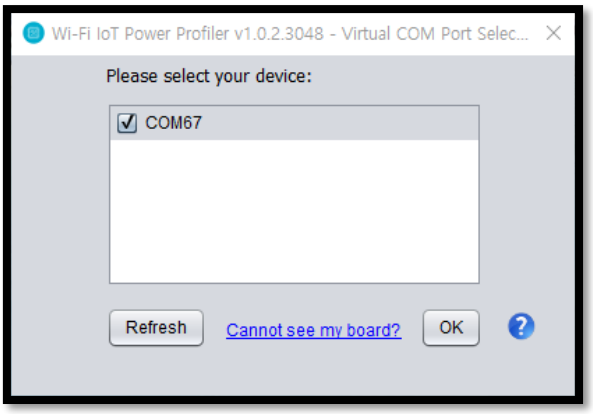


Figure 3: Virtual COM Port Selection Window

3.4 Wi-Fi IoT Power Profiler Setup

When the proper COM port is selected (Figure 3), click **OK** and the main window of the Power Profiler application in SmartSnippets Wi-Fi IoT Power Profiler Toolbox will pop up (Figure 4). Click the **Config** button in the bottom right and check if the configuration is correct (Figure 5).

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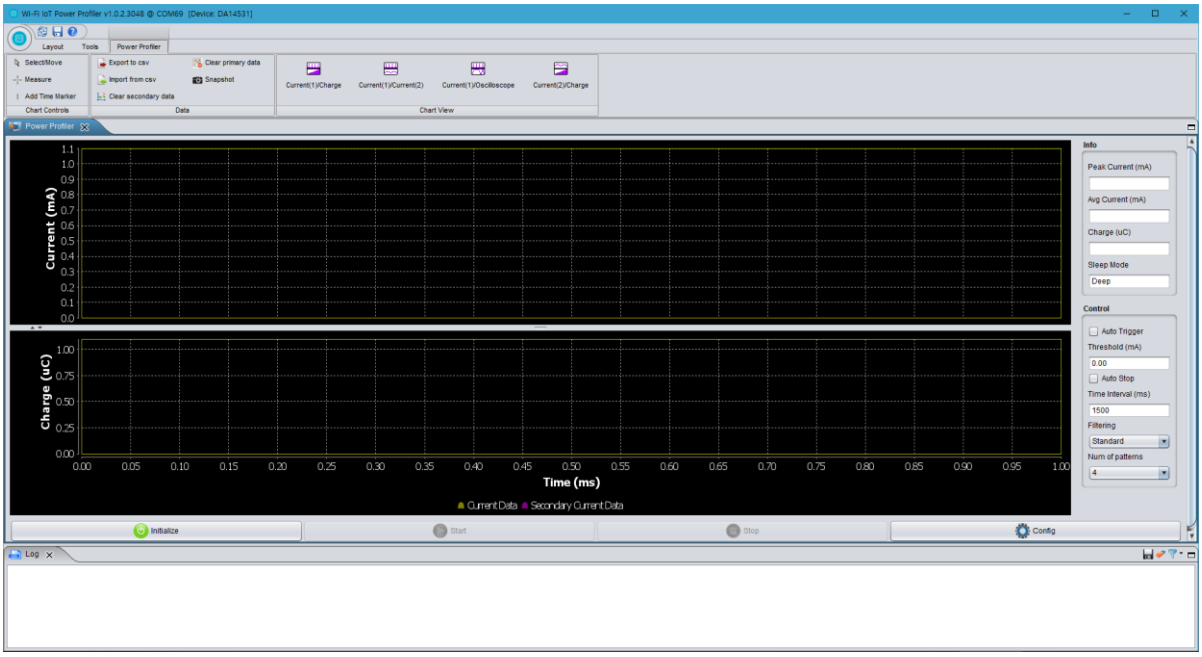


Figure 4: Power Profiler of SmartSnippets Toolbox Main Window

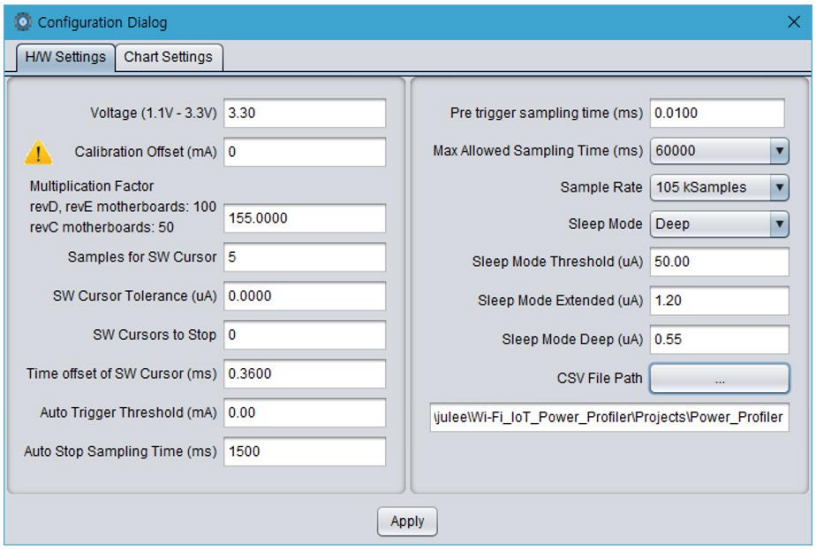


Figure 5: Power Profiler Configuration

In a new profile, in the **H/W Settings** tab, the **Voltage (1.1V - 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 ±2% accuracy, so in most cases we can leave it as is.

Check the multiplication factor. For DA16200 it should be **155**.

Optionally, set a max scale for the waveform window, because typically there are large peaks on wake-up from sleep (charging capacitors), so the useful part of the signal is compressed to a very small area. To set a max scale for the waveform window, open the **Chart Settings** tab (Figure 6) and for **Plot** *Current1*, set the **MAX** scale of **Current (mA)** to 10 mA. Note that this does not affect in any way the accuracy of measurement. It only zooms in the waveform that is presented in the viewer window.

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

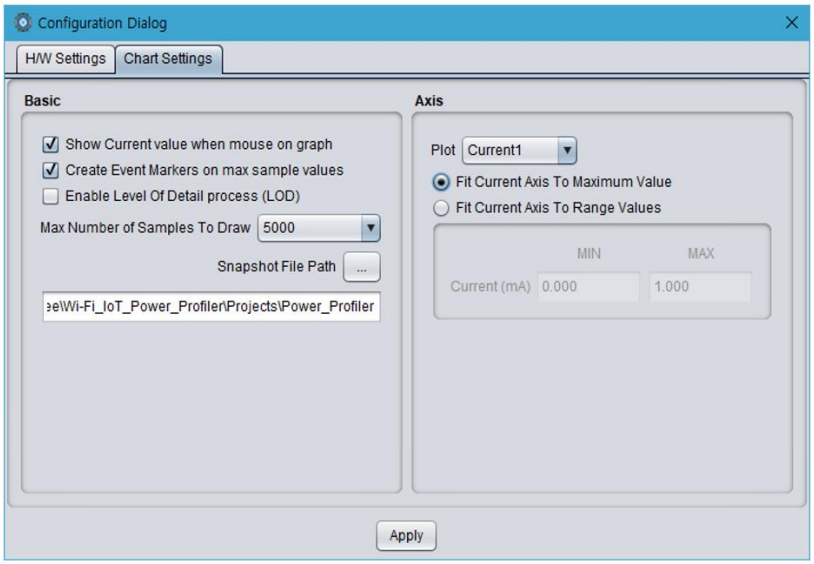


Figure 6: Power Profiler Chart Settings

3.5 Measurements

In the measurement window (Figure 7), click the **Initialize** button at the bottom left (this step is only needed at the first communication with the A/D converter) and then click the **Start** button.

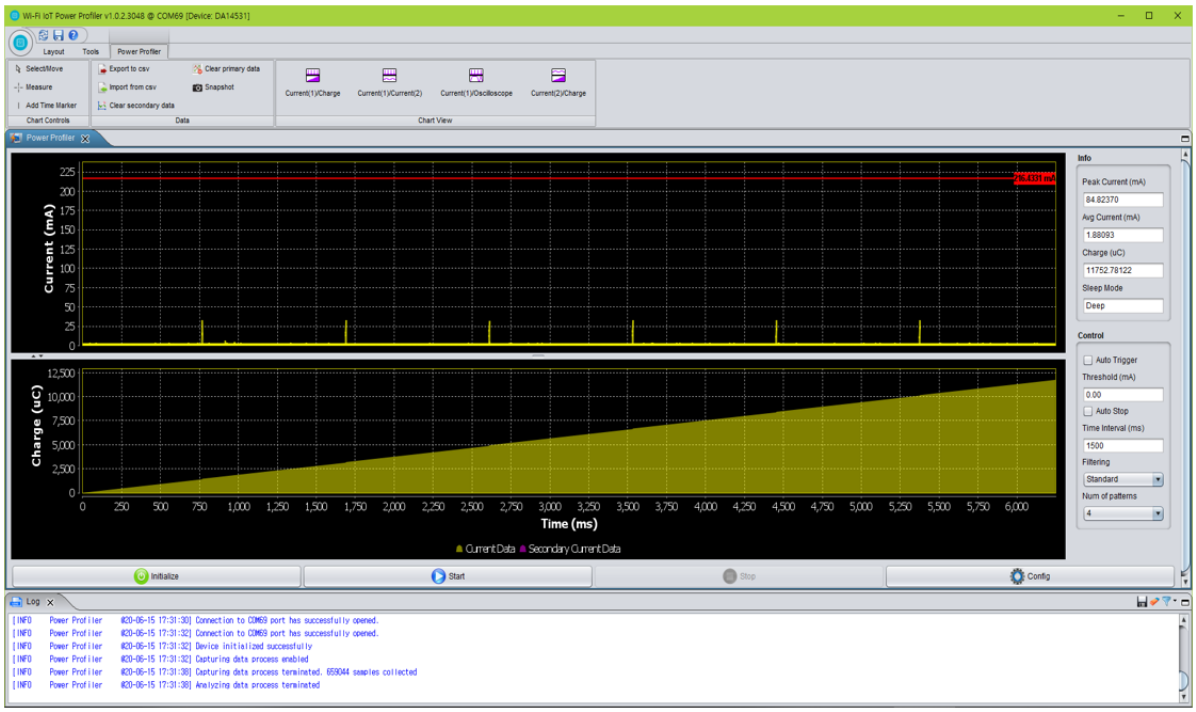


Figure 7: Free Running Capture

Select the **Power Profiler → Measure** menu on the window, you can measure the current consumption in the desired section as peak and average by using a mouse.

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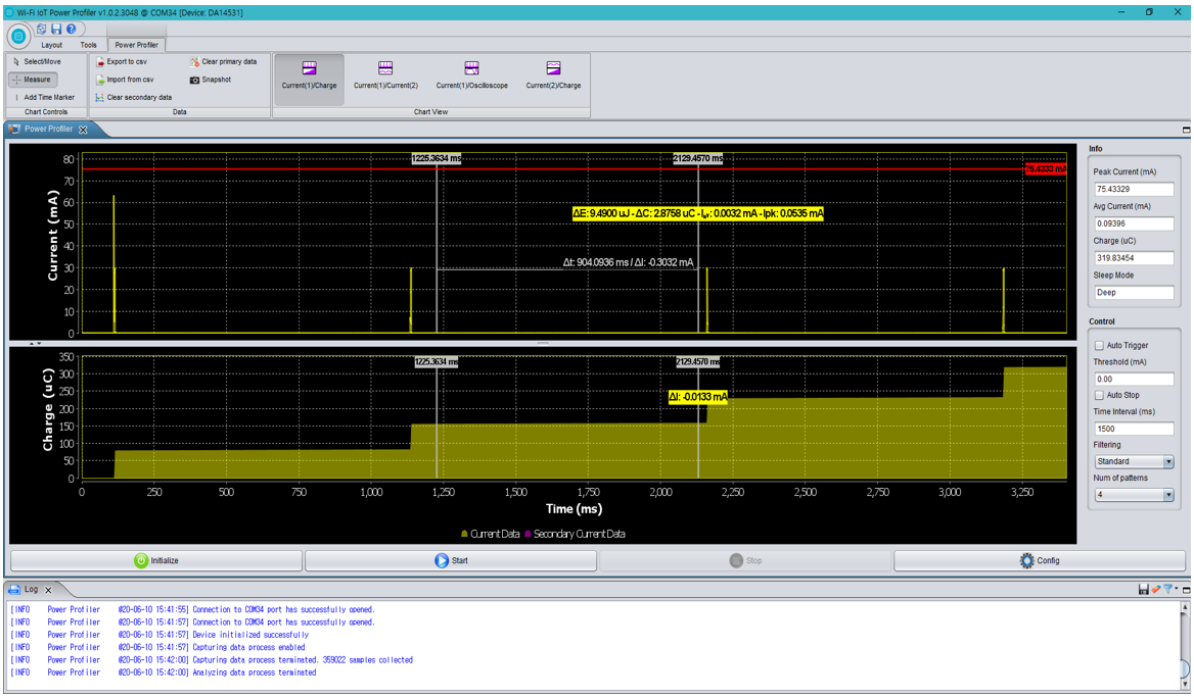


Figure 8: Consumption Measurement by Using Chart Controls

3.6 Manual Calibration

For an ultimate measurement accuracy, do the steps below for a manual calibration:

1. Remove the daughterboard, i.e. the load, by physically disconnecting the DA16200 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 9).

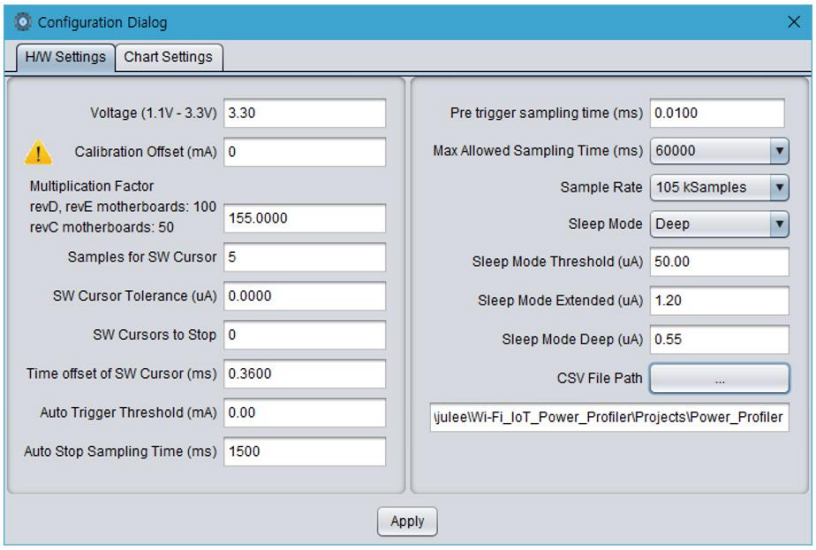


Figure 9: Setting Offset to Zero

3. Run a free running capture for a few seconds and note down the number in the **Avg Current (mA)** field (Figure 10). Note that the last digits of the number keep changing slowly due to temperature drift. It is important to periodically do the calibration steps.
4. Finally, put this average value with a negative sign in the **Calibration Offset (mA)** field. CTRL-C and CTRL-V also works (Figure 10).

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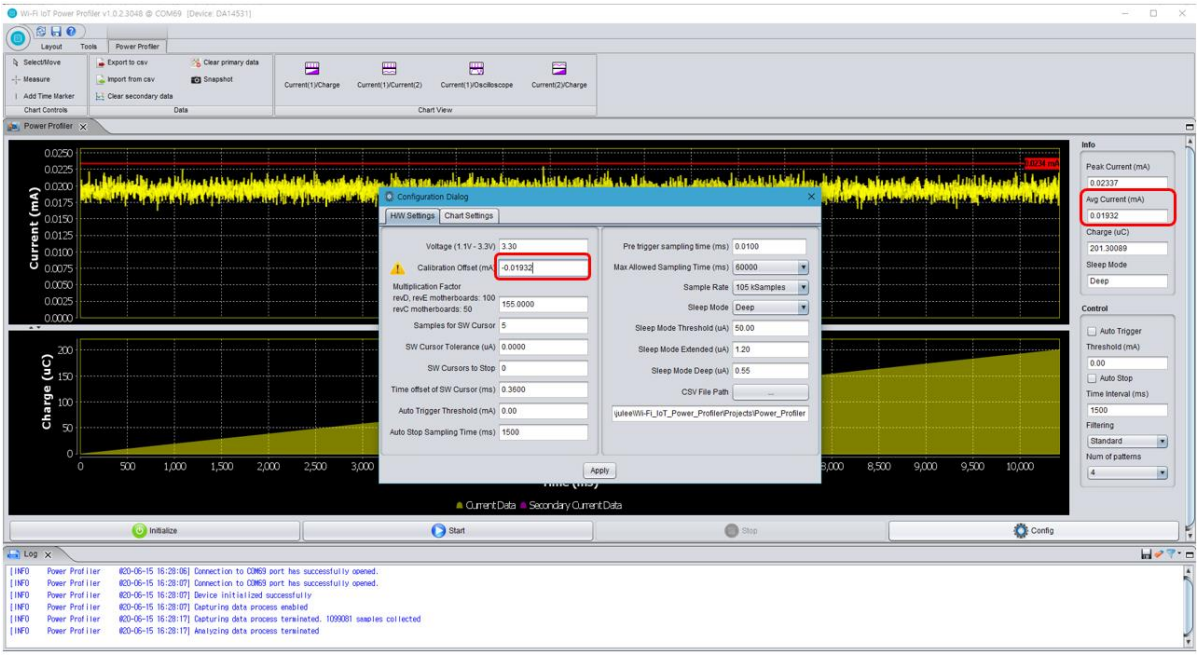


Figure 10: Setting Calibration Offset

The user manual can be downloaded from the customer support portal. Link: windows.

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Revision History

Revision	Date	Description
1.1	28-Mar-2022	Update logo, disclaimer, copyright.
1.0	09-Feb-2021	First Release

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APPROVED or unmarked	The content of this document has been approved for publication.

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Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu

Koto-ku, Tokyo 135-0061, Japan

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