qorvo

TYPE 2AB EVB Quick Start Guide

Note: Details on Type 2AB EVB board can be found on muRata® website[1].

Introduction

The muRata® Type 2AB EVB is an evaluation board using the muRata UWB/Bluetooth Low Energy module Type 2AB.

Type 2AB module contains a Qorvo QM33120 UWB transceivers and a Nordic nRF52840 BLE SoC.
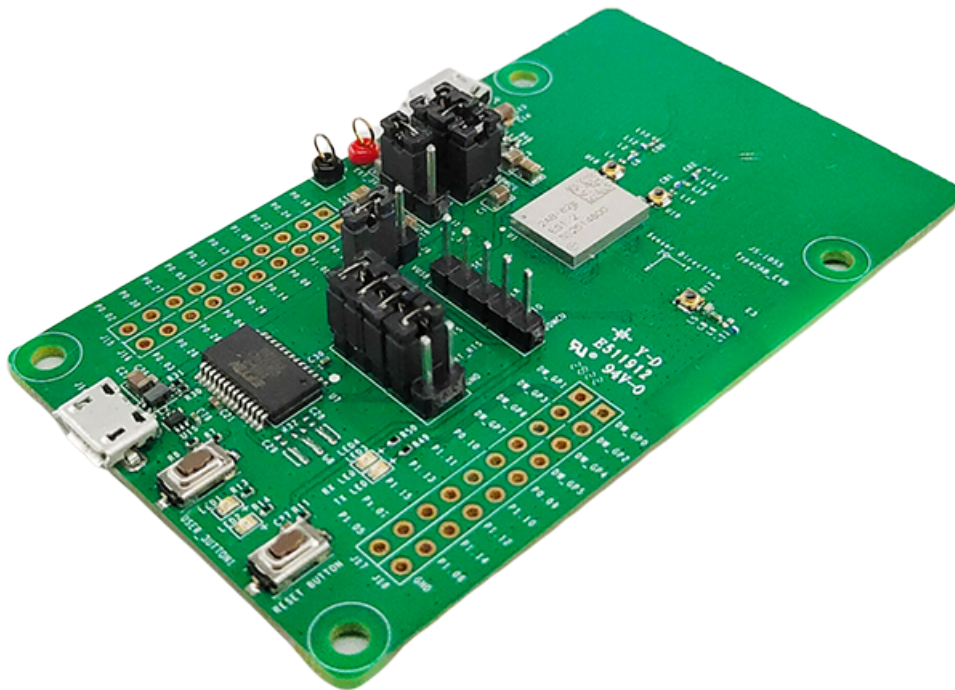

Fig. 1.1: Type 2AB EVB Rev4.0 (JS-1055)

[1] https://www.murata.com/en-us/products/connectivitymodule/ultra-wide-band/qorvo

© 2024 Qorvo US, Inc.
Qorvo® Proprietary Information

Jumpers configuration

Type 2AB EVB has multiple jumpers defining the power supply of the board.

Please refer to muRata® UWB Module(2AB) EVB User Manual[2] for further information.

Required Tools

Hardware Tools

The following hardware tools are needed to flash the binary into the target board over SWD interface:

- J-Link debug/flash probe[3]

Software Tools

To flash the development kit, you can to use the Segger J-Flash Lite[4], which is a component of the **J-Link Software and Documentation Pack**. Follow the instructions below to download and install J-Flash Lite:

1. Go to the Segger downloads page[5].

2. Choose the latest version of the J-Link Software and Documentation Pack which is compatible with your operating system.

3. Download and execute the installer, then follow the installation procedures.

4. Once the software is installed, you can proceed with flashing your development kit.

Flashing the development kit

> **Warning:** Type 2AB EVB boards are not shipped preprogramed. UCI firmware needs to be flashed to continue.

1. To flash the board, it must be powered on by connecting a micro-USB cable to the board (or via external power depending on jumpers configuration). Refer to muRata® UWB Module(2AB) EVB User Manual[6] if needed.

For flashing or debugging, connect the JTAG connector to a J-Link Debug Probe by SEGGER® as follow:

---

[2] https://www.murata.com/en-us/products/connectivitymodule/ultra-wide-band/qorvo#datasheet-and-documentations
[3] https://www.segger.com/products/debug-probes/j-link/
[4] https://wiki.segger.com/J-Flash_Lite
[5] https://www.segger.com/downloads/jlink/
[6] https://www.murata.com/en-us/products/connectivitymodule/ultra-wide-band/qorvo#datasheet-and-documentations
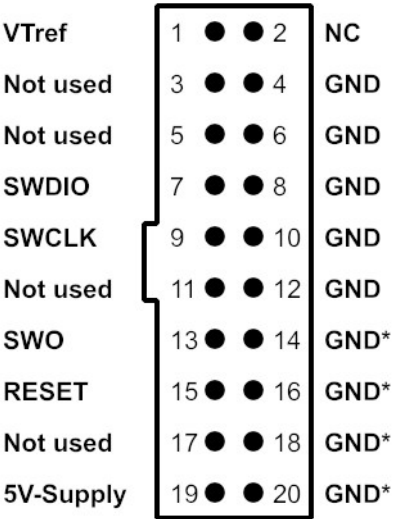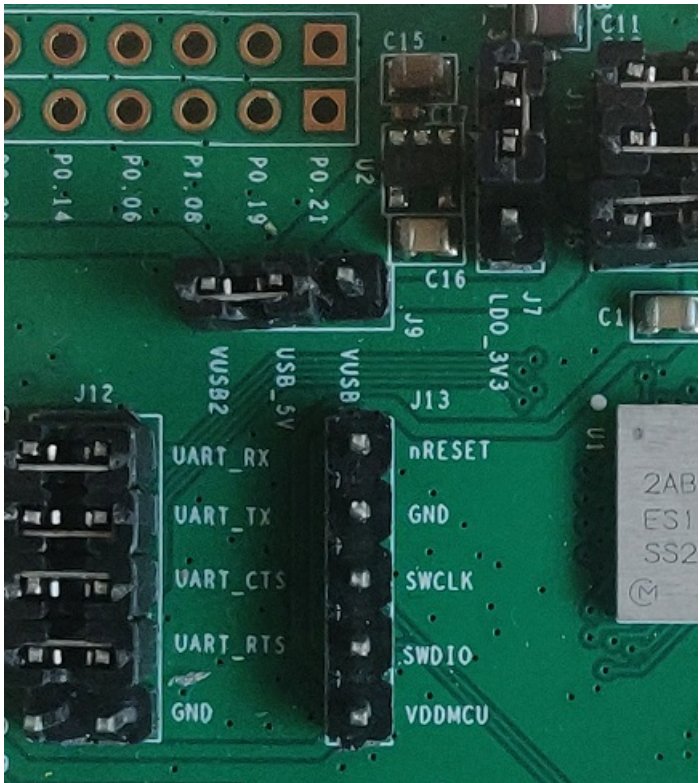
Fig. 1.2: J-Link SWD Connector Pinout

Fig. 1.3: Type 2AB EVB SWD Connector

Following signal names from previous pictures, here is the connections to do:

J-Link	Type 2AB EVB
RESET	nRESET
GND	GND
SWCLK	SWCLK
SWDIO	SWDIO
VTref	VDDMCU

© 2024 Qorvo US, Inc.
Qorvo® Proprietary Information

2. Locate the JFLashLite tool in your installation directory (e.g. `C:\Program_Files\SEGGER\FlashLite.exe` in Windows or `/usr/bin/JFlashLite` in Ubuntu) and launch the application.

Note: When you connect the development kit for the first time, you may be prompted to update firmware of the on-board programmer. Please approve the update by clicking **OK** and wait for the update to complete.

3. Upon starting JFlashLite, the Device and Interface selection dialog will appear. Select **NRF52840_xxAA** device by clicking on **"..."** button. On the right side of dialog window, select **SWD** Interface with clock speed of **4000 kHz**. Click **OK** to proceed.

Fig. 1.4: Select CPU settings.

4. Next, select the firmware file you wish to flash onto the board. Click the **"..."** button to browse for the firmware (e.g. `DW3_QM33_SDK/Binaries/Type 2AB EVB-DW3_QM33_SDK_UCI-FreeRTOS.hex`). After selecting the file, click **Program Device** to start the flashing process.

Note: To evaluate the board with the Qorvo One TWR GUI application please ensure that you flashed the **UCI** hex file.
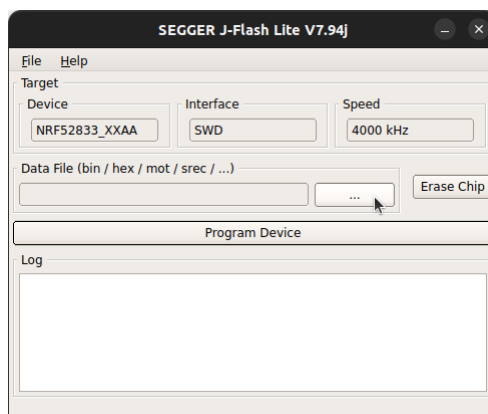

Fig. 1.5: Select .hex file to flash.

5. Once the progress bar is completed, the device has been successfully flashed. Perform a power cycle by disconnecting and reconnecting the power supply to reset the board. Your device should be now ready to use.
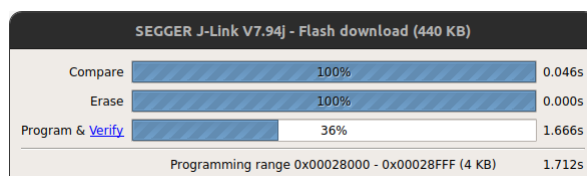

Fig. 1.6: Programming progress window.

© 2024 Qorvo US, Inc.
Qorvo® Proprietary Information

Type 2AB EVB Setup

Connect both Type 2AB EVB boards to a PC using USB cables.

Note: Make sure that the antennas face each other during the evaluation.

Ranging and AoA Evaluation

Install **Qorvo One TWR GUI** evaluation software included in the package and start the application. Please check *Qorvo Software License* and click **Next** if you agree to the terms and conditions.

> **Warning:**
>
> - If you got the error:
>
>     ```
>     dlopen():  error loading libfuse.so.2
>     ```
>
>   Install libfuse2 using the following commands:
>
>     ```
>     sudo apt update
>     sudo apt install libfuse2
>     ```
>
> - On Ubuntu 20.04, you may also need to install qt5-default:
>
>     ```
>     sudo apt update
>     sudo apt install qt5-default
>     ```
>
> - On Ubuntu 22.04 & Ubuntu 24.04, you may also need to install qtbase5-dev:
>
>     ```
>     sudo apt update
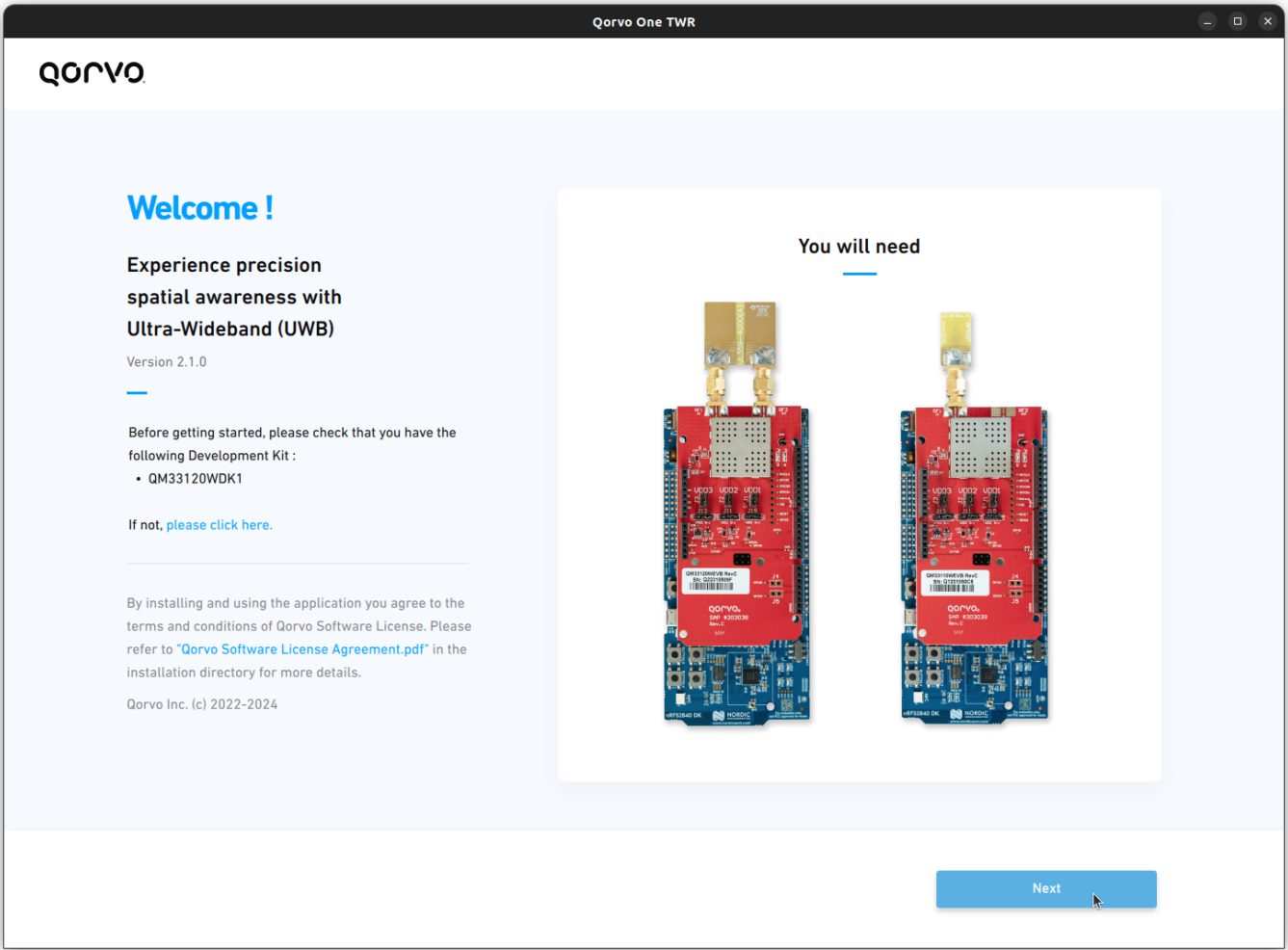>   sudo apt install qtbase5-dev
>     ```

Fig. 1.7: Welcome screen

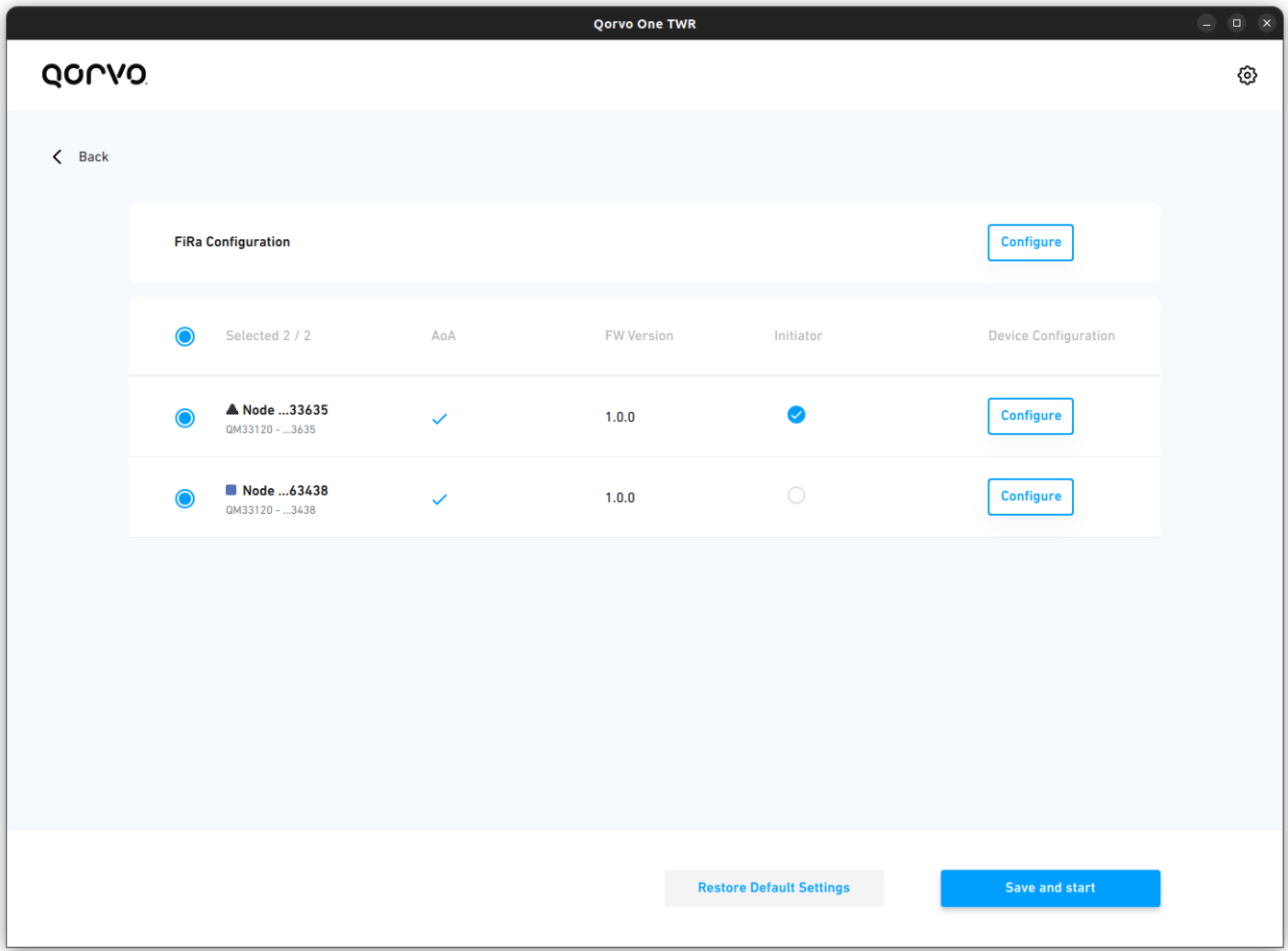The boards will be detected and displayed on the main screen.

Fig. 1.8: Boards detection

FiRa Configuration

Use **FiRa Configuration** button to setup the ranging parameters. A new window will appear, allowing you to modify various FiRa settings, such as **UWB Channel** or **Ranging duration**.

© 2024 Qorvo US, Inc.
Qorvo® Proprietary Information

QOrVO

FiRa Configuration
Initiator and Responder

Session ID	0x0000002A	Ranging Frame (RFRAME)	SP3
Measurement scheme ⓘ	DS-TWR-deferred	vendor ID	0x0708
Peer mode	One-to-Many	Static STS config	0x060504030201
Pulse Repetition Freq. (PRF)	BPRF	Vupper64	0x0605040302010708
UWB Channel	9	Ranging round hopping	⚪ (off)
SFD ⓘ	2	Report angle	🔵 (on)
Frame preamble code	9		
Ranging duration (ms)	200		
Slot duration (ms)	2		
Num. of slots in ranging rounds ⓘ	25		

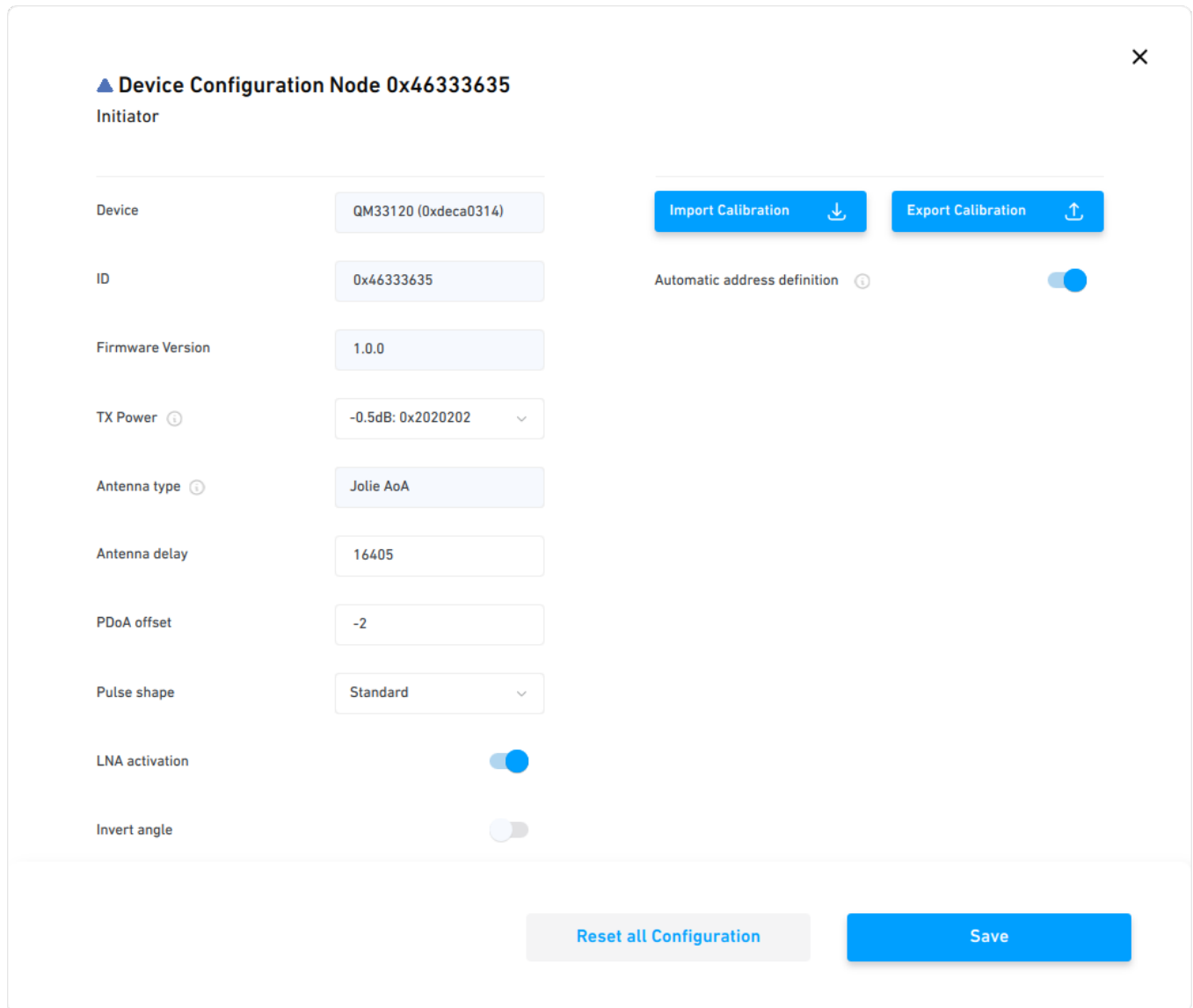Reset all Configuration   **Save**

Fig. 1.9: FiRa configuration

Apply desired setting and click **Save** button. You can also use **Reset all Configuration** to restore the default values.

QOrvO

Device configuration

To setup the device parameters of each board, click the **Configure** button located in the **Device Configuration** column. A new window will appear, allowing you to modify various device settings, such as **TX Power** or **Antenna delay**.

Fig. 1.10: Device configuration

To ensure optimal ranging performance, the board's UWB chip requires calibration.

To understand calibration settings, refer to the **Calibration and Configuration** section in **DW3000 QM33 SDK Developer Manual**. However, to quickly evaluate the system you can use preset settings provided in the SDK.

Note:

- Configuration and calibration settings are non-volatile, they are retained after power cycle or firmware update.
- If you perform a Non-Volatile Memory (NVM) erase, such as a chip erase, it is crucial to reapply calibration and configuration to the device.

> **Warning:** It is mandatory to perform the configuration procedure of the UWB chip when the development kit is used for the first time or when the SDK is upgraded to a higher version since the compatibility of the calibration data from one firmware version to another is not guaranteed.

To load the calibration, click the **Import Calibration** button.

> **In the new dialog, select appropriate calibration file:**
> `DW3_QM33_SDK_1.0.0/Tools/uwb-qorvo-tools/scripts/device/load_cal/calib_files/`
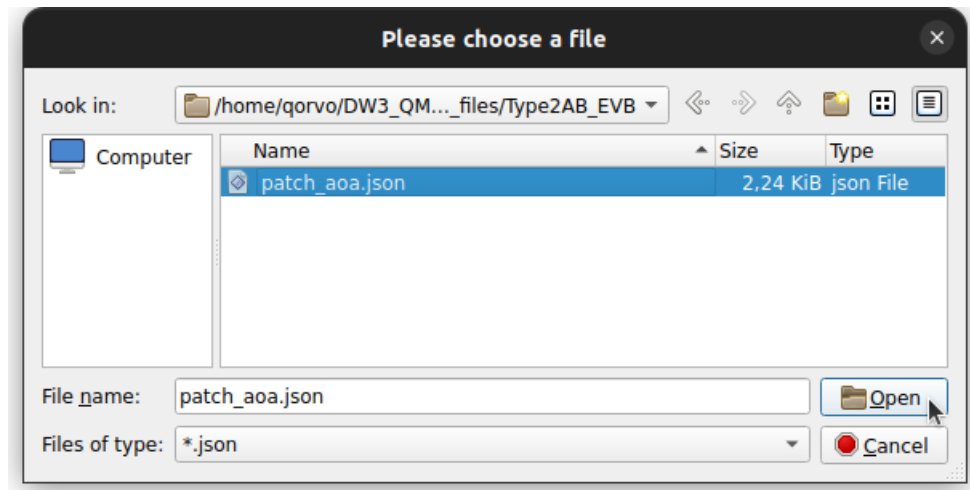> `Type2AB_EVB/patch_aoa.json`

Fig. 1.11: Device calibration file

Press **Save** button in **Device configuration** window to apply configuration and calibration. When calibration has changed, saving may take up to 10 seconds.

TWR Ranging

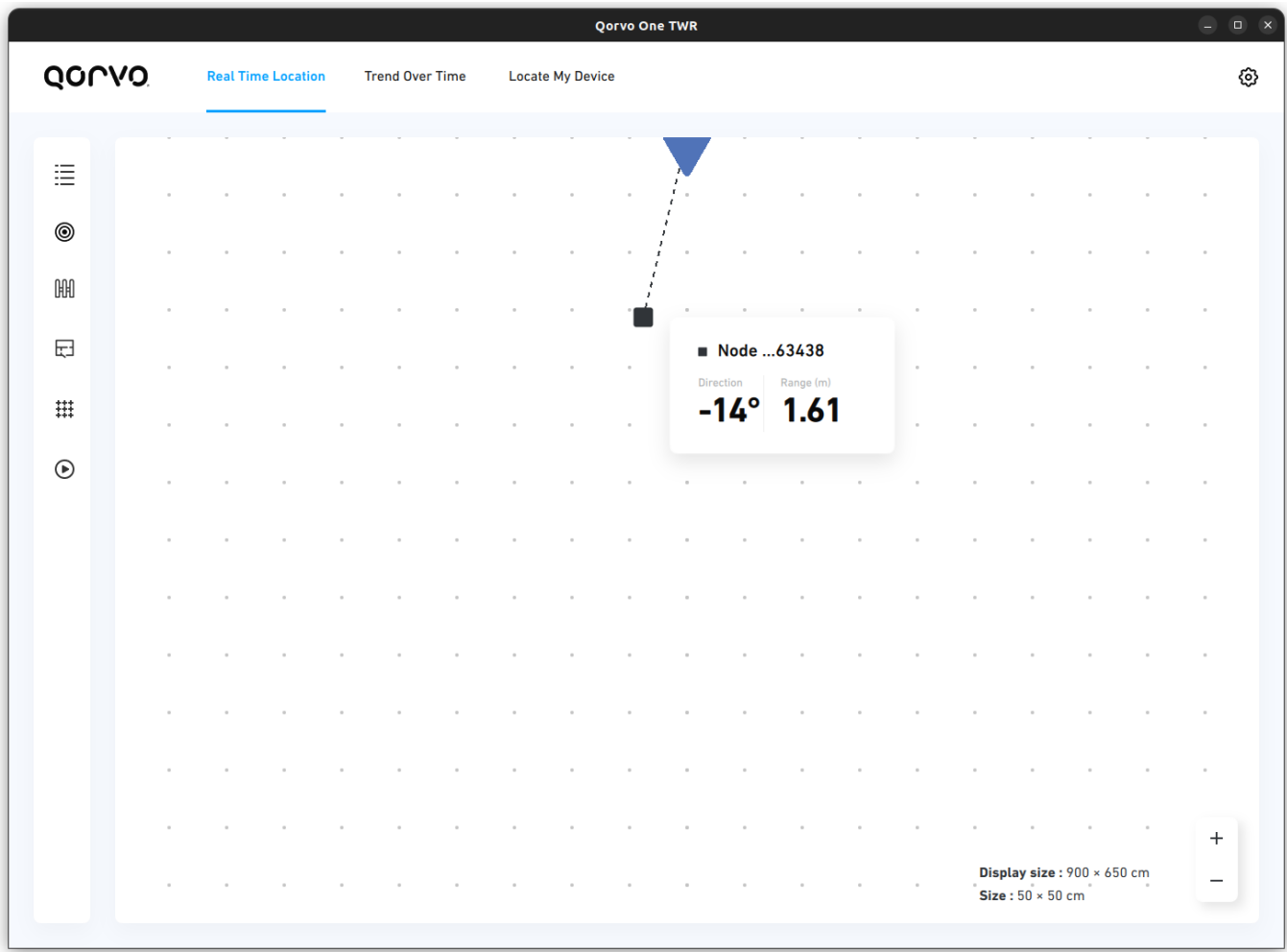Press **Save and start** to start the ranging experience.

Fig. 1.12: Real Time Location

Auto Calibration

The Qorvo One TWR GUI software provides an auto calibration feature that simplifies the calibration process on the development boards. This feature automatically adjusts the antenna delay and the PDoA offset in the NVM of the MCU.

Note: As antenna delay and PDoA offset values are stored in a specific section of the NVM, they are retained after power cycle or firmware update.

It is highly recommended to perform auto calibration as it improves distance and AoA performances.

Click on the **Auto Calibration** button located in the left bar.

Fig. 1.13: Auto calibration icon

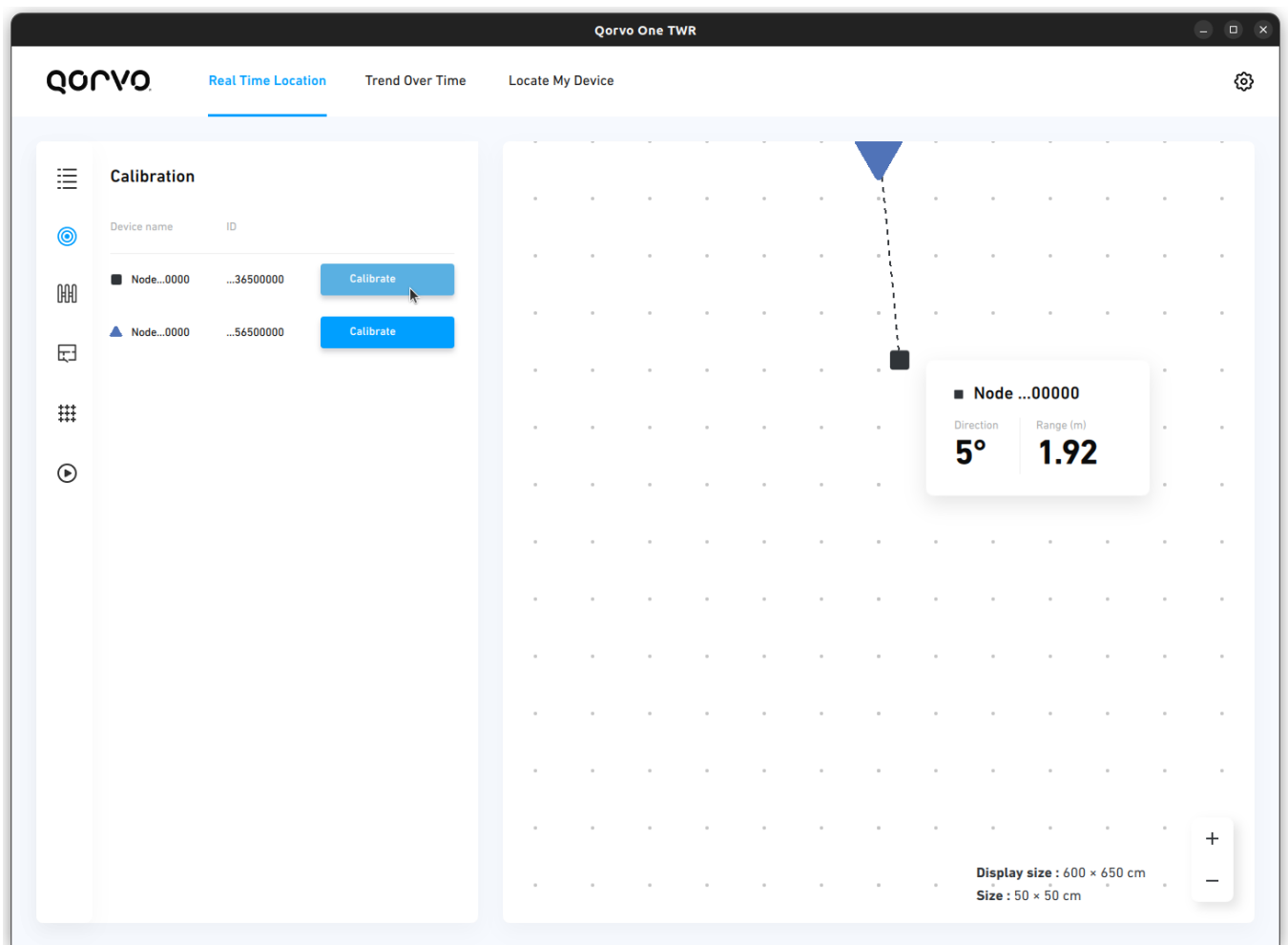A new tab will appear, listing the different devices.

Fig. 1.14: Auto Calibration tab

Click on the **Calibrate** button of the device to calibrate. A new window will appear, explaining the auto calibration process.

Note: It is important to follow the instructions displayed in the window as precisely as possible to ensure improved performance.
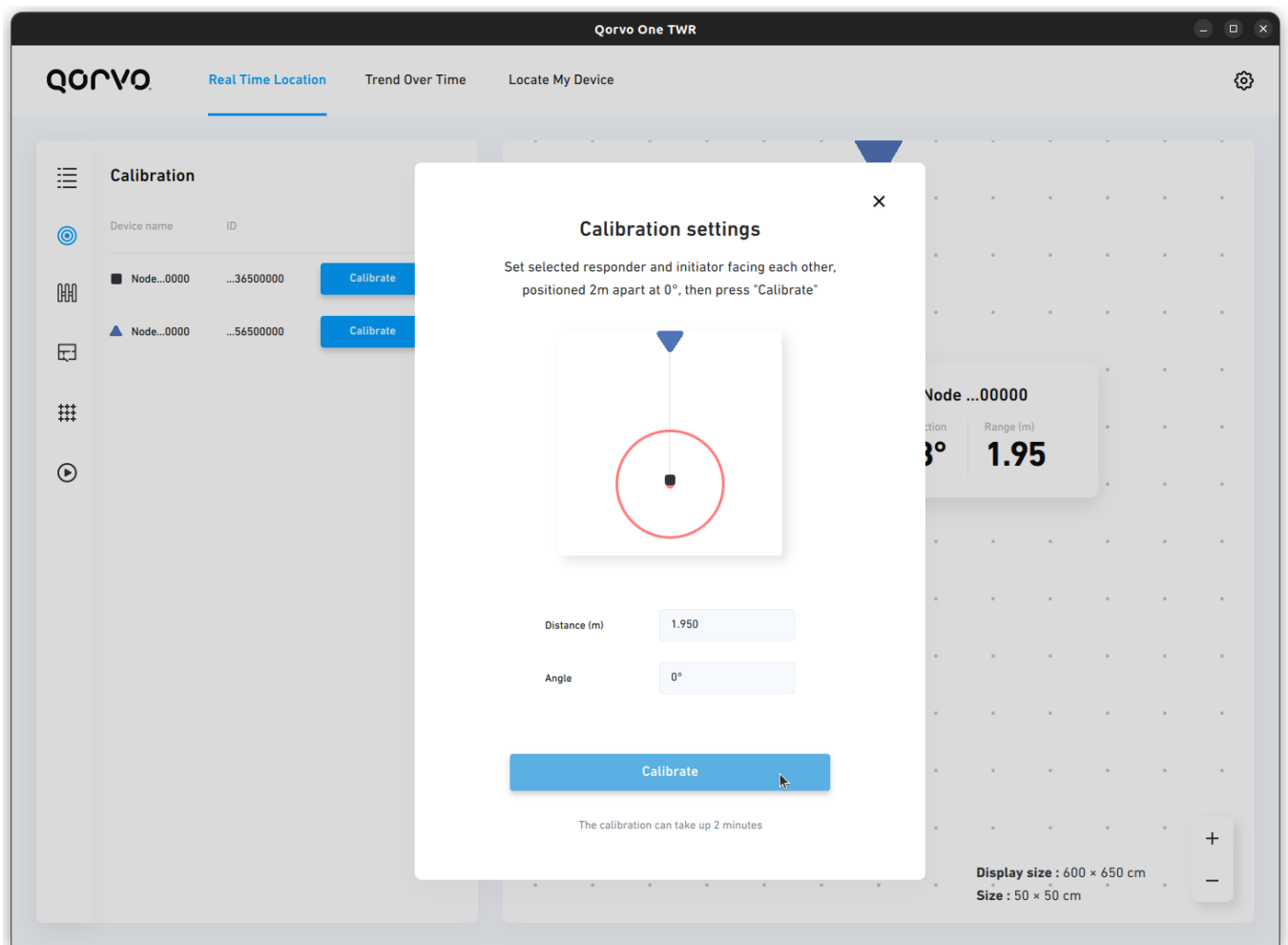

Fig. 1.15: Auto Calibration window

Click on the **Calibrate** button to start the auto calibration. Once the auto calibration process is complete, the software will display a message indicating the success of the calibration.
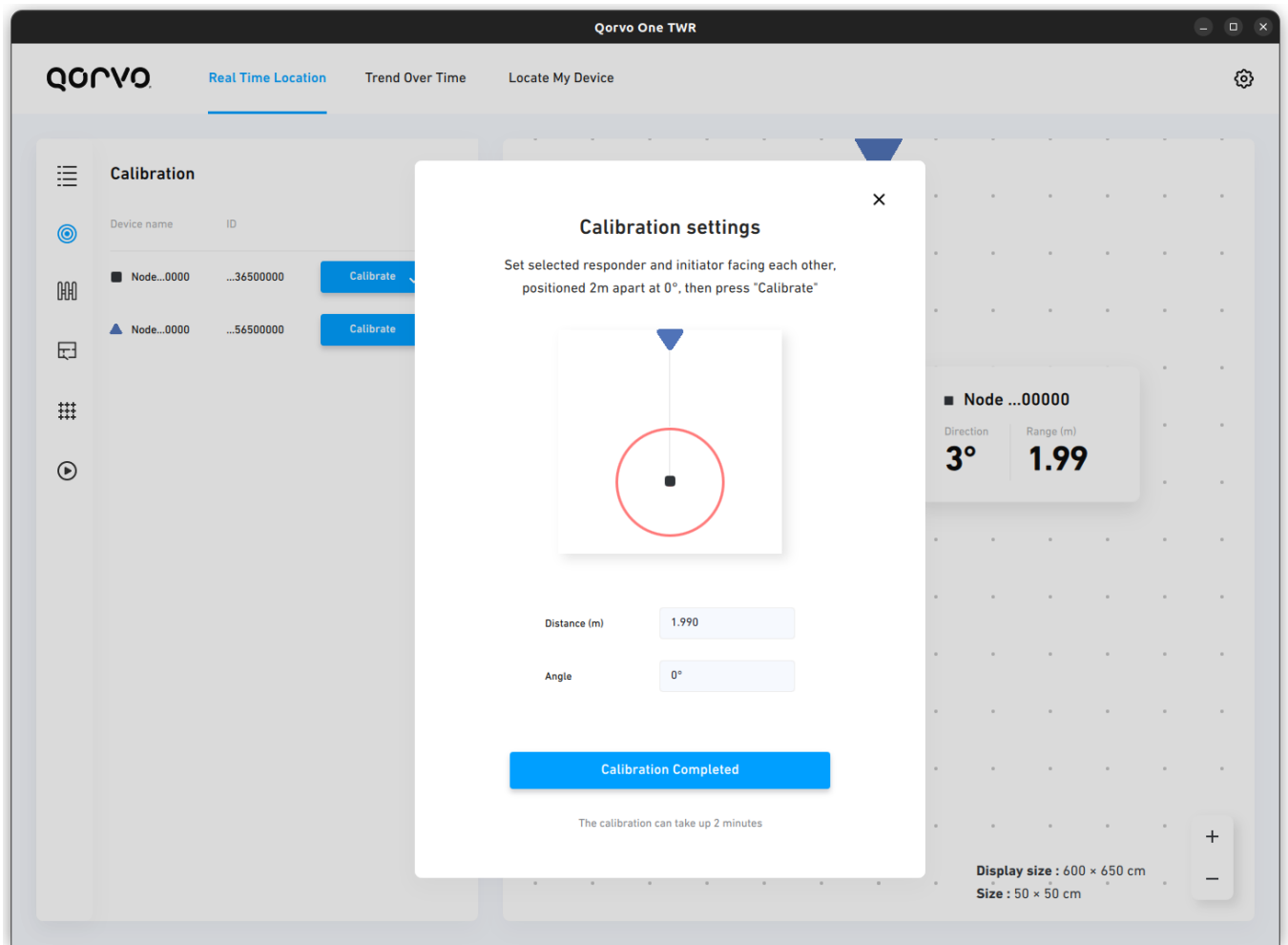

Fig. 1.16: Auto Calibration completed

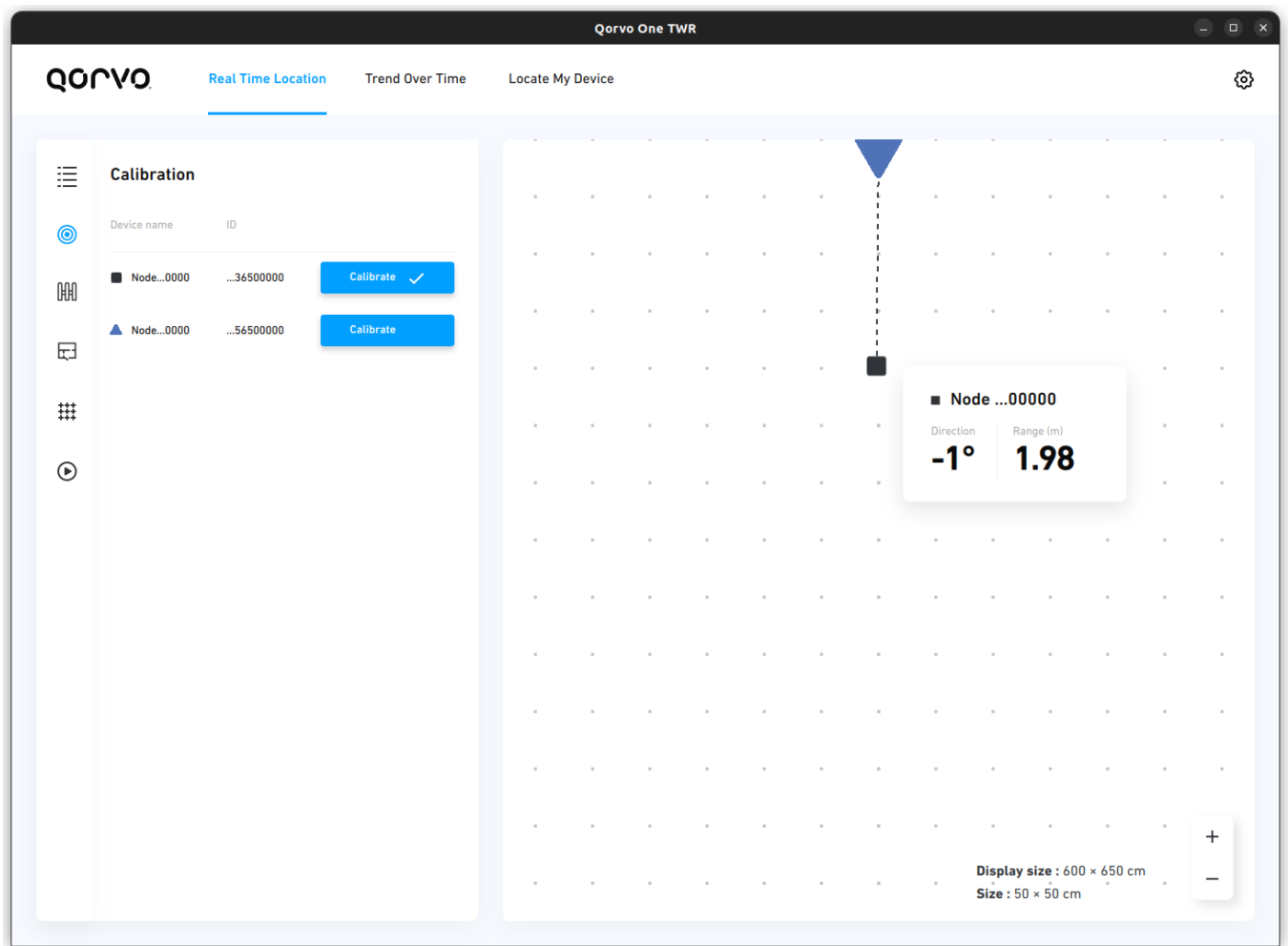The device will be marked as calibrated in the Auto Calibration tab.

Fig. 1.17: Auto Calibration tab with device calibrated

After completing the auto calibration, you can proceed with the TWR ranging or AoA evaluation as described in the previous section.

Revision History

Version	Date	Comment

DW3_QM33_SDK_1.0.0	2024-11-06	• Added *Required Tools* section.
		• Added *Flashing the development kit* section.
		• Updated *Ranging and AoA Evaluation* section:
		  – Content divided into subsections: *Fira Configuration*, *Device Configuration* and *TWR Ranging*.
		  – Added information about calibration and configuration.
		  – Updated GUI images to the latest version.
		• Updated target board images and their descriptions.
		• Removed *Type 2AB EVB Flash* section and moved it to the *Flashing the development kit* section.
		• Removed reference to discontinued *Type2AB JS-0989 EVB* board from the *Introduction* section.

DW3_QM33_SDK_0.1.1	2022-11-03	Initial release