How to use evaluation kit software

TLE4999

About this document

Scope and purpose

This document describes how to use the TLE4999 linear Hall evaluation software in combination with the PGSISI-3 evaluation kit hardware. Additional information for the correct sensor parameter setup is provided in the TLE4999I3 and TLE4999C data sheets and user manuals.

Intended audience

This document is intended for anyone who wants to use the linear Hall TLE4999 evaluation kit.

Evaluation kit software quick start

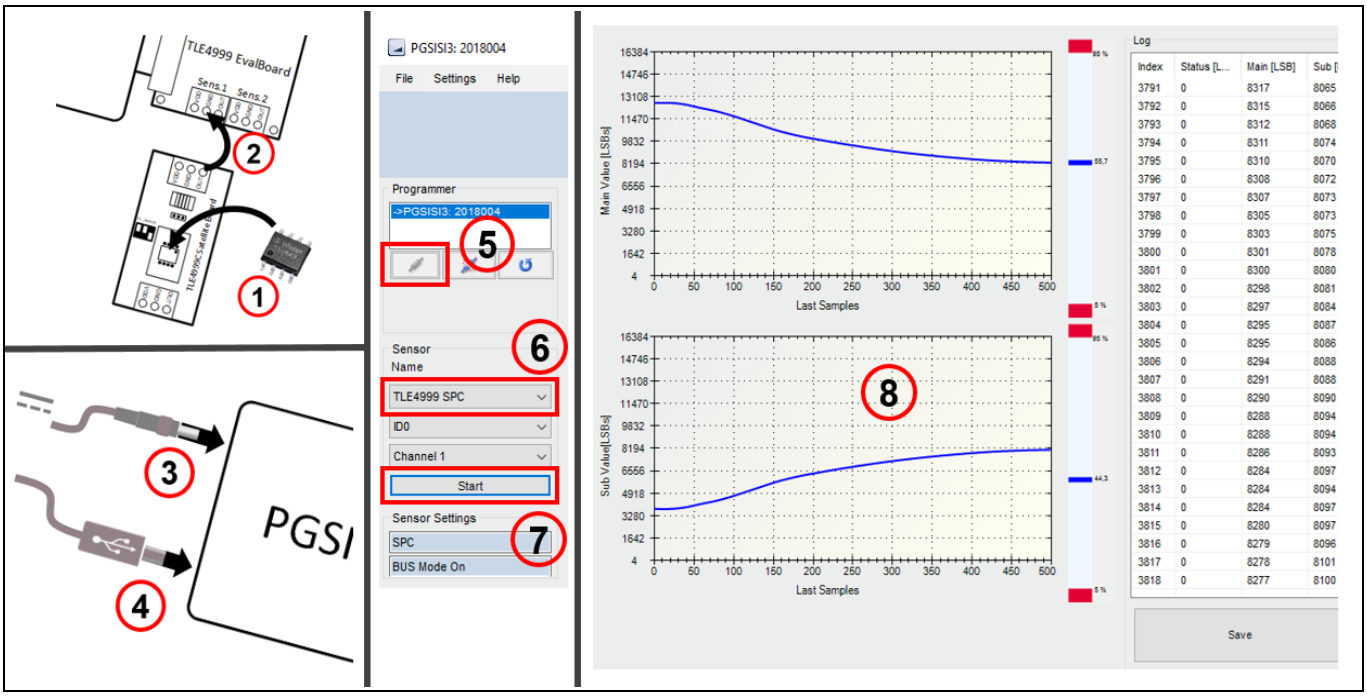

Figure 1 Evaluation kit software quick start

- 1) Plug the sensor into the satellite board.
- 2) Attach the satellite board to the TLE4999 EvalBoard.
- 3) Plug the power supply to the PGSISI box.
- 4) Establish USB connection between PGSISI box and PC.
- 5) Connect the PGSISI box to the evaluation kit software.
- 6) Select the attached sensor (PSI5 or SPC). The software detects automatically the correct setting.
- 7) Start the communication to the sensor.
- 8) Measurement data is displayed in the graphs and log.

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1 TLE4999 evaluation kit hardware

The evaluation kit consist of several parts. Basis of all variants is the PGSISI box which is directly connected to the computer via USB. Depending on the used sensor, either the PSI5 or the SPC satellite board is attached to the PGSISI box to communicate with the sensor.

1.1 PGSISI box

The PGSISI box is connected to the computer and to a power supply to provide the communication between the sensor and the evaluation software.

Figure 2 PGSISI box with power supply and USB cable

1.2 TLE4999x EvalBoard

To use a TLE4999 satellite board with the PGSISI box, the EvalBoard is necessary as bridge. It is directly connected to the PGSISI box and offers multible connectors for up to 2 PSI5 or SPC sensors.

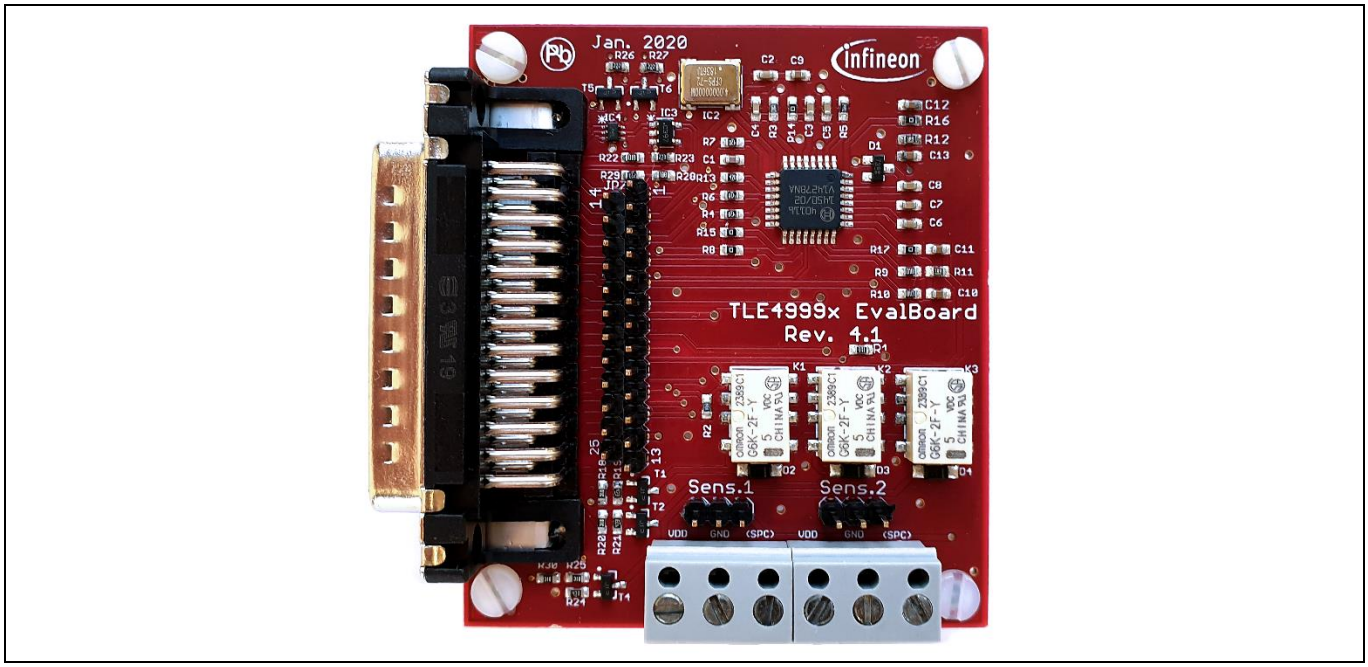

Figure 3 TLE4999x EvalBoard

1.3 TLE4999I3 PSI5 satellite board

To connect a TLE4999I3 sensor with PSI5 interface to the PGSISI box an adapter PCB is needed. This satellite board is connected with two wires to the EvalBoard and the PGSISI box to enable a sensor communication.

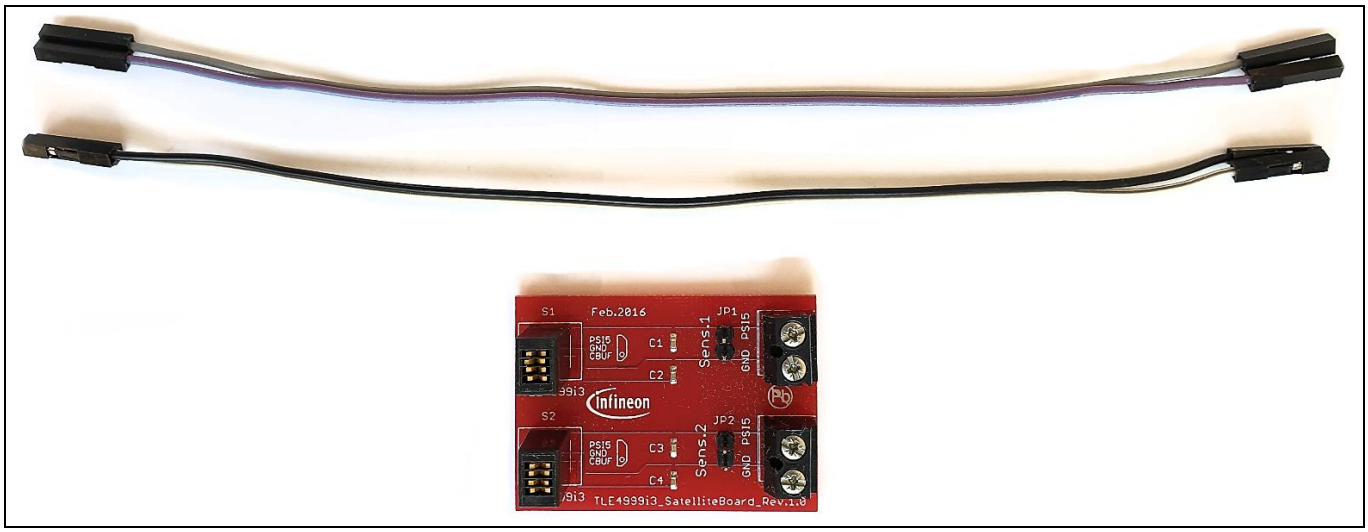

Figure 4 TLE4999i3 PSI5 satellite board with connection cables

1.4 TLE4999C SPC satellite board

To connect a TLE4999C sensor with SPC interface to the PGSISI box an adapter PCB is needed. This satellite board is connected with three wires to the EvalBoard and the PGSISI box to enable a sensor communication.

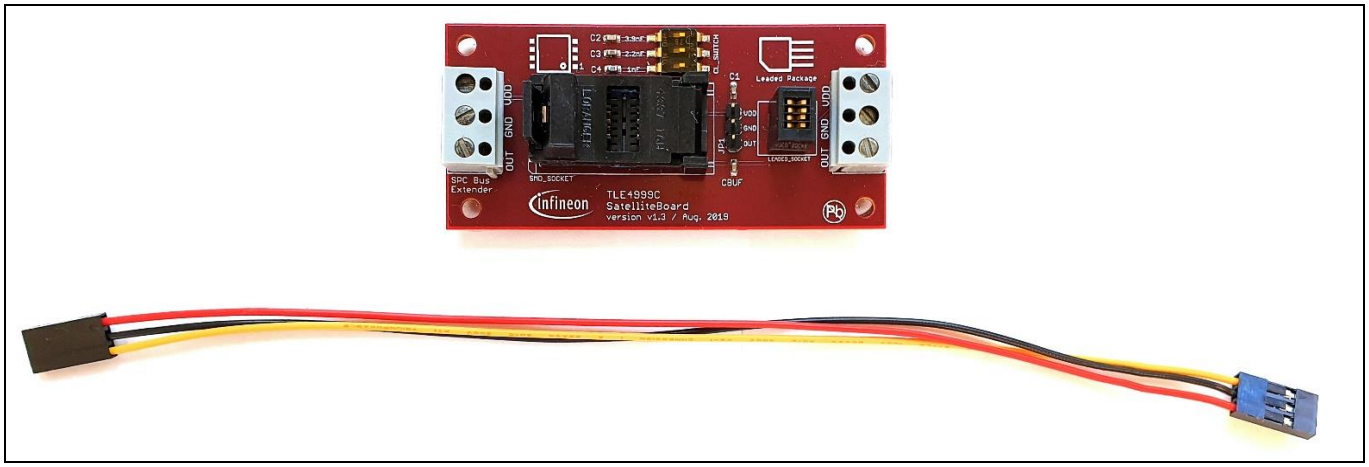

Figure 5 TLE4999C SPC satellite board with connection cable

2 Using of TLE4999 evaluation kit for the first time

2.1 Install evaluation kit software

Before using the evaluation kit please install the software. New versions of the software can be downloaded from the Infineon website:

https://www.infineon.com/cms/en/product/sensor/magnetic-sensors/magnetic-position-sensors/linear-halls/#!tools

2.2 Connect the evaluation kit hardware to the computer

To use the evaluation kit the sensor has to be connected via a satellite board to the PGSISI box. Furthermore the PGSISI box needs to be connected to the computer and power supply. Please use the included USB cable and power supply.

2.2.1 TLE4999I3 PSI5 satellite board

If a PSI5 sensor should be connected to the PGSISI box, the PSI5 satellite board needs to be attached to the TLE4999 EvalBoard. As the PSI5 standard needs only two wires for communication and power supply, only the VDD/PSI5 and GND pins of the EvalBoard and the satellite board have to be connected (see Figure 6).

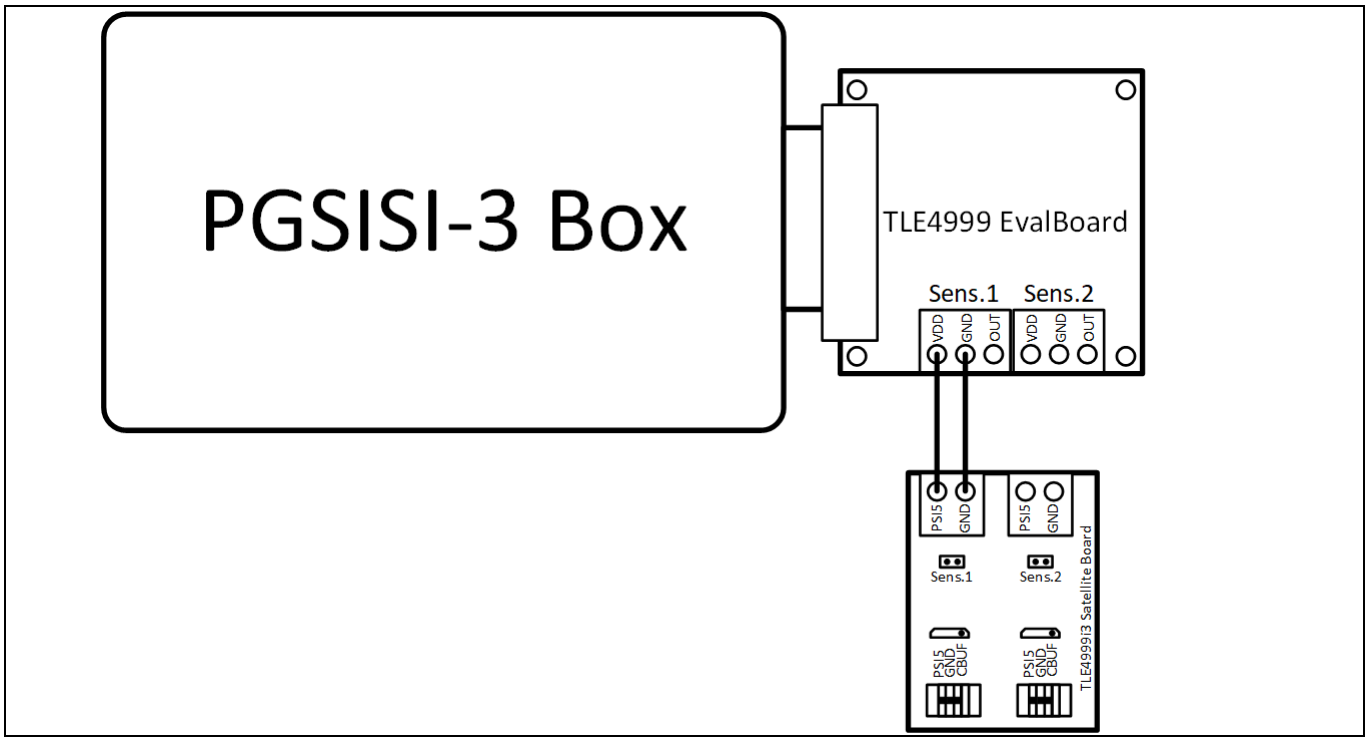

Figure 6 TLE4999i3 PSI5 satellite board connection to PGSISI box

2.2.2 TLE4999C SPC satellite board

If a SPC sensor should be connected to the PGSISI box, the SPC satellite board needs to be attached to the TLE4999 EvalBoard. As the SPC standard needs three wires for communication and power supply, the VDD, SPC and GND pins of the EvalBoard and the satellite board have to be connected (see Figure 7).

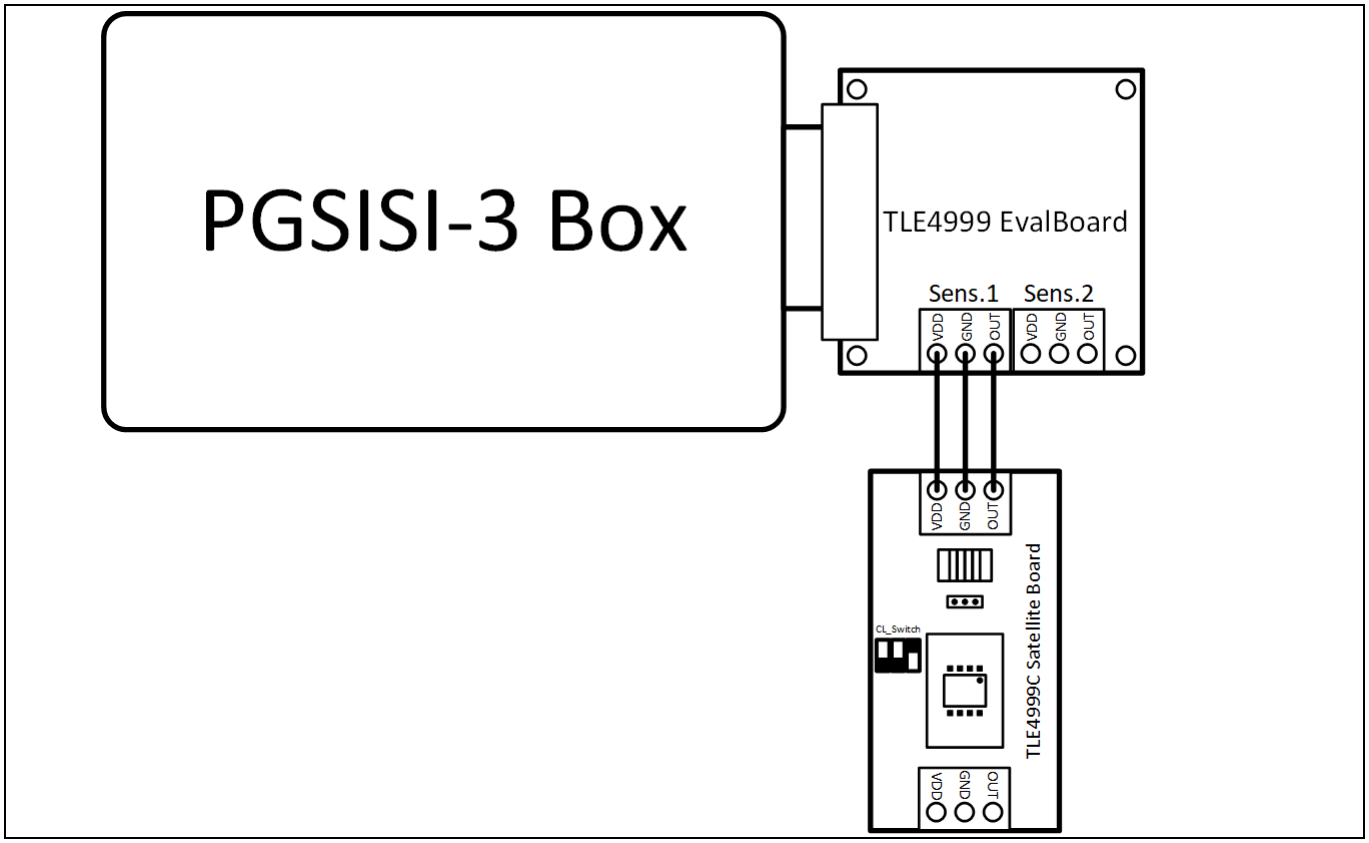

Figure 7 **TLE4999C SPC satellite board connection to PGSISI box**

Attention: ***To ensure a correct communication with the sensor, the CL_SWITCH dip switch needs to be set accordingly to the selected SPC unit time. Please see Table 1 for more information.***

Table 1 **CL_SWITCH settings**

Unit time	**0.5 – 1 µs**	**1.05 – 2 µs**	**2.05 – 3 µs**
CL_SWITCH	1: ON 2: OFF 3: OFF	1: OFF 2: ON 3: OFF	1: OFF 2: OFF 3: ON

3 Evaluation kit software

The evaluation kit software offers an easy possibility to communicate with the sensor and displays the sensor out data. Furthermore the software has access to the sensor EEPROM to configure TLE4999 sensors. For quick sensor adjustment configuration wizards are implemented.

3.1 Graphical user interface (GUI)

The user interface is separated in three sections. On the left side the settings for the communication with the PGSISI bix and the sensor are located (1). In the middle the measurement data is displayed (2). Both channels are are shown seperatly. For each channel the Hall value is displayed in a waveform graph in LSBs and in a second bar graph in percentage. On the right side the output protocol data is shown (3). Additional sensor configuration function are available in the settings menu.

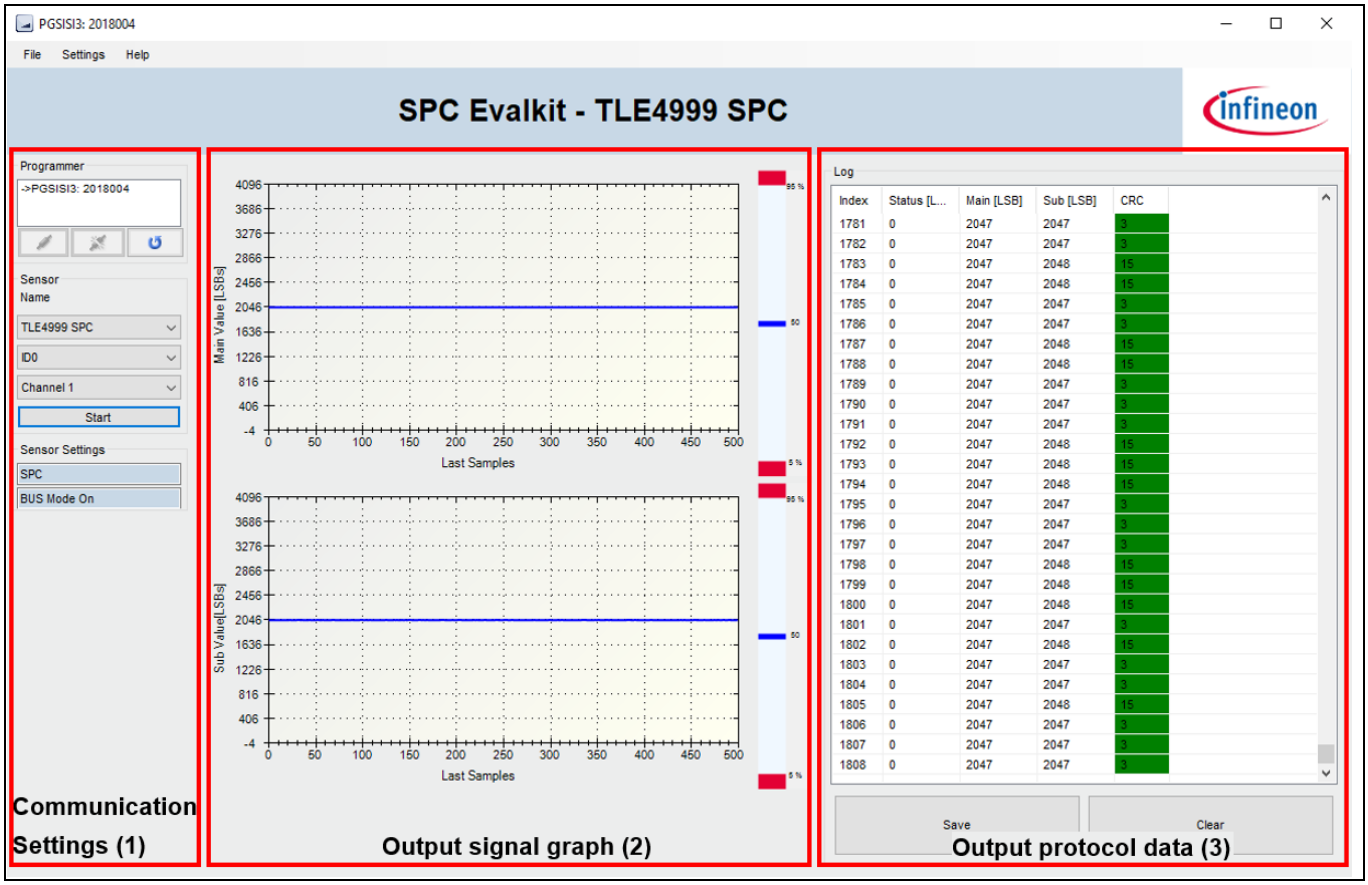

Figure 8 Evaluation kit software user interface

3.2 Evalkit software – basic functions

When the PGSISI box is powered and attached to the computer the evaluation kit software can be started. The PGSISI box is displayed automatically in the programmer list. In case the box is attached after starting the software the list can be refreshed.

After connecting the PGSISI box to the software the correct sensor has to be selected in the drop down menu. The softwar then automatically detects the correct communication parameters.

The “Start” button enables the measurement and data visualization.

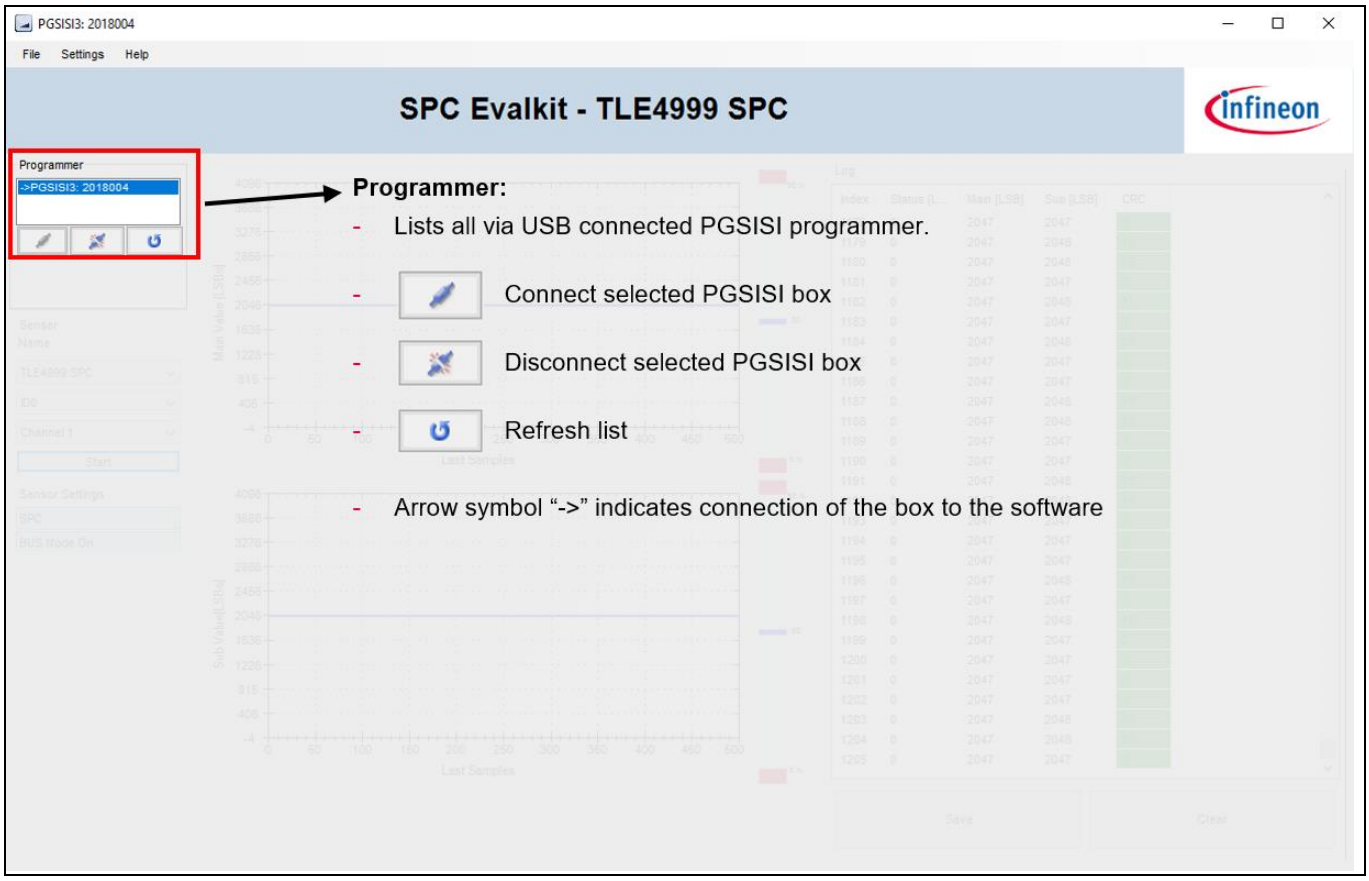

Figure 9 Connect the PGSISI box to the evaluation kit software

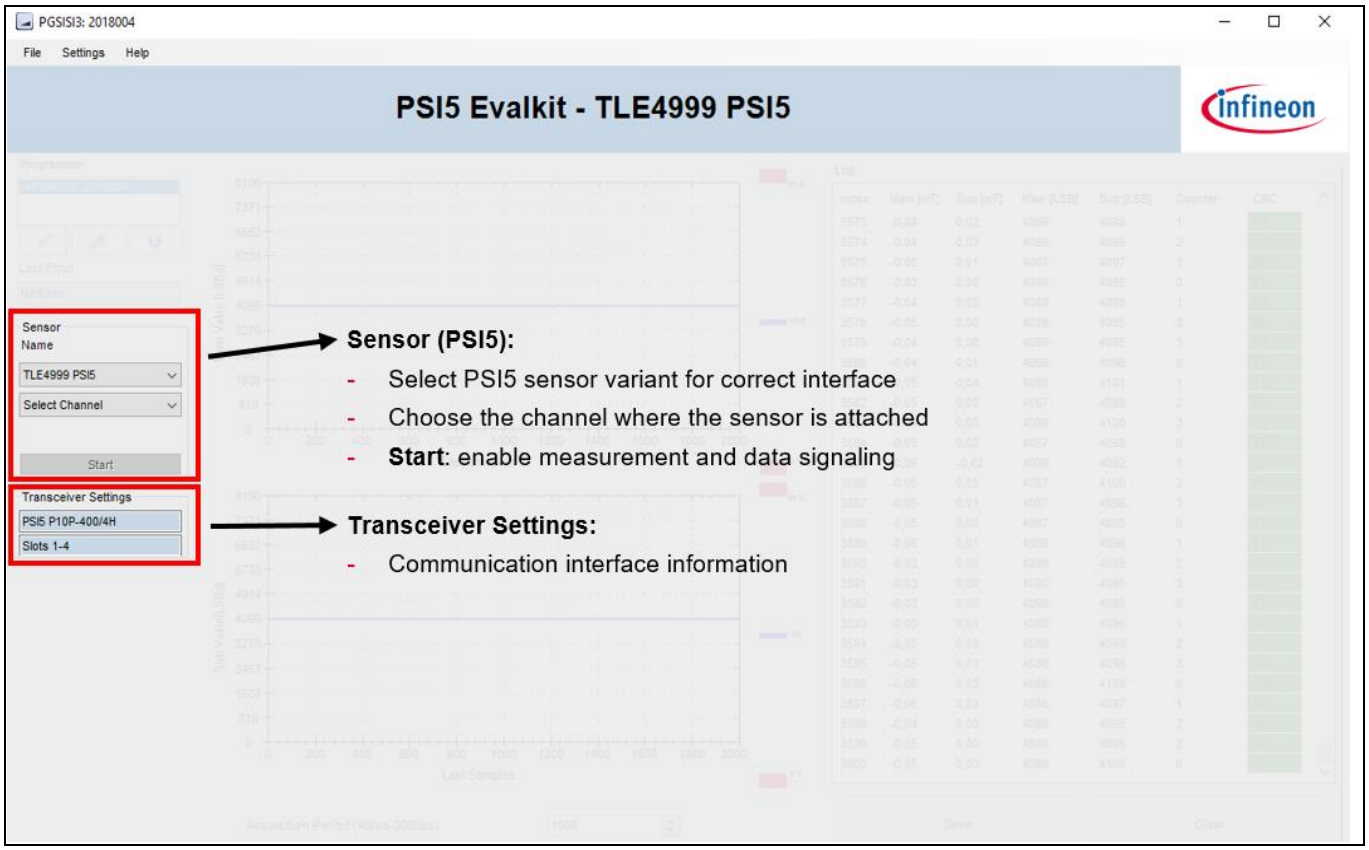

Figure 10 PSI5 communication interface settings

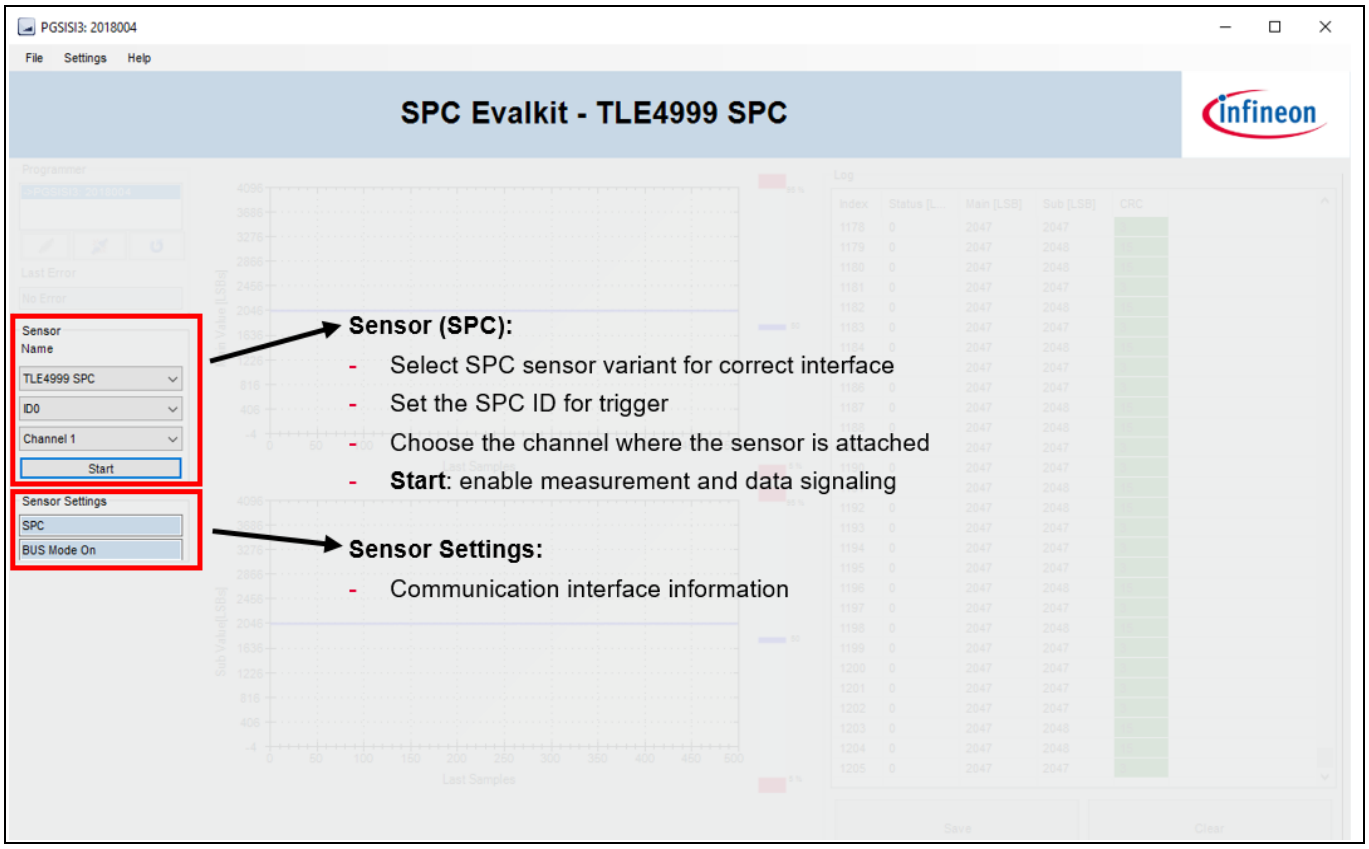

Figure 11 SPC communication interface settings

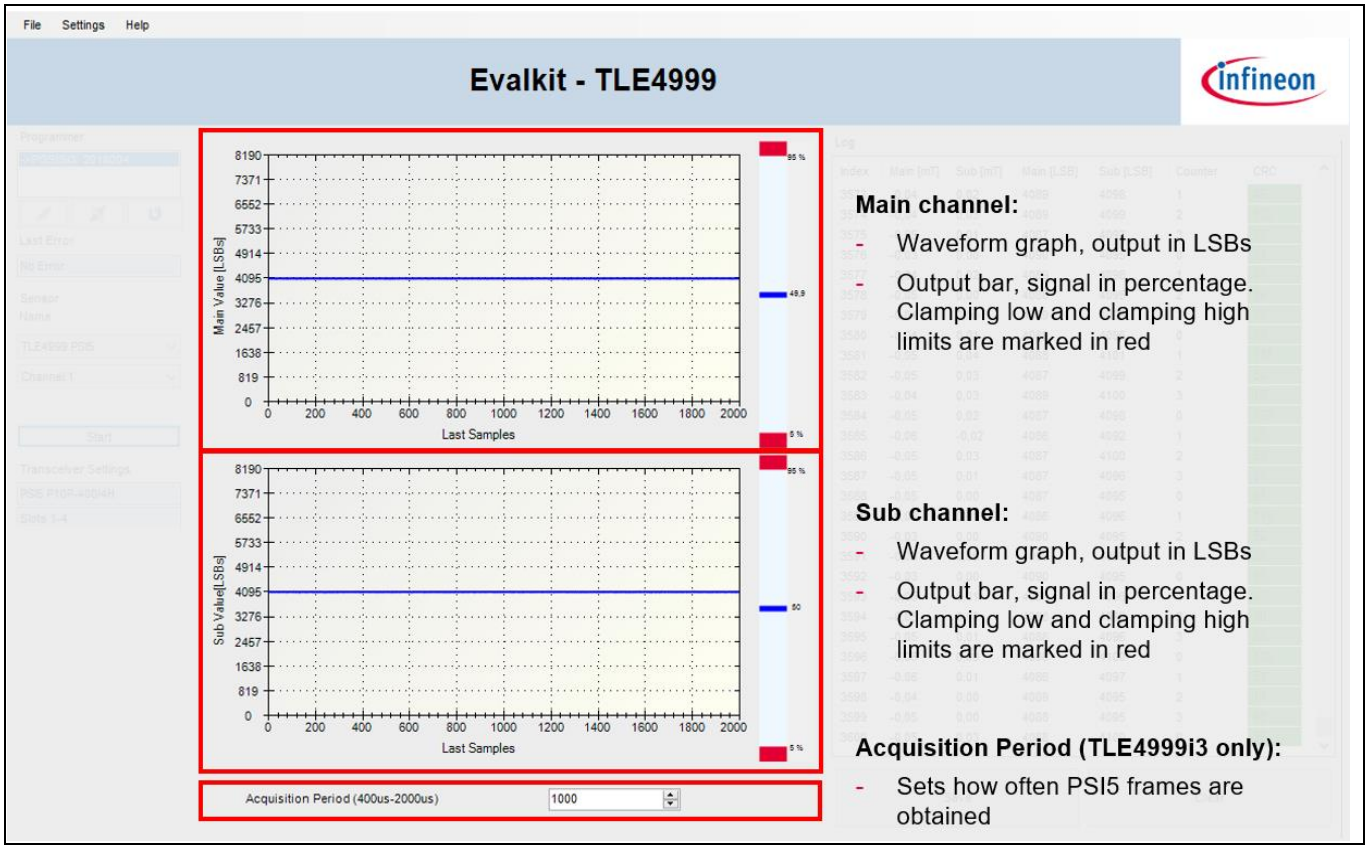

Figure 12 Waveform and bar graph of measurement data

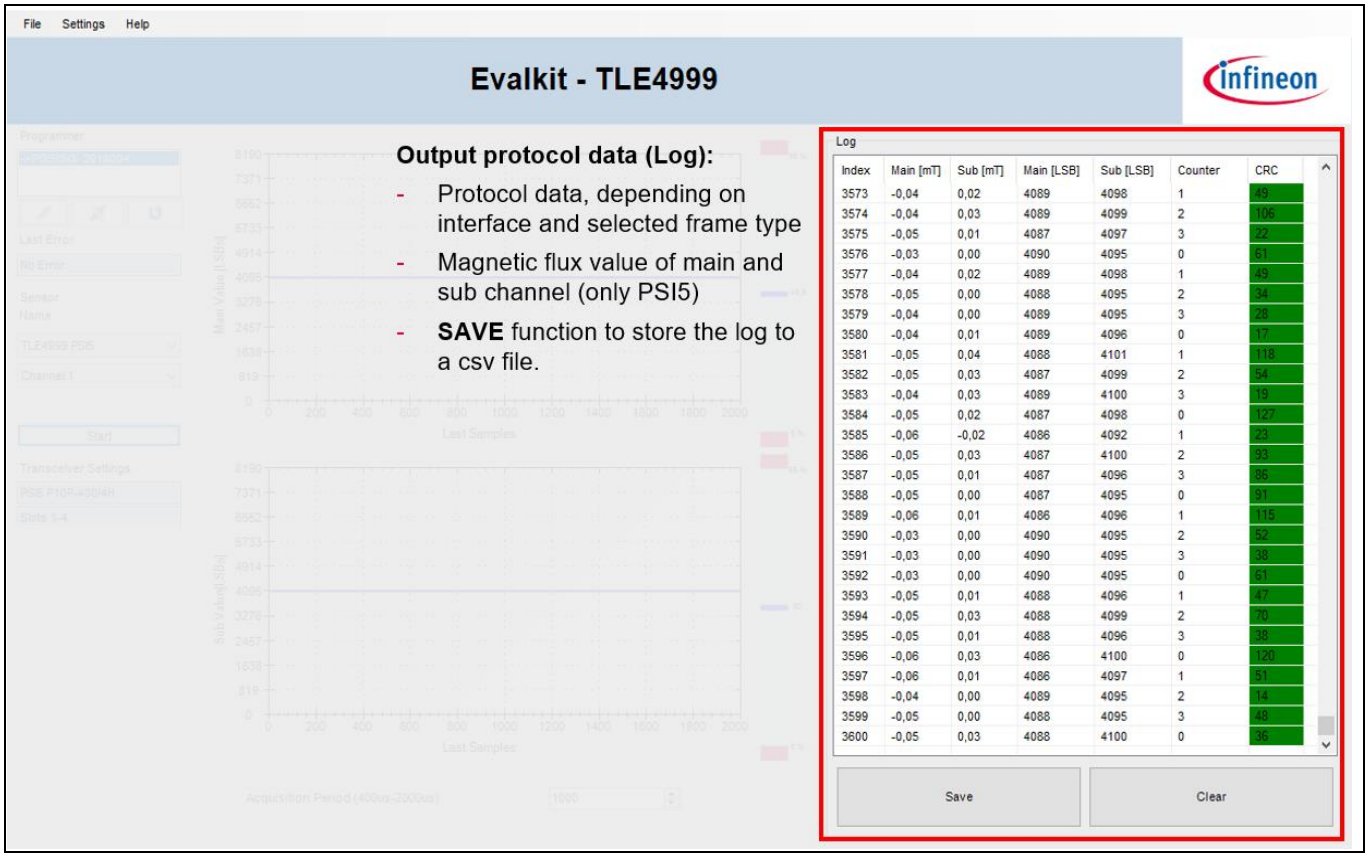

Figure 13 Measurement data log

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Evalkit Software for TLE4998												
2	Date: Donnerstag	19. November 2020											
3	Time:11:48:47												
4													
5	H_ADC [LSB]	H_CAL [LSB]	T_ADC [LSB]	T_CAL [LSB]	Dout [LSB]	Status [LSB]	SCAL [LSB]	SADC [LSB]	Sensor output [LSB]	Status [LSB]	CRC [LSB]	Temp [LSB]	Unit time [us]
6	0x0016	0xFFFA	0x60EB	0xFEF1	0x7FED	0xAA3D	0x1F9B	0x343A	0x07FE	0x0001	0x000E		2.8
7	0x0016	0xFFFD	0x60EC	0xFEF3	0x7FF6	0xAA3D	0x1F9C	0x343A	0x07FF	0x0001	0x0003		2.8
8	0x0019	0xFFFD	0x60EB	0xFEF3	0x7FF6	0xAA3D	0x1F9B	0x3439	0x07FF	0x0001	0x0003		2.8
9	0x0016	0xFFFB	0x60EC	0xFEF3	0x7FF0	0xAA3D	0x1F9A	0x3439	0x07FF	0x0001	0x0003		2.8
10	0x0017	0xFFFD	0x60ED	0xFEF3	0x7FF6	0xAA3D	0x1F9A	0x343A	0x07FF	0x0001	0x0003		2.8

Figure 14 Log data from csv file

4 How to configure the TLE4999 linear Hall sensor

The TLE4999 sensor offers the possibility to adjust its configuration. An integrated EEPROM is used to store the configuration data. To edit the sensor settings, the EEPROM is accessable via the evaluation kit software. All sensor paramters can be edited directly in the EEPROM Map. The Simplified EEPROM Map (only TLE4999C), 2 Point Calibration (only TLE4999I3) and Temperature Compensation function of the software offers an easier possibility to edit the most important parameters.

4.1 Simple sensor parameter adjustment (TLE4999C only)

For an easy setup of the most important settings of the TLE4999C the Simplified EEPROM Map can be used. The window is structured in three parts, sensor communication, measurement parameters and multipoint calibration settings. A detailed explanation of the multipoint calibration can be found in the user manual.

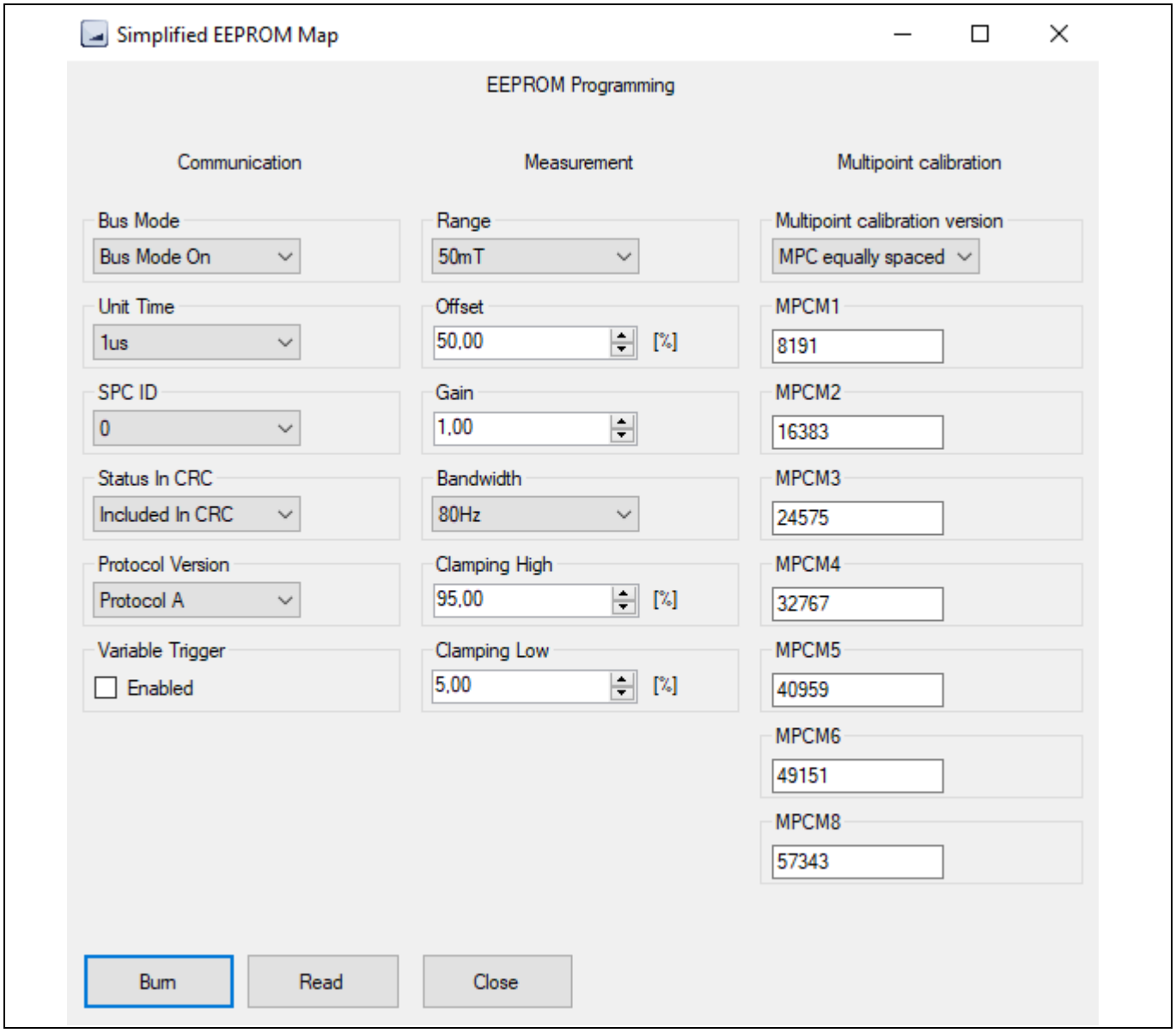

Figure 15 Simple sensor configuration (TLE4999C version only)

Note: Please check CL_SWITCH setting of satellite board in case of unit time change (see Table 1).

4.2 Temperature compensation

With the temperature compensation setup it is possible to compensate the magnetic remanence degradation due to temperature rising. Beside user defined values the software offers predefined values for some standard magnets.

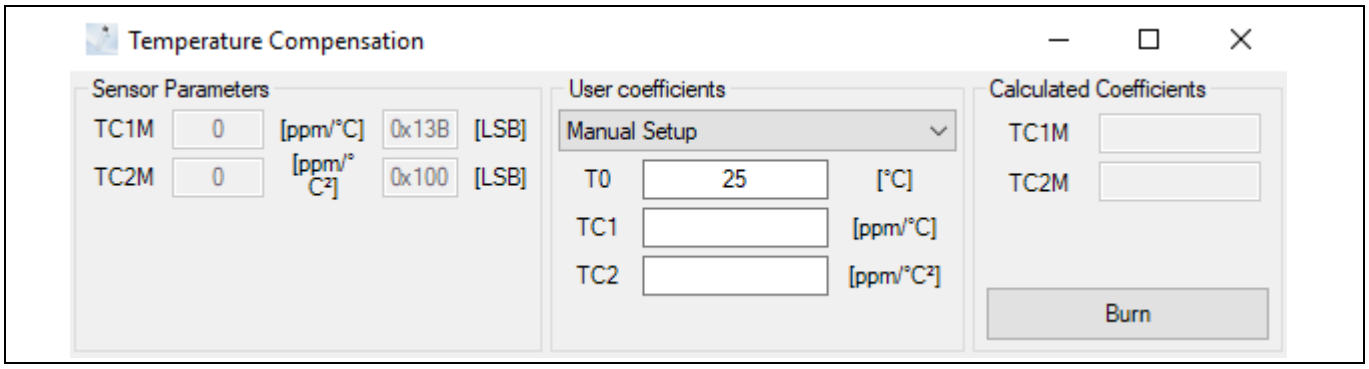

Figure 16 Temperature compensation adjustment

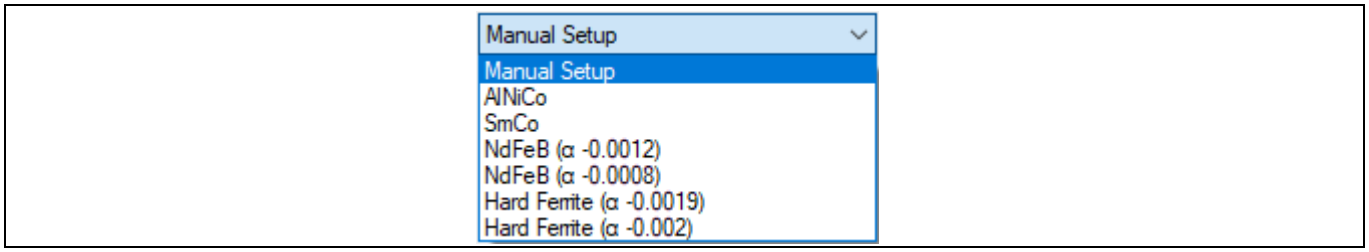

Figure 17 Temperature compensation, predefined coefficients for standard magnets

4.3 2-point calibration (TLE4999i3 only)

In order to configure an application specific output-characteristic, a two-point calibration procedure can be performed. The software offers an easy way to measure the required values and calculate the sensor settings gain and offset accordingly. A detailed step by step manual is shown in the Two Point Calibration window or in the TLE4999I3 user manuals.

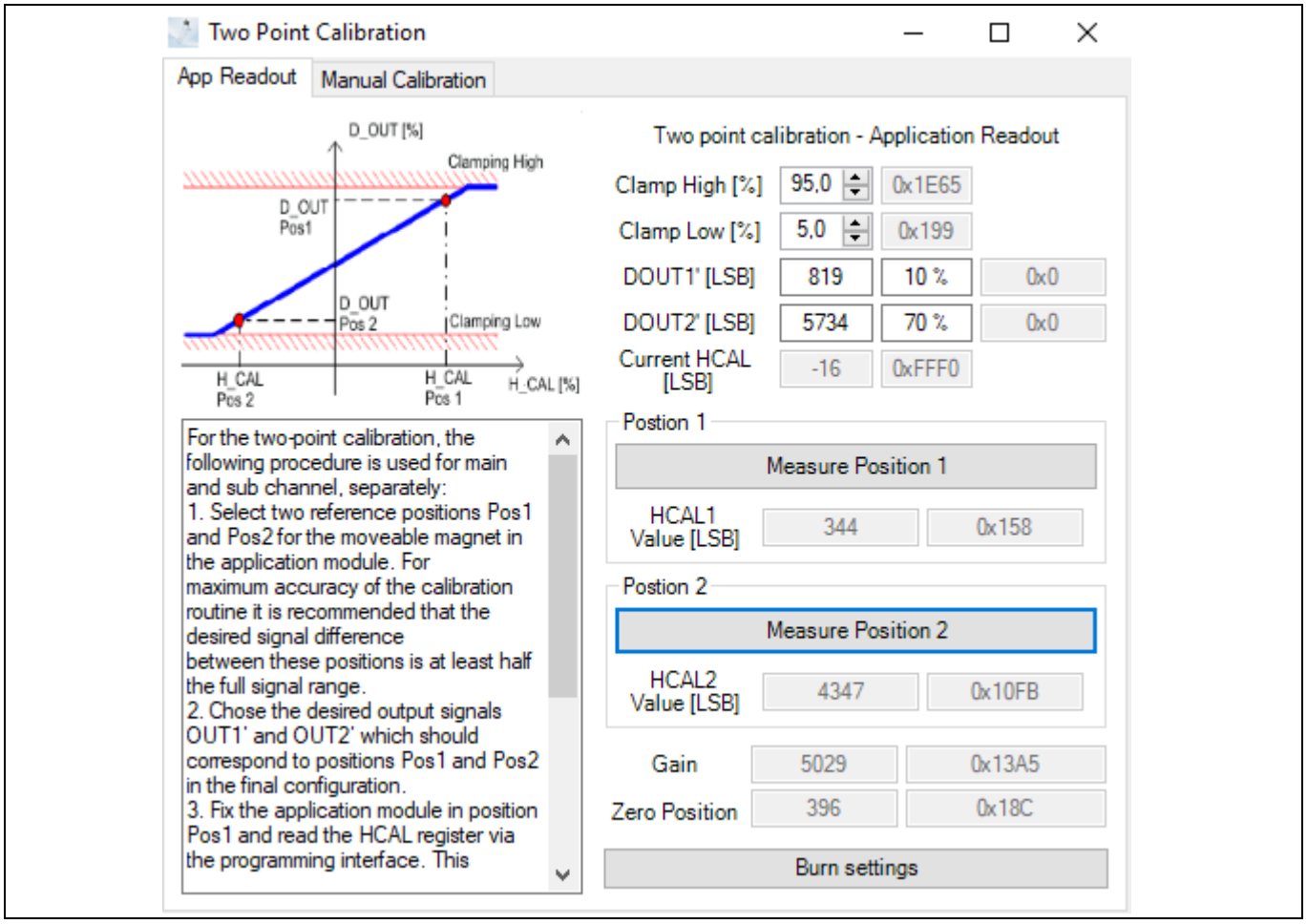

Figure 18 Two point calibration (TLE4999I3 version only)

5 TLE4999 EEPROM configuration

With the TLE4999 evaluation kit software it is possible to access all parameters saved in the user space of the EEPROM. The map gives an overview of the current settings while each parameter can be edited seperatly.

5.1 EEPROM map

The EEPROM Mapping window gives direct access to each EEPROM cell. In the left column all user EEPROM lines are listed. If a line is expanded, all included parameters are listed (see Figure 19). When a parameter is selected, the corresponding bits are highlighted in the map (1, 2). The values can be edited either using hexadecimal or decimal numbers (3). To make EEPROM changes effective the map from the software needs to be “burned” into the sensor´s EEPROM (see Table 2).

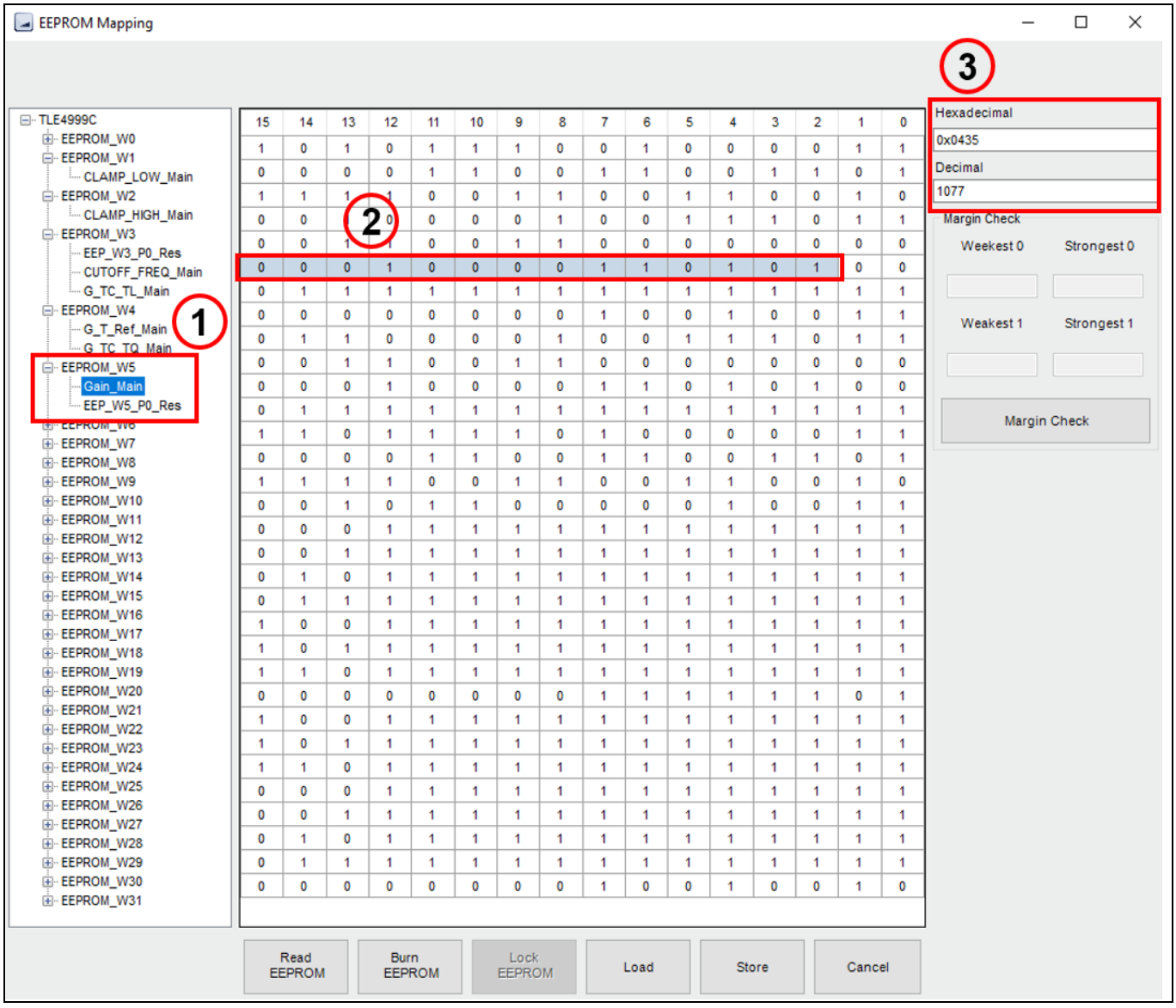

Figure 19 Sensor EEPROM map

5.2 EEPROM Mapping functions

Table 2 EEPROM Mapping functions

Read EEPROM	Read EEPROM content from sensor and refresh EEPROM map in evaluation kit software.
Burn EEPROM	Burn current Mapping data from evaluation kit software to sensor EEPROM.
Lock EEPROM	Lock sensor EEPROM. *No further data change of the sensor EEPROM is possible afterwards.*
Load	Load a saved EEPROM map from the hard disk into the evaluation kit software.
Store	Save the current EEPROM map data to a file on the hard disk.
Cancel	Close the EEPROM Mapping window and discard all changes.

6 Diagnostic tools

6.1 EEPROM margin test

To check the correct programming of the EEPROM cell margin voltages, the software can perform a margin test. The software shows the lowest and the highest of the “0” and “1” cell margin value.

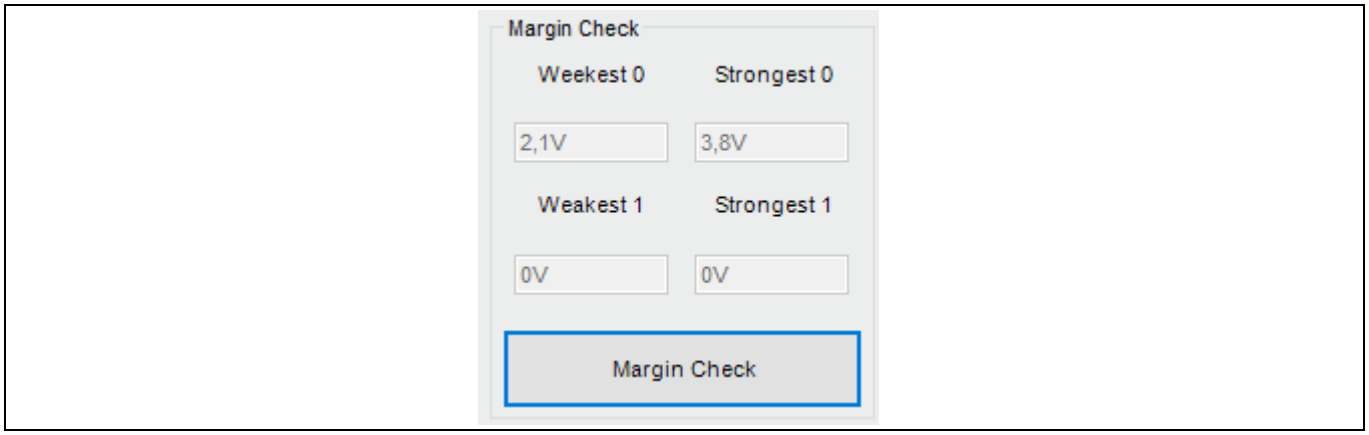

Figure 20 EEPROM margin voltage test.

Note: For information regarding correct cell voltage levels please see TLE4999 User Manual.

6.2 DSP register

The Register Readout window shows continuously the values of the DSP registers of the main and sub channel.

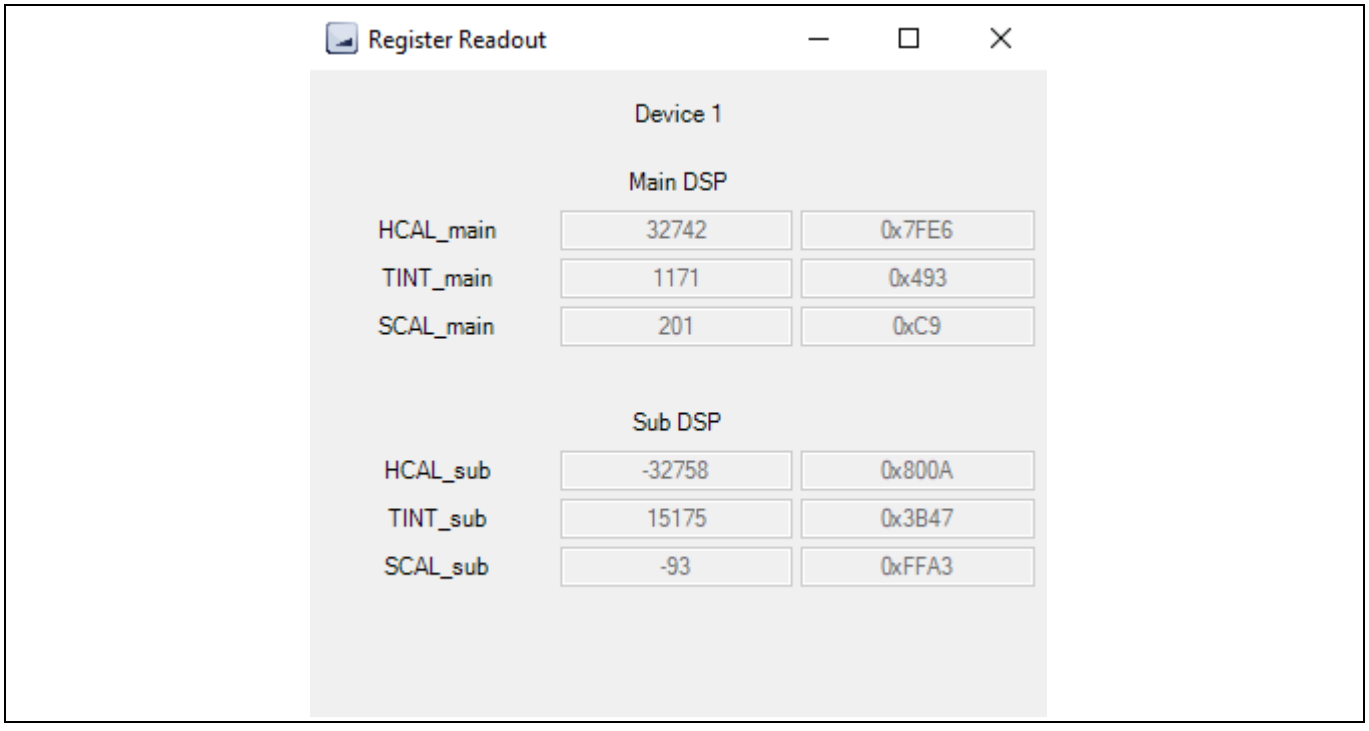

Figure 21 TLE4999C sensor DSP registers

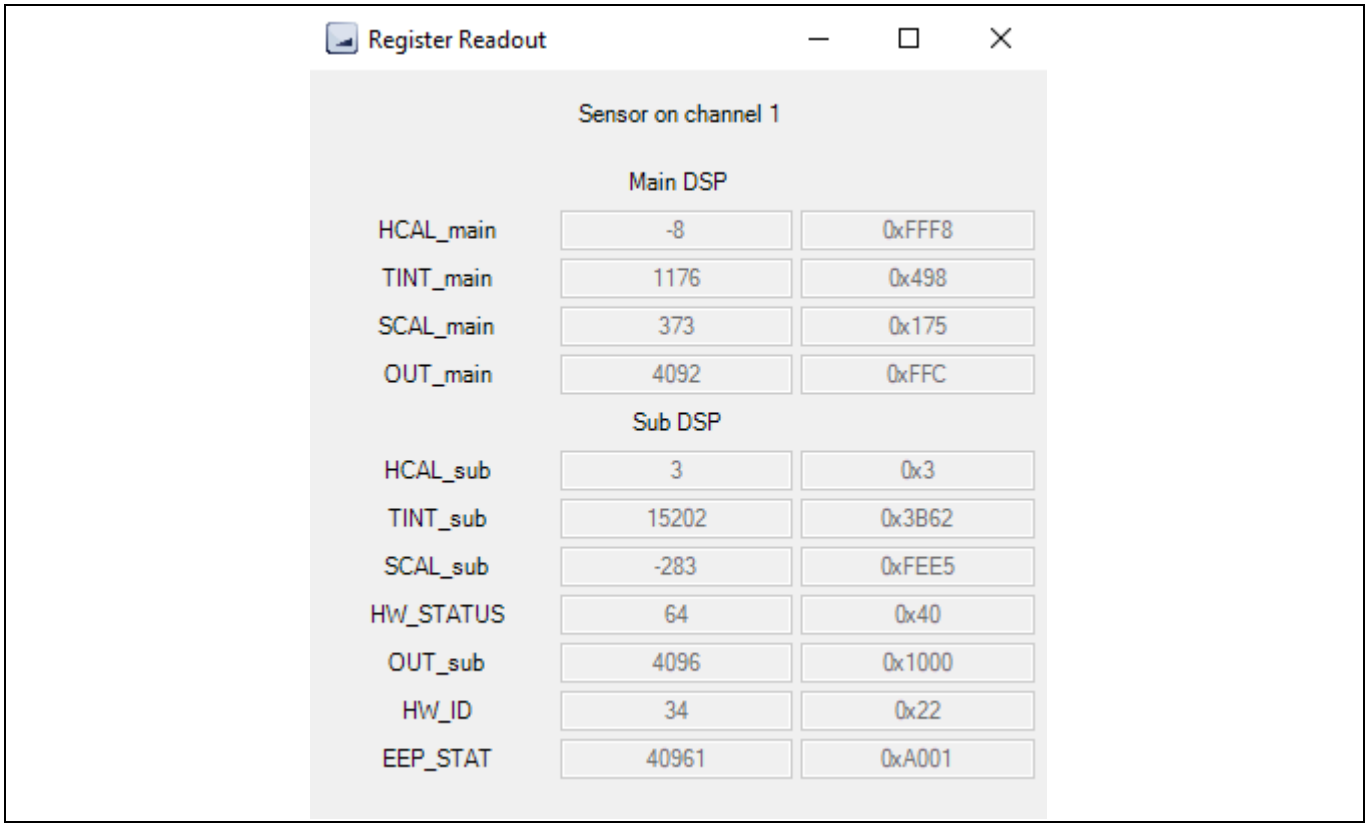

Figure 22 TLE4999i3 sensor DSP registers

Revision history

Document version	Date of release	Description of changes
1.0	2020	Initial release

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