Getting started with STSW-STWBCGUI for wireless power transmitter evaluation boards based on the STWBC chip family

Introduction

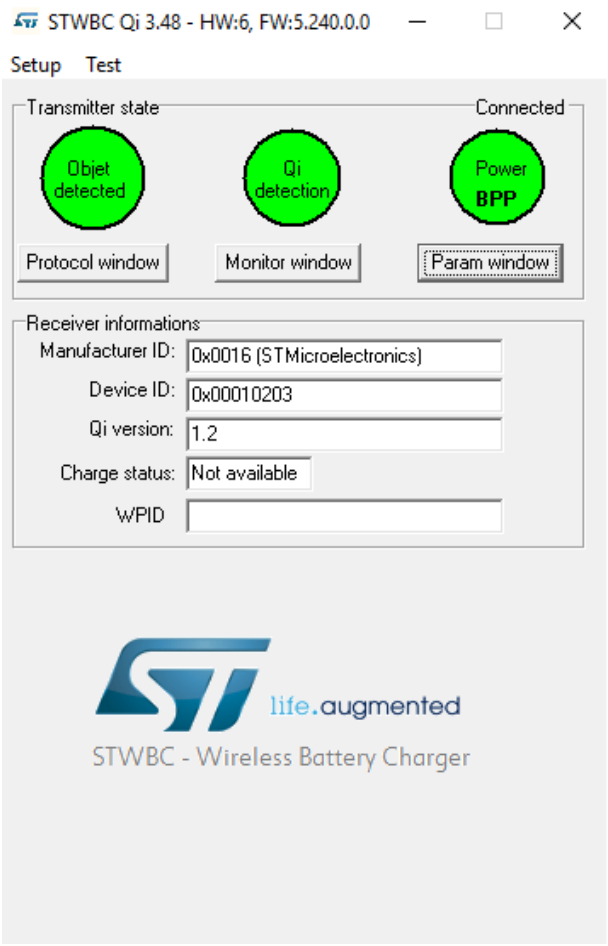
The STSW-STWBCGUI graphical user interface lets you configure the main parameters of the STWBC chip family-based wireless power transmitters.

It also provides runtime information such as power delivered, bridge frequency, demodulation quality and protocol status.

The GUI facilitates the monitoring of all the board parameters and ADC measurements as well as downloading new firmware or changing settings.

The GUI requires: any STWBC chip family-based evaluation board, a USB-to-UART jack cable or a USB-to-UART dongle (provided with the board) coming with a standard micro-USB cable, and a Windows PC.

Figure 1. STSW-STWBCGUI graphical user interface



1 Getting started

1.1 Overview

The STSW-STWBCGUI works with the wearable transmitter boards based on STWBC-WA (STEVAL-ISB045V1) and on STWBC-EP/STWBC-MC (EVALSTWBC-EP and STEVAL-ISB047V1).

The STSW-STWBCGUI features are:

- Complete monitoring platform
- Transmitter status and Qi receiver information
- Rx to Tx communication protocol error display
- Parameter tuning window to facilitate system configuration (threshold, frequency, regulation)
- Foreign object detection (FOD) tuning and monitoring
- Firmware download

1.2 System requirements

To use the STSW-STWBCGUI, you need:

- a PC with Microsoft Windows operating system (XP or later versions)
- a USB-to-UART dongle board
- NET Framework 4
- FTDI VCP driver https://www.ftdichip.com/Drivers/VCP.html
- ST-LINK USB driver
- STVP programming tool

2 STSW-STWBCGUI installation

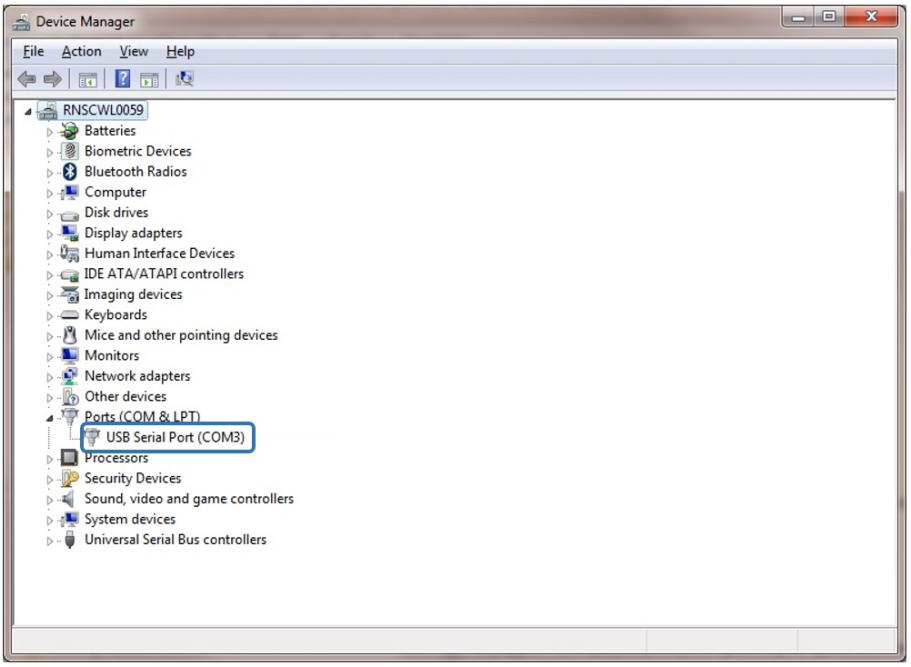
Step 1. Install the STSW-STWBCGUI by launching the STWBC_GUI_Setup.msi installation file.

Figure 2. STSW-STWBCGUI - launching the installation file

Step 2. Connect the wireless power transmitter board to the PC with the USB-to-UART dongle board and a cable on J1 connector.

Step 3. Check Windows Device Manager to identify the correct port number and select the appropriate USB serial COM port.

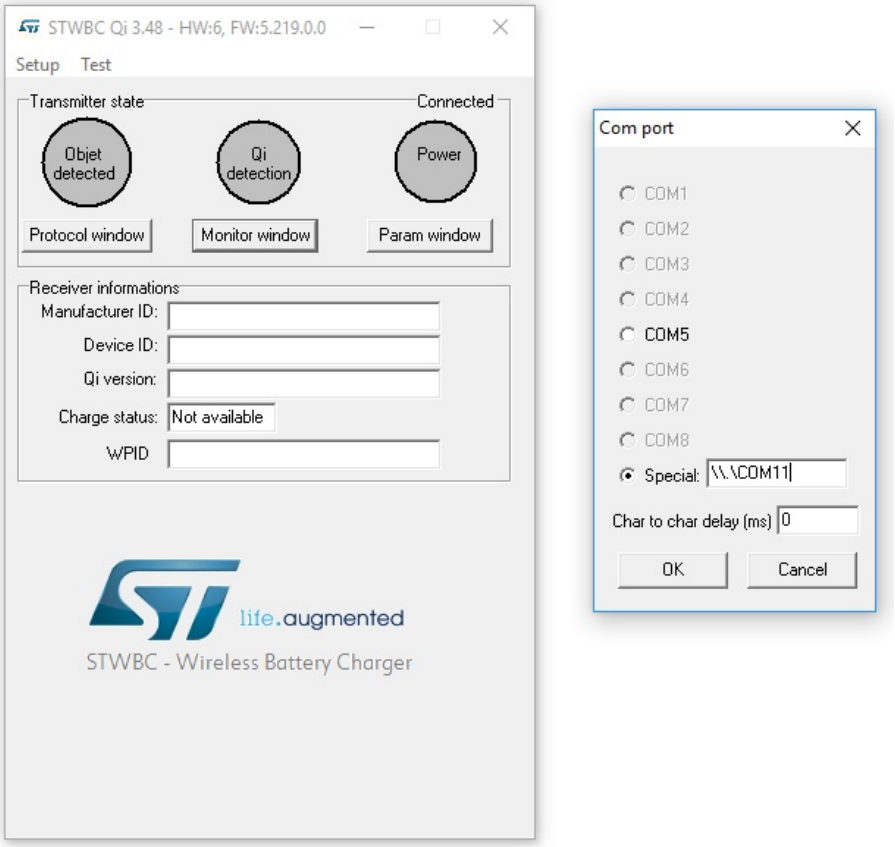
Figure 3. Windows Device Manager: COM port selection (highlighted)



Step 4. Enter a specific COM port number (if not listed in the selection window) in the [**Special**] text box (e.g. “COM11” or the specific syntax \\.\COM11).

If the STSW-STWBCGUI is switched off, check whether the chosen COM port is already in use on your computer. If so, try another USB port.

Figure 4. STSW-STWBCGUI - selecting a specific COM port



Step 5. Press [**OK**].

The STSW-STWBCGUI is ready to run.

3 How to use the STSW-STWBGUI

3.1 Using the GUI with wearable transmitter boards based on STWBC-WA (STEVAL-ISB045V1)

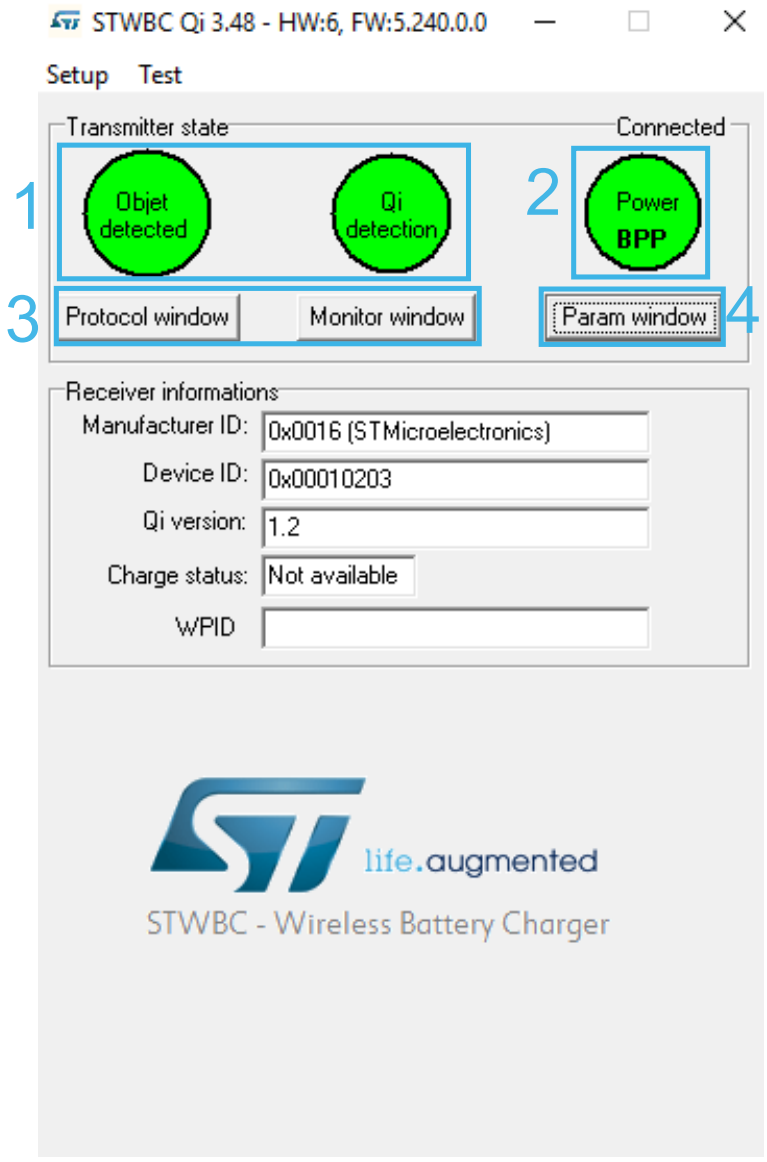
The STSW-STWBCGUI can monitor all STWBC-WA operations.

3.1.1 Main screen

The main screen shows information about the transmitter and Qi receiver status.

Figure 5. STSW-STWBCGUI - object detected and charge in progress

1. Transmission state indicator
2. Power transmission indicator
3. Debug window buttons
4. Parameter window buttons



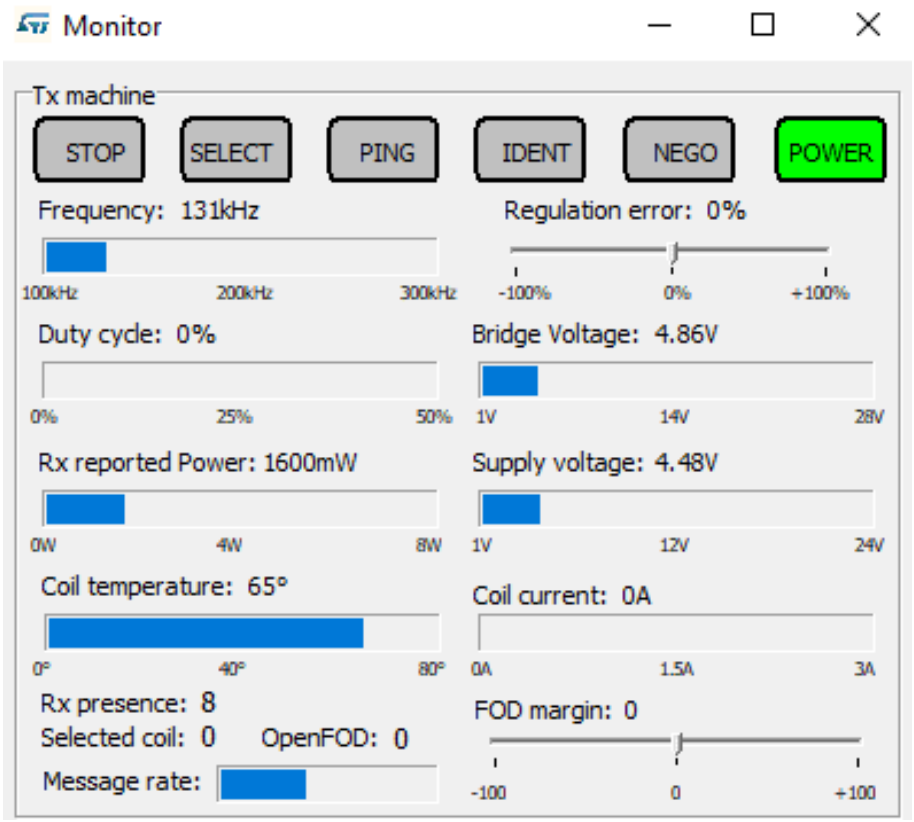
3.1.2 Monitor window

The Monitor window allows you to control internal STWBC-WA variables such as bridge voltage and frequency, demodulation quality, regulation error, Rx reported power, coil temperature, etc.

The figure below shows (in counterclockwise direction) all the variables you can set:

- **Frequency** - Bridge frequency
- **Duty cycle** - Bridge duty cycle (delta vs 50%)
- **Rx reported power**
- **Coil temperature** - ADC coil temperature
- **Rx presence** - RX presence metric
- **Message rate** - Message rate (demodulation quality)
- **OpenFOD** - OpenFOD measurement (N/A on this platform)
- **Regulation error** - Control error stability
- **Bridge voltage** - ADC bridge voltage (5 V)
- **Supply voltage** - ADC supply voltage (V_{BUS})
- **Coil current** - ADC coil current (N/A on this platform)
- **FOD margin** (N/A on this platform)

Figure 6. STSW-STWBCGUI - Qi Monitor window



3.1.3 Protocol window

The STSW-STWBCGUI can also display Rx to Tx communication protocol errors for system debugging.

Figure 7. STSW-STWBCGUI - protocol window

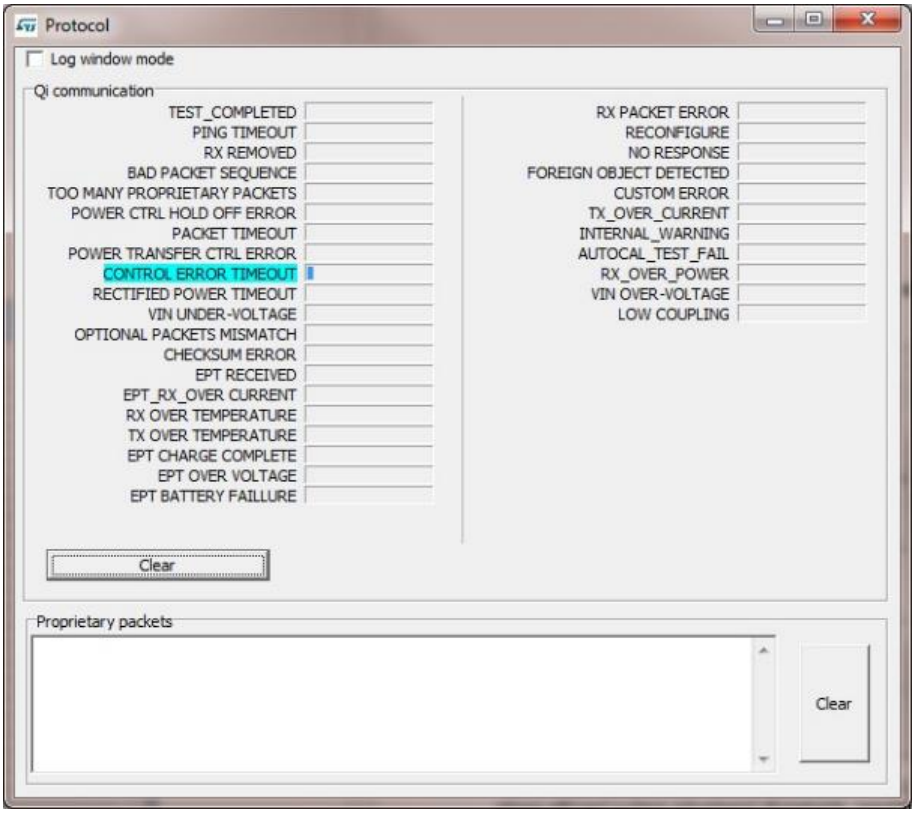


Table 1. STSW-STWBCGUI - protocol window details

Parameter	Description
TEST_COMPLETED (AUTOCAL_TEST_DONE)	Status bit for autocalibration, to be done after each firmware download.
PING_TIMEOUT	Occurs when the digital ping phase is not completed on time (1).
RX_REMOVED	Occurs when the Qi Finite State Machine detects that the Qi Rx has been removed in a specific case as after a “sticky error”.
BAD_PACKET_SEQUENCE	Occurs when the Qi received messages do not come in the order specified in the Qi standard.
TOO_MANY_PROPRIETARY_PACKETS	Occurs when more than 7 optional configuration packets are received during the Identification and Configuration phase (1).
POWER_CTRL_HOLD_OFF_ERROR	Occurs when the Power Control Hold-off Time parameter received in the Power Control Hold-Off packet is not inside the range [5, 205] ms (1).
PACKET_TIMEOUT	Occurs during the Identification phase when the Power Transmitter does not detect the start bit of the header byte of a next Packet in the sequence within the time interval (after the end of the directly preceding Packet in the sequence (1)).
POWER_TRANSFER_CONTROL_ERROR	Occurs in case the received power (obtained from the RECEIVED_POWER packet) is above the allowed power.
CONTROL_ERROR_TIMEOUT	Occurs in Power Transfer state when the control error packets are not received in time as described in the Qi standard.
RECTIFIED_POWER_TIMEOUT	Occurs in Power Transfer state when the received power packets are not received in time as described in the Qi standard.
VIN_UNDER_VOLTAGE (VBUS_DROP_DOWN)	Occurs when an undervoltage is detected and the power transmitter cannot provide the requested amount of power to the power receiver.

Parameter	Description
OPTIONAL_PACKETS_MISMATCH	Occurs in the Identification and Configuration phase when: • the number of optional configuration packets, received by the power transmitter, is equal to the value contained in the Count field of the configuration packet • after the [Ext] Identification packet, the received packet is not a configuration packet, not a power control Hold Off packet nor a proprietary packet (1)
CHECKSUM_ERROR	Occurs in the Identification and Configuration phase when the power transmitter does not receive a packet correctly.
EPT_RECEIVED	Occurs when a End Power Transfer packet has been received with a code different from Reconfigure, Charge complete, EPT over voltage, EPT over current, EPT over temperature, EPT battery failure or EPT no response.
EPT_RX_OVER_CURRENT	Occurs when an End Power Transfer Packet has been received with a code equal to Over Current.
RX_OVER_TEMPERATURE	Occurs when an End Power Transfer Packet has been received from RX with a code equal to Over Temperature.
TX_OVER_TEMPERATURE	Occurs when an overtemperature defect is detected on the transmitter side.
EPT_CHARGE_COMPLETE	Occurs when an End Power Transfer packet has been received with a code equal to Charge Complete.
EPT_OVER_VOLTAGE	Occurs when an End Power Transfer packet has been received with a code equal to Over Voltage.
EPT_BATTERY_FAILURE	Occurs when an End Power Transfer packet has been received with a code equal to Battery Failure.
EPT_RX_PACKET_ERROR	Occurs when an error is detected during the packet decoding.
EPT_RECONFIGURE	Occurs when an End Power Transfer packet has been received with a code equal to Reconfigure.
EPT_NO_RESPONSE	Occurs when an End Power Transfer packet has been received with a code equal to No Response.
FOREIGN_OBJECT_DETECTED	Occurs when a foreign object has been detected.
CUSTOM_ERROR	Occurs when an error comes from the customer code(2).
TX_OVER_CURRENT	Occurs when the transmitter detects a too high current in the Tx coil. It can typically happen when the coil is shorted. Internal measurement is checked through the bridge frequency programming.
INTERNAL_WARNING	Reserved (internal).
AUTOCAL_TEST_FAILED	Reserved (internal).
RX_OVER_POWER	N/A on the wearable platform.
VIN_OVER_VOLTAGE	N/A on the wearable platform.
LOW COUPLING	N/A on the wearable platform.
EPT_UNKNOWN	Occurs when an End Power Transfer Packet has been received with a code equal to Unknown.

1. *See Qi standard*
2. *This notification is specific to the transmitter, not part of Qi standard*

3.1.4 Parameter window

The STSW-STWBCGUI interface allows you to control the system (frequency, thresholds, regulation error), as well as store parameters to and load parameters from your computer.

The parameters have the following levels of protection:

- Level 0: parameters can be modified without protection
- Level 1: more critical parameters to be modified with caution.

Caution: You must click the [**Unlock param**] button before modifying it to avoid system malfunction or unexpected behavior.

Figure 8. STSW-STWBCGUI - parameter window unlock button

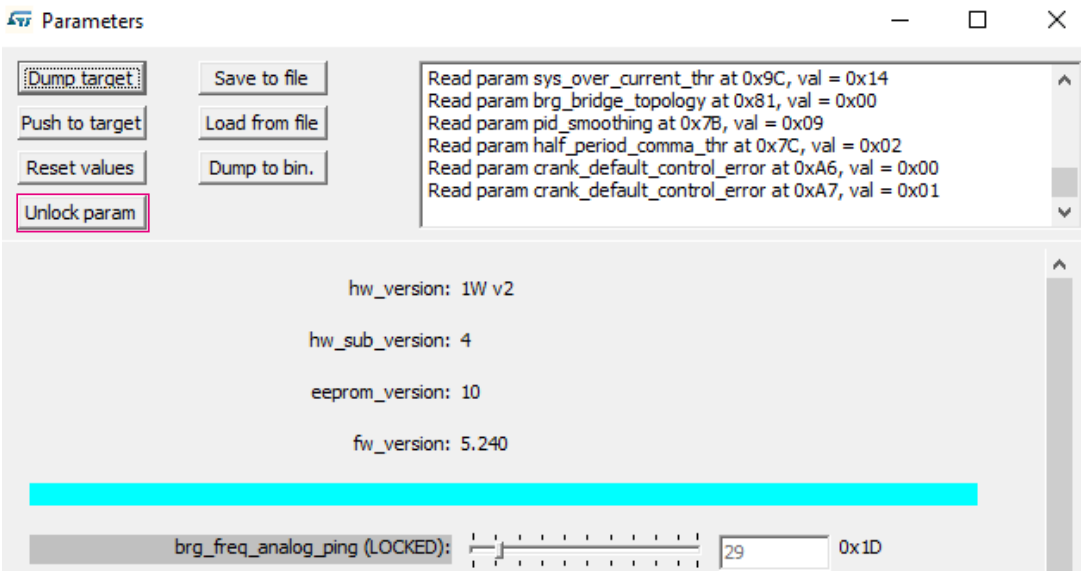


Figure 9. STSW-STWBCGUI - parameter window board information

1. Hardware version (read-only)
2. Hardware sub-version (read-only)
3. EEPROM version (read-only)
4. Firmware version (read-only parameter)

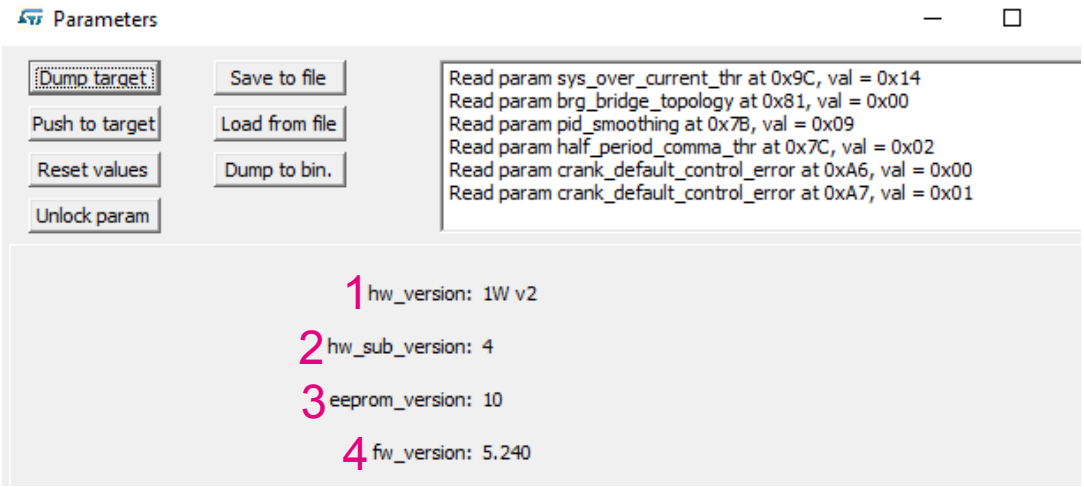


Figure 10. STSW-STWBCGUI - parameter window bridge frequency

1. Parameter used to set presence detection signal characteristics (analog ping). A higher value means the frequency is more shifted from the resonance frequency
2. Bridge frequency used during digital ping
3. Maximum bridge frequency allowed by the transmitter
4. Minimum bridge signal frequency allowed by the transmitter

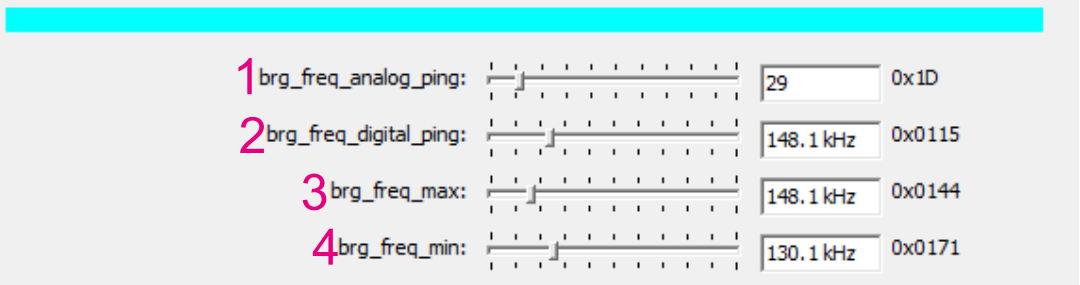


Figure 11. STSW-STWBCGUI - parameter window thresholds

1. Threshold above which an object is considered detected (used during analog ping)
2. Threshold used for the OpenFOD. Foreign object presence is checked before entering power transfer mode thanks to a dedicated algorithm. If this parameter is set to 0, it disables the FOD feature
3. If, during coil temperature check, the average of several ADC measurements is below `temp_high_meas_thr`, an overtemperature error is assumed
4. After an overtemperature, if the ADC measurement is above `temp_low_meas_thr`, the overtemperature issue is considered as solved and the power transfer resumes
5. Red LED mode management:
   – normal mode → LED blinks for all errors
   – demo mode → LED blinks for FOD error only
6. Mean value of the raw presence detection metric for DC offset compensation. The value is obtained from the auto-calibration sequence after each firmware download (without Rx on Tx)

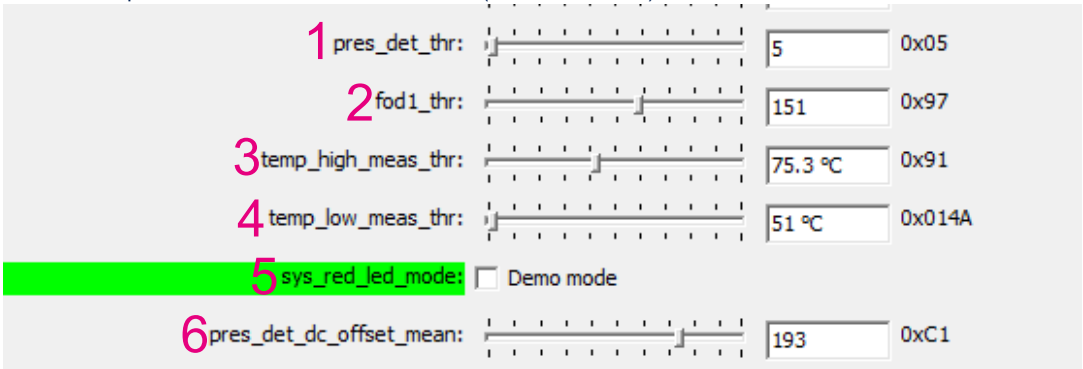
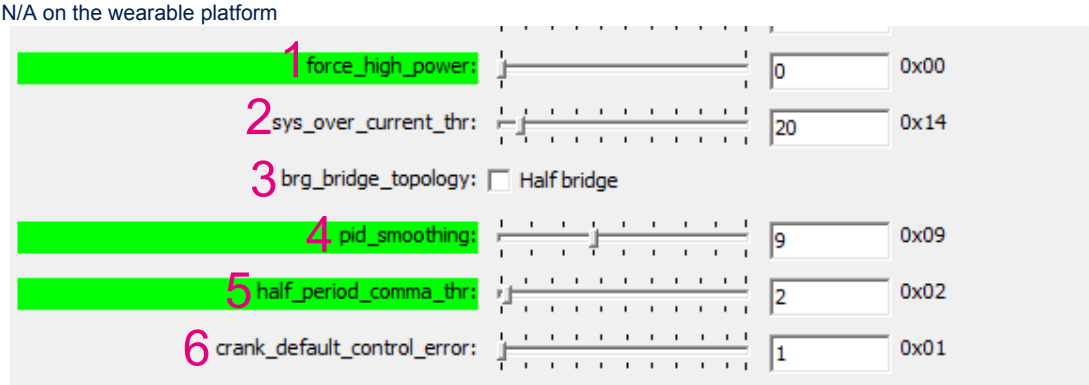


Figure 12. STSW-STWBCGUI - other parameters

1. Debug parameter to force CPU to high power mode (no deep sleep, no WFI state enabled). It allows using IAR debug tools.
   - 1 → Force High power mode
   - 0 → Restore previous power mode
2. Sets the sensitivity of coil overcurrent detection (internal metrics)
3. Half bridge topology, if selected
4. PID reactivity settings. A higher value means a slower power regulation loop
5. N/A on the wearable platform
6. N/A on the wearable platform



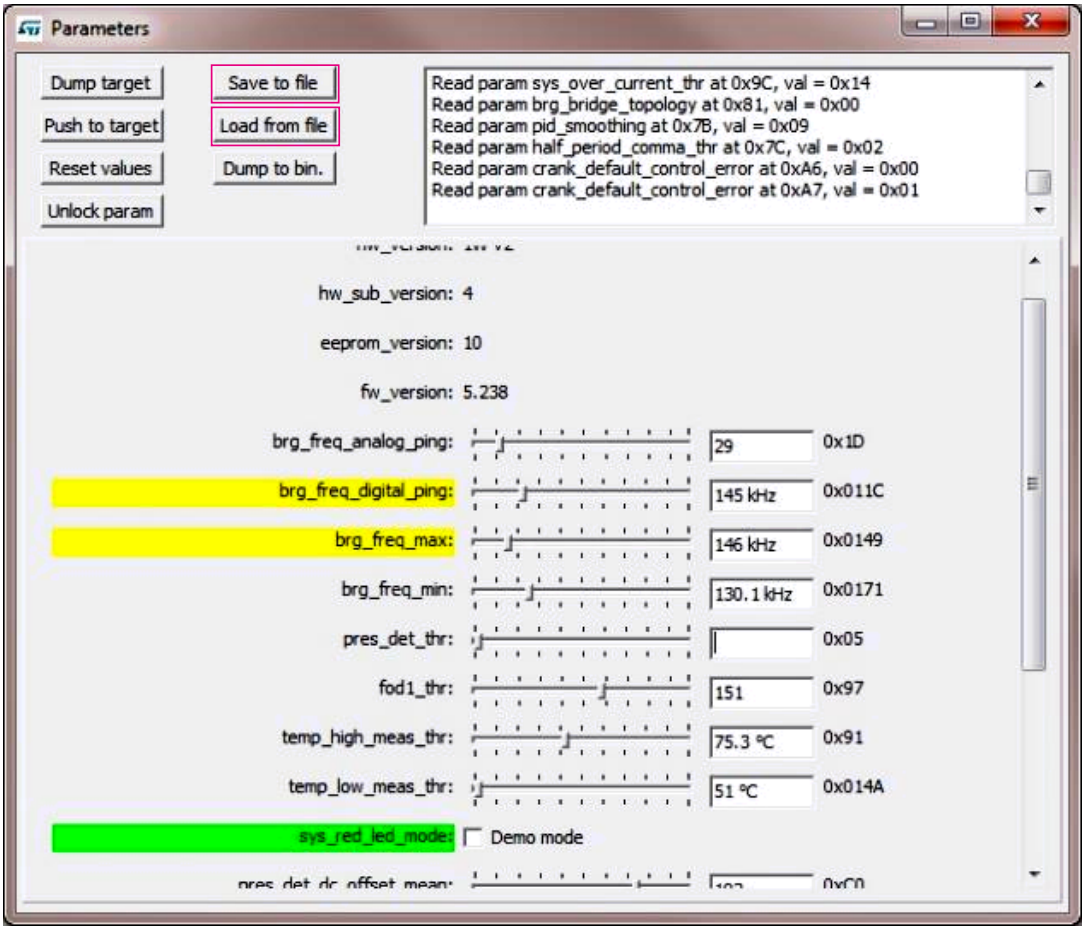
3.1.5 Parameter change and firmware patch

The [**Dump target**] button allows checking the parameters.

They can be modified and tested by clicking [**Push to target**]: you can double-check the parameter modification by clicking on [**Dump target**] button.

Important:
*As most parameters are very critical for the good operation of the transmitter board, proceed with caution. Before any modification, save a backup file using the [**Save to file**] button which allows saving a .txt file containing all the parameters. If case of issues, it can be reload using the [**Load from file**] button.*

Figure 13. STSW-STWBCGUI - parameter modification



The STSW-STWBCGUI includes the STSW-STWBCFWDT firmware downloader (which uses UART connection) and tools to generate binary files with adjusted parameters and to build a new firmware package with these files.

Through the STSW-STWBCGUI you can change the parameters and produce a new cab to program a batch of new boards by dumping the parameters into a bin file, but only after clicking the [**Push to target**] button.

Figure 14. **STSW-STWBCGUI - saving modified parameters (Dump to bin)**

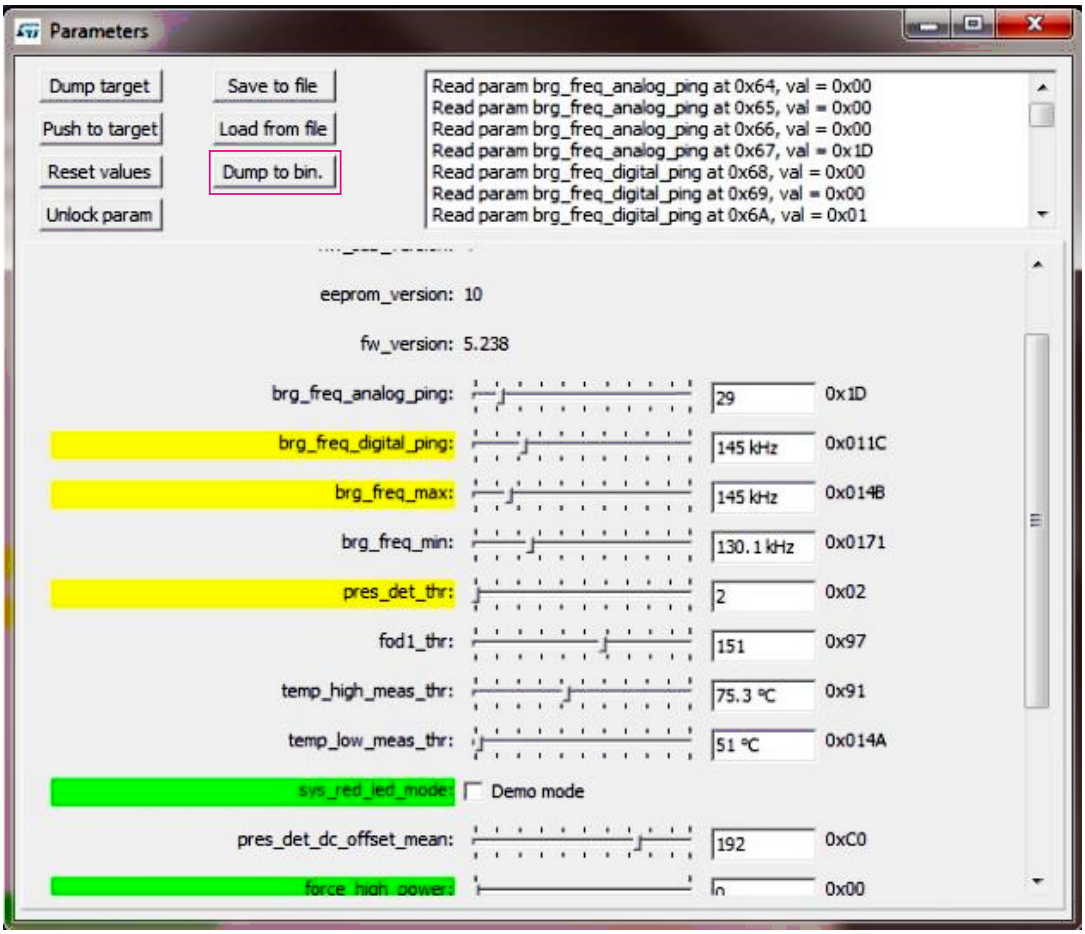
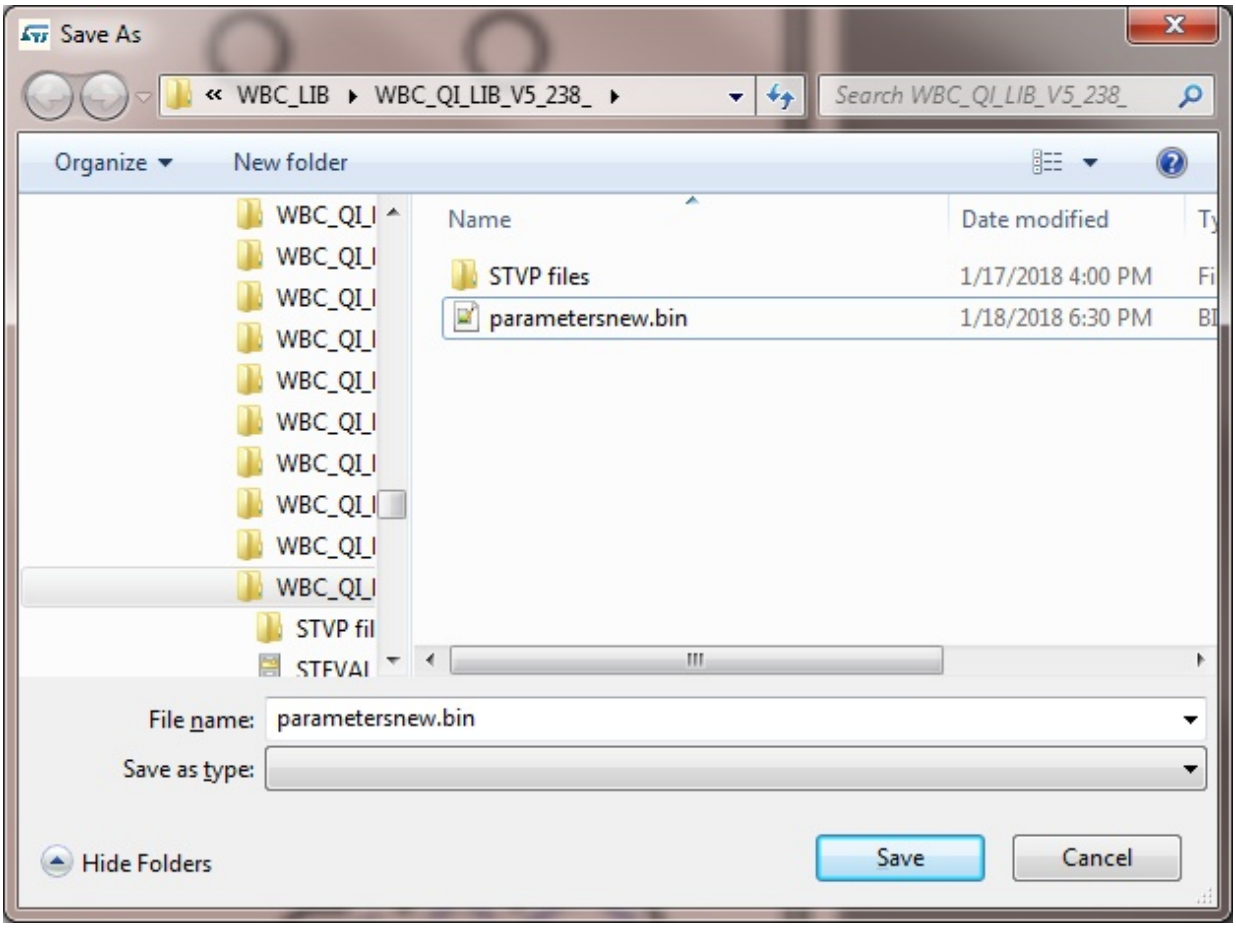
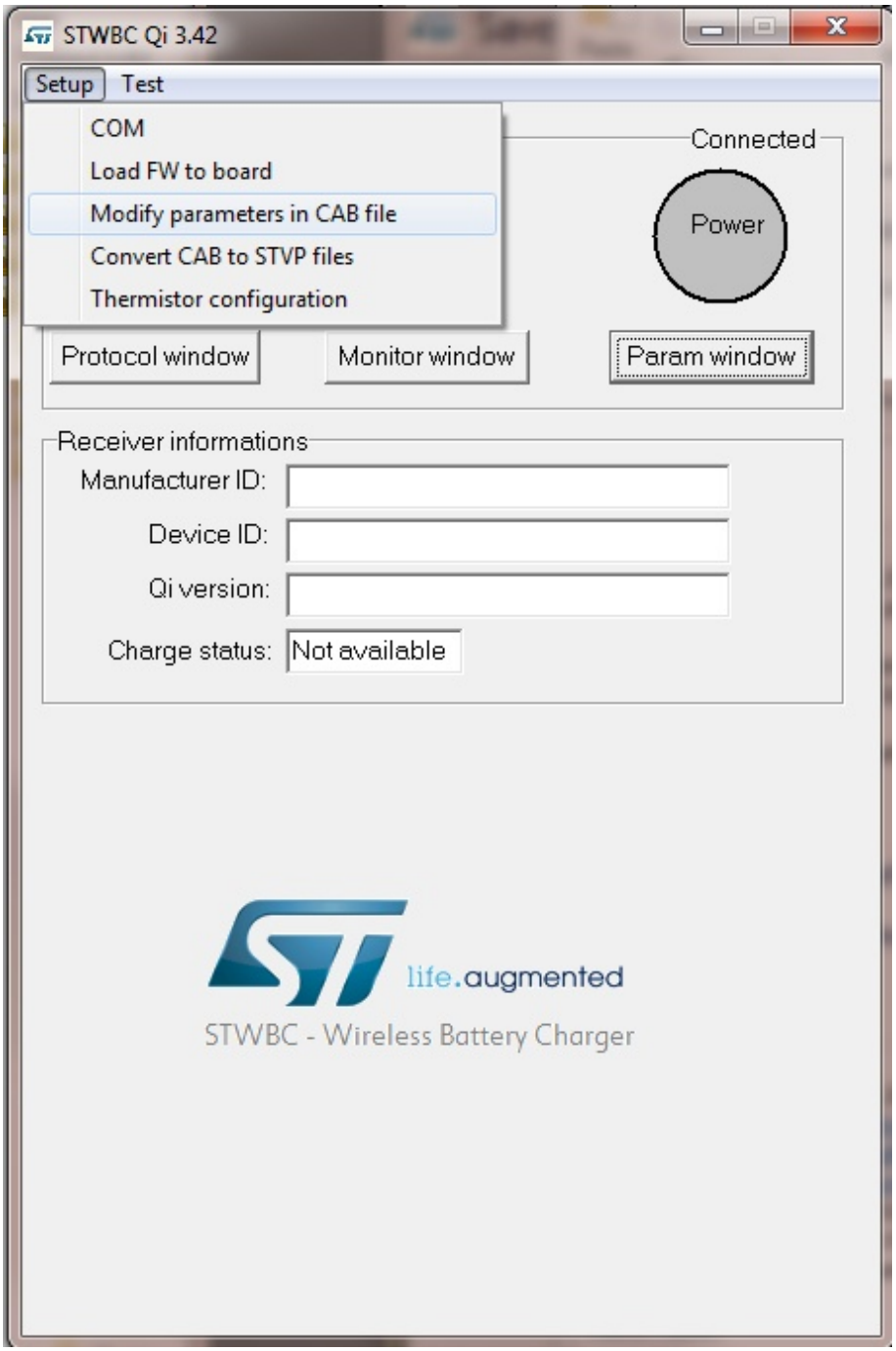


Figure 15. STSW-STWBCGUI - bin file backup



You can then select [**Modify parameters in CAB file**] from the Setup menu and select the appropriate firmware CAB file to be patched. This operation alters the firmware file with new tuning parameters, which can be subsequently loaded using the standard procedure (refer to UM2367: "Getting started with the STEVAL-ISB045V1 2.5 W wireless charger transmitter evaluation kit", freely available on www.st.com).

Figure 16. **STSW-STWBCGUI - CAB file patch button**



3.2 Using the GUI with wearable transmitter boards based on STWBC-EP/STWBC-MC (EVALSTWBC-EP and STEVAL-ISB047V1)

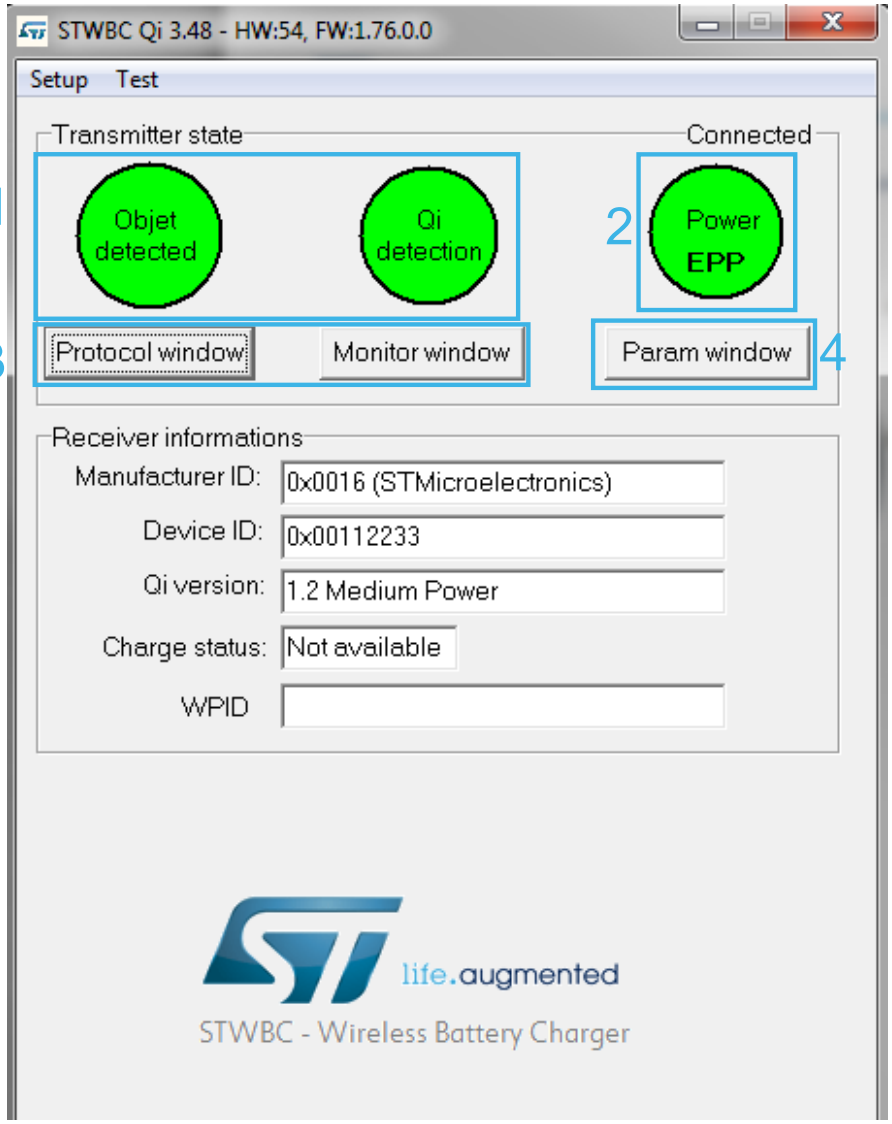
The STSW-STWBCGUI can monitor all STWBC-EP/STWBC-MC operations.

3.2.1 Main screen

The main screen shows information about the transmitter and Qi receiver status.

Figure 17. STSW-STWBCGUI - object detected and charge in progress

1. Transmission state indicator
2. Power transmission indicator
3. Debug window buttons
4. Parameter window buttons



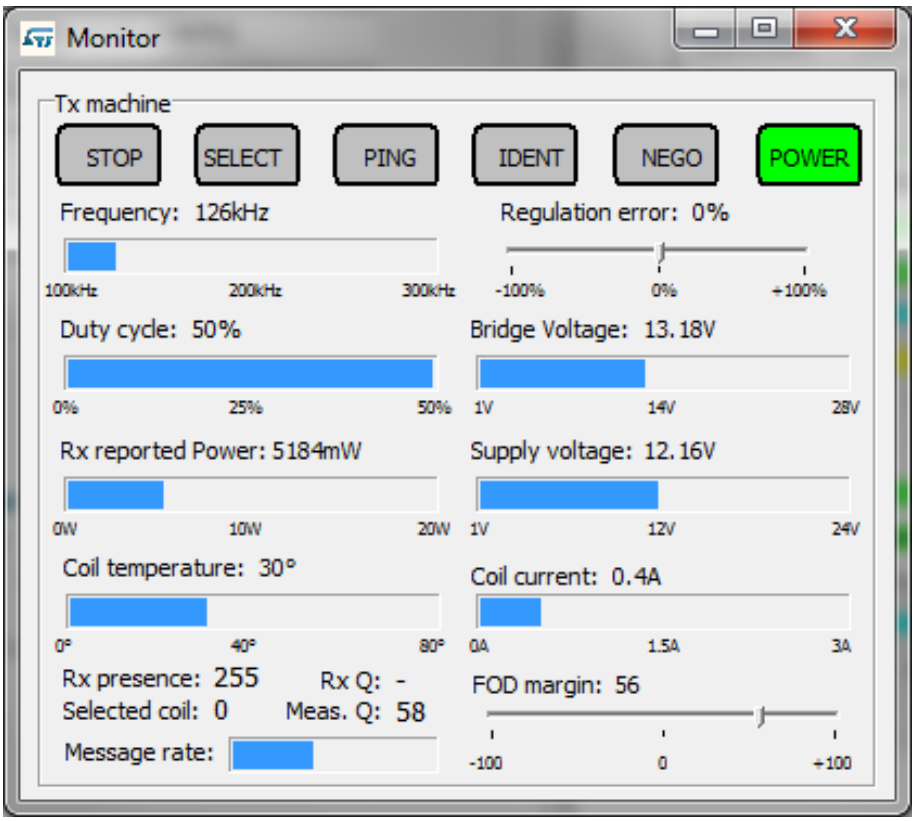
3.2.2 Monitor window

Using the STSW-STWBCGUI monitor window allows controlling STWBC-EP internal variables such as bridge voltage and frequency, demodulation quality, regulation error, Rx reported power, coil temperature, etc.

The figure below shows (in counterclockwise direction) all the variables you can set:

- **Frequency** - Bridge frequency
- **Duty cycle** - Bridge duty cycle
- **Rx reported power**
- **Coil temperature** - ADC coil temperature
- **Rx presence** - RX presence metric
- **Message rate** - Message rate (demodulation quality)
- **Rx Q** - Q factor measurement
- **Regulation error** - Control error stability
- **Bridge voltage** - ADC bridge voltage (VDCDC)
- **Supply voltage** - ADC supply voltage (V_{BUS})
- **Coil current** - ADC coil current (Isense)
- **FOD margin** - (FOD if < 0)

Figure 18. STSW-STWBCGUI - Qi Monitor window



3.2.3 Protocol window

The STSW-STWBCGUI can also display Rx to Tx communication protocol errors for system debugging.

Figure 19. **STSW-STWBCGUI - protocol window**

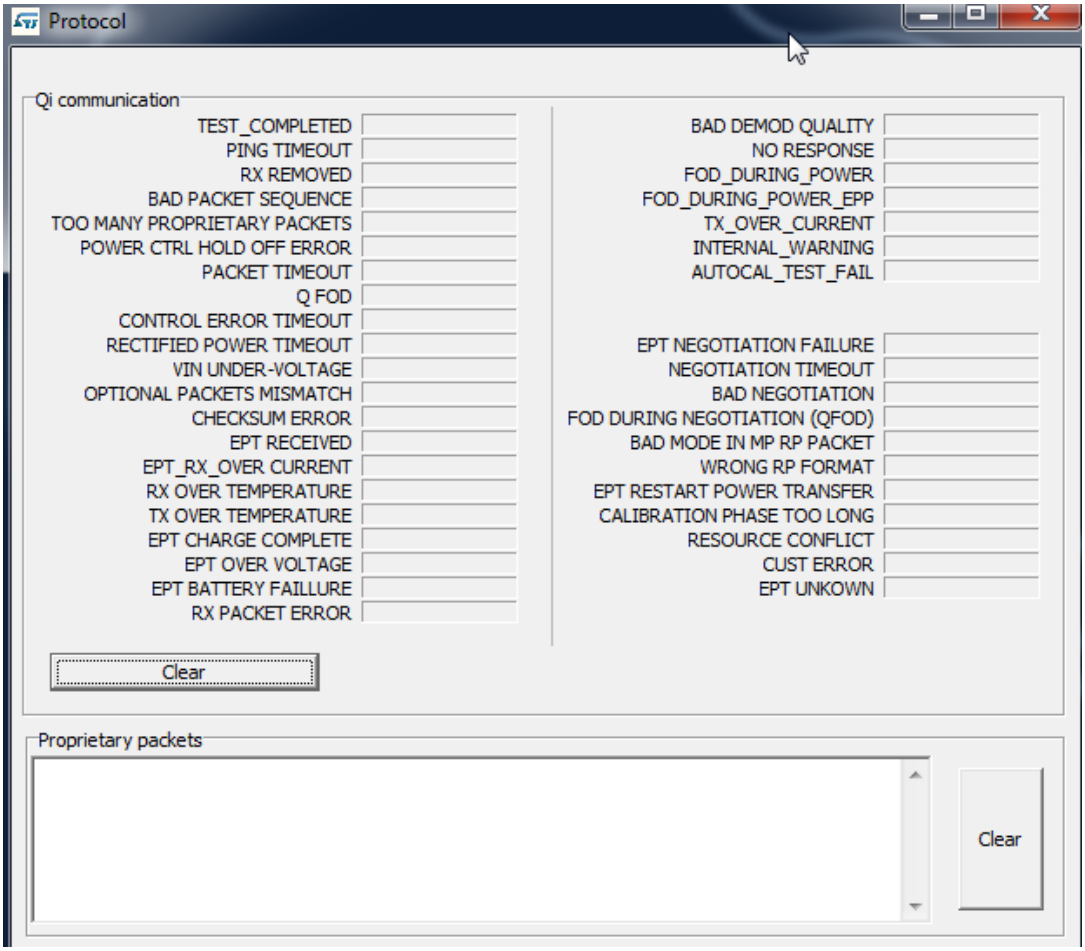


Table 2. **STSW-STWBCGUI - protocol window details**

Parameter	Description
TEST_COMPLETED (AUTOCAL_TEST_DONE)	Status bit for auto-calibration , to be done after each firmware download.
PING_TIMEOUT	Occurs when the digital ping phase is not completed on time (1).
RX_REMOVED	Occurs when the Qi Finite State Machine detects that the Qi Rx has been removed in a specific case as after a “sticky error”.
BAD_PACKET_SEQUENCE	Occurs when the Qi received messages do not come in the order specified in the Qi standard.
TOO_MANY_PROPRIETARY_PACKETS	Occurs when more than 7 optional configuration packets are received during the Identification and Configuration phase (1).
POWER_CTRL_HOLD_OFF_ERROR	Occurs when the Power Control Hold-off Time parameter received in the Power Control Hold-Off packet is not inside the range [5, 205] ms (1).
PACKET_TIMEOUT	Occurs during the Identification phase when the Power Transmitter does not detect the start bit of the header byte of a next Packet in the sequence within the time interval (after the end of the directly preceding Packet in the sequence (1)).
QFOD	Occurs when a FOD has been detected before the power transfer phase.
CONTROL_ERROR_TIMEOUT	Occurs in Power Transfer state when the control error packets are not received in time as described in the Qi standard.

Parameter	Description
RECTIFIED_POWER_TIMEOUT	Occurs in Power Transfer state when the received power packets are not received in time as described in the Qi standard.
VIN_UNDER_VOLTAGE (VBUS_DROP_DOWN)	Occurs when an undervoltage is detected and the power transmitter cannot provide the requested amount of power to the power receiver.
OPTIONAL_PACKETS_MISMATCH	Occurs in the Identification and Configuration phase when: • the number of optional configuration packets, received by the power transmitter, is equal to the value contained in the Count field of the configuration packet • after the [Ext] Identification packet, the received packet is not a configuration packet, not a power control Hold Off packet nor a proprietary packet (1)
CHECKSUM_ERROR	Occurs in the Identification and Configuration phase when the power transmitter does not receive a packet correctly.
EPT_RECEIVED	Occurs when a End Power Transfer packet has been received with a code different from Reconfigure, Charge complete, EPT over voltage, EPT over current, EPT over temperature, EPT battery failure or EPT no response.
EPT_RX_OVER_CURRENT	Occurs when an End Power Transfer Packet has been received with a code equal to Over Current.
RX_OVER_TEMPERATURE	Occurs when an End Power Transfer Packet has been received from RX with a code equal to Over Temperature.
TX_OVER_TEMPERATURE	Occurs when an overtemperature defect is detected on the transmitter side.
EPT_CHARGE_COMPLETE	Occurs when an End Power Transfer packet has been received with a code equal to Charge Complete.
EPT_OVER_VOLTAGE	Occurs when an End Power Transfer packet has been received with a code equal to Over Voltage.
EPT_BATTERY_FAILURE	Occurs when an End Power Transfer packet has been received with a code equal to Battery Failure.
RX_PACKET_ERROR	Occurs when an error is detected during the packet decoding.
BAD_DEMOD_QUALITY	Occurs when demodulation quality is low.
NO_RESPONSE	Occurs when an End Power Transfer packet has been received with a code equal to No Response.
FOD_DURING_POWER	Occurs when a foreign object has been detected.
FOD_DURING_POWER_EPP	Occurs when a foreign object is detected during the power transfer phase during an Extended Power Profile transfer (supported power above 5 W).
TX_OVER_CURRENT	Occurs when the transmitter cannot support the current required by the receiver. For EPP 15 W, this threshold is tuned and set for Vin=12 V.
INTERNAL_WARNING	Reserved (internal).
AUTOCAL_TEST_FAILED	Reserved (internal).
EPT_NEGOTIATION_FAILURE	Occurs when an End Power Transfer Packet has been received with a code equal to “negotiation failure”.
NEGOTIATION TIMEOUT	Occurs when the negotiation fails.
BAD NEGOTIATION	Occurs in the negotiation phase when an “End Negotiation” message is received but the power transmitter has not sent an ACK response earlier in the negotiation phase to a specific request packet with request = 0x02 (Received Power Packet Type) and an FOD status packet (1).
FOD DURING NEGOTIATION (QFOD)	Occurs in the negotiation/renegotiation phase when a FOD is detected after receiving a FOD_STATUS message.
BAD MODE IN MP RP PACKET	Occurs during the calibration phase if the power transmitter receives a 24-bit received power packet with a mode value other than ‘001’ and ‘010’.

Parameter	Description
WRONG RP FORMAT	Occurs if the power transmitter receives a received power packet with a format that is different from the format in the Power Transfer Contract.
EPT RESTART POWER TRANSFER	Occurs if the power transmitter receives an End Power Transfer Packet that contains an end power transfer code of 0x0B (Restart Power Transfer).
CALIBRATION PHASE TOO LONG	Occurs if the power transmitter does not receive a satisfactory Received Power Value within 10 seconds from entering the calibration phase.
RESOURCE CONFLICT	Reserved (internal).
CUST ERROR	Occurs when an error comes from the customer code.
EPT_UNKNOWN	Occurs when an End Power Transfer Packet has been received with a code equal to “Unknown”.

1. *See Qi standard*

3.2.4 Parameter window

The STSW-STWBCGUI interface allows you to configure the system (frequency, thresholds, regulation error) and lets you store parameters to and load parameters from your computer.

The parameters have the following levels of protection:

- Level 0: parameters can be modified without protection
- Level 1: more critical parameters to be modified with caution.

Caution: You must click the [**Unlock param**] button before modifying it to avoid system malfunction or unexpected behavior.

Figure 20. STSW-STWBCGUI - parameter window unlock button

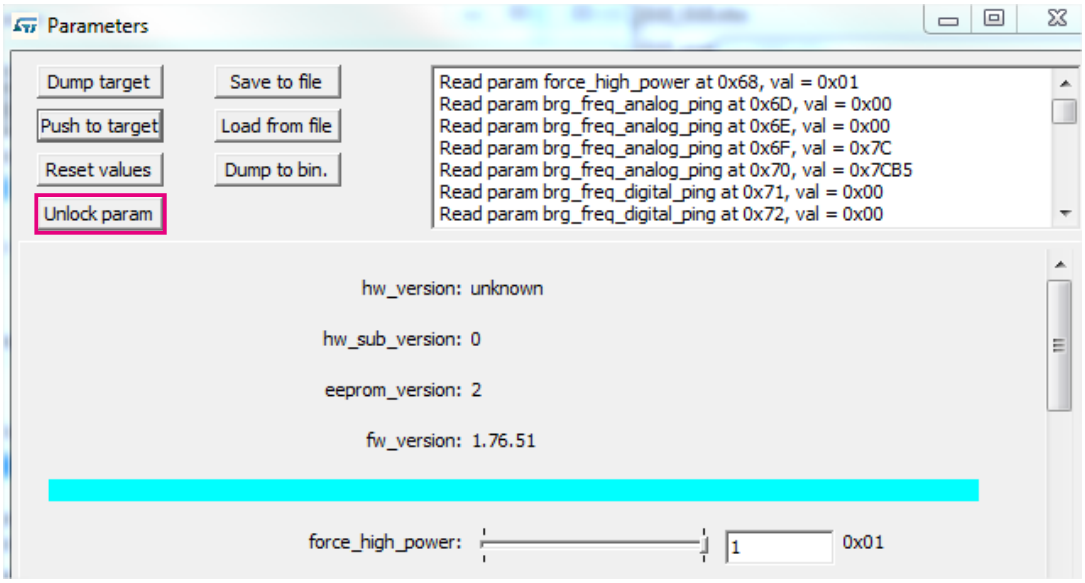


Figure 21. STSW-STWBCGUI - parameter window board information

1. Hardware version (read-only)
2. Hardware sub-version (read-only)
3. EEPROM version (read-only)
4. Firmware version (read-only parameter)
5. Force _high power - debug parameter that forces CPU to High Power Mode (no deep sleep, no WFI state enabled) and allows using AR debug tools:
   – 1 → to force High power mode
   – 0 → to restore the previous power mode

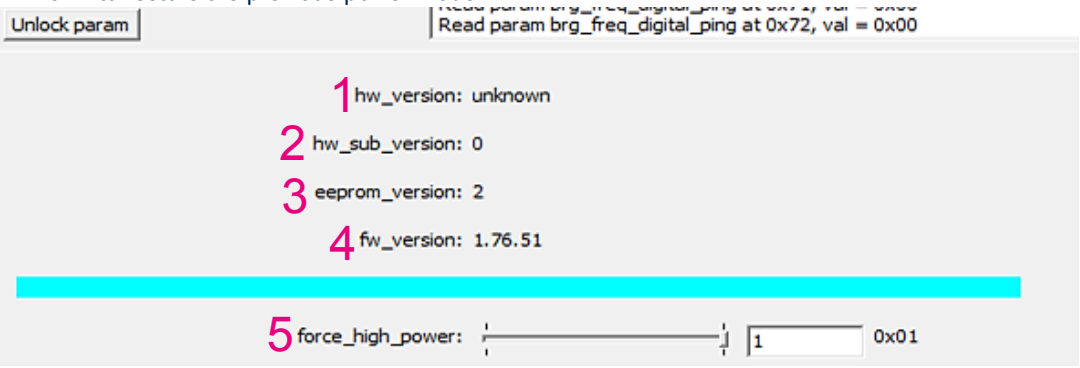


Figure 22. STSW-STWBCGUI - bridge parameters

1. Specific power signal operational frequency used during object detection phase. It sets the frequency and duty cycle (via a specific function) of the produced analog ping burst
2. Bridge frequency used during digital ping
3. Maximum bridge frequency allowed by the transmitter
4. Minimum bridge signal frequency allowed by the transmitter
5. Maximum power signal duty cycle allowed by the transmitter
6. Minimum power signal duty cycle allowed by the transmitter
7. Variable that indicates if the hardware is full or half bridge (`HALF_BRIDGE_ENABLE`, if selected)
8. Bridge dead time among MOS driving phases (96 MHz clock period = 10.41 ns)
9. Number of coils on the hardware

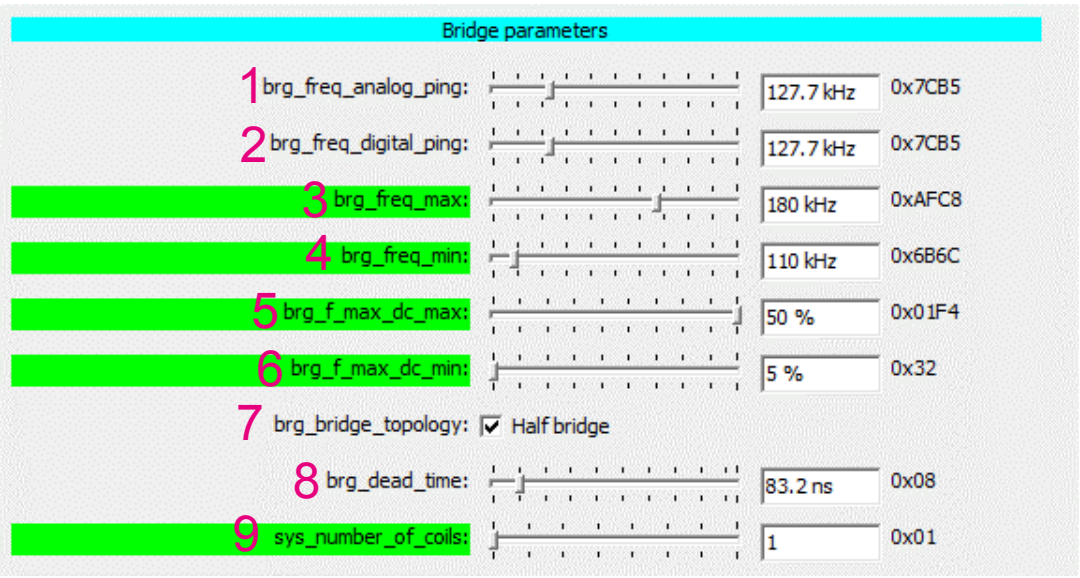


Figure 23. STSW-STWBCGUI - parameter window thresholds

1. Threshold above which an object is considered detected (used during analog ping)
2. If, during coil temperature check, the average of several ADC measurements is below `temp_high_meas_thr`, an overtemperature error is assumed
3. After an overtemperature, if the ADC measurement is above `temp_low_meas_thr`, the overtemperature issue is considered as solved
4. Red LED mode management:
   – normal mode → LED blinks for all errors
   – demo mode → LED blinks for FOD error only
5. Address of the GPIO expander if present on board
6. Low power/medium power threshold:
   – below → the TX considers that the power supply indicates that it will run in low power mode (5 W)
   – above → the TX considers that the power supply indicates that it will run in EPP mode (15 W)

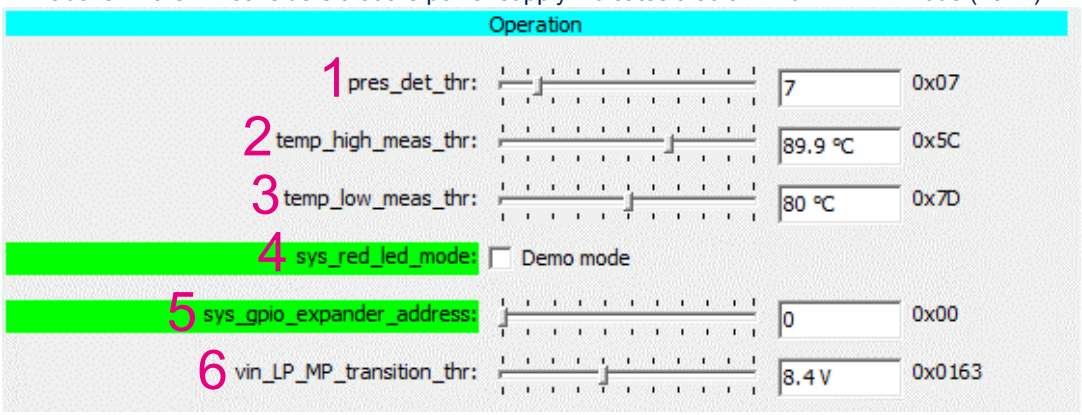


Figure 24. STSW-STWBCGUI - parameter window protection

1. Threshold above which the Tx limits the current. If there is a large current step (500 mA above the threshold) the system stops immediately, raising a `TX_OVER_CURRENT` error
2. Threshold (on tank) above which the overvoltage protection is activated
   0 → deactivates the OVP feature
3. Used for power limitation:
   – 0 → power limitation disabled
   – between 0 and 30000 → power limitation value (e.g., 4400 means power limited to 4,400 mV)
   – greater than 30000 → power limitation = Vin – (30000 – value) (e.g. 31000 means power limited to Vin - 1000 mV)

   In the GUI, a negative value means Vin - value (-1000 mV means power limited to Vin - 1000 mV).

Note: A clamp is set at 4.6 V (that is, setting a value below 4.6 V is equal to having a limitation at 4.6 V).

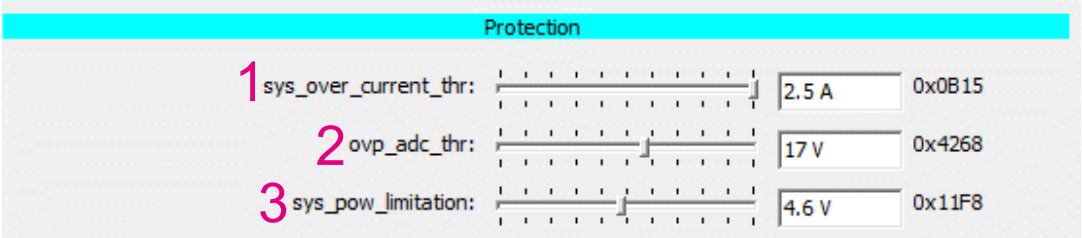


Figure 25. STSW-STWBCGUI - parameter window DC-DC converter

1. DC-DC init voltage (default SEPIC voltage)
2. DC-DC voltage value during digital ping on the top primary coils or for single coil HW
3. Not applicable on MP-A15 single coil
4. Maximum SEPIC voltage when the power transfer is in Baseline Power Profile mode
5. Maximum SEPIC voltage when the power transfer is in Extended Power Profile mode
6. Maximum allowed SEPIC voltage value during the digital ping

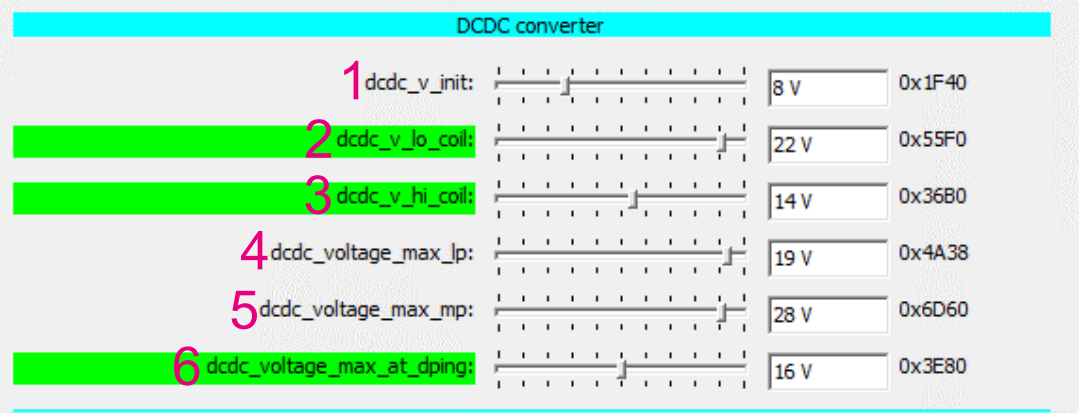


Figure 26. STSW-STWBCGUI - parameter window FOD

1. Coefficient used during power transfer phase on the central coil when determining the threshold above which a Foreign Object is detected
   – 0 → disables the FOD feature used during power transfer
2. Offset used during the power transfer phase on the central coil when determining the threshold above which a Foreign Object is detected
3. Frequency below which, during power transfer, if all the foreign object detection criteria are met, a foreign object detection error is raised. Above this frequency, no foreign object detection error can occur during power transfer
4. Loss contribution as square of bridge voltage. Used during the secondary FOD algorithm when power transfer is on the central coil
5. Loss contribution as square of ringing voltage. Used during the secondary FOD algorithm when power transfer is on the central coil
6. Loss contribution as power at ringing voltage. Used during the secondary FOD algorithm when power transfer is on the central coil
7. Loss contribution as square of bridge current. Used during the secondary FOD algorithm when power transfer is on the central coil
8. Loss contribution as square of bridge current. Used during the secondary FOD algorithm when power transfer is on the central coil
9. Reserved for future use
10. Coefficient used for the temperature compensation in the FOD algorithm during power transfer

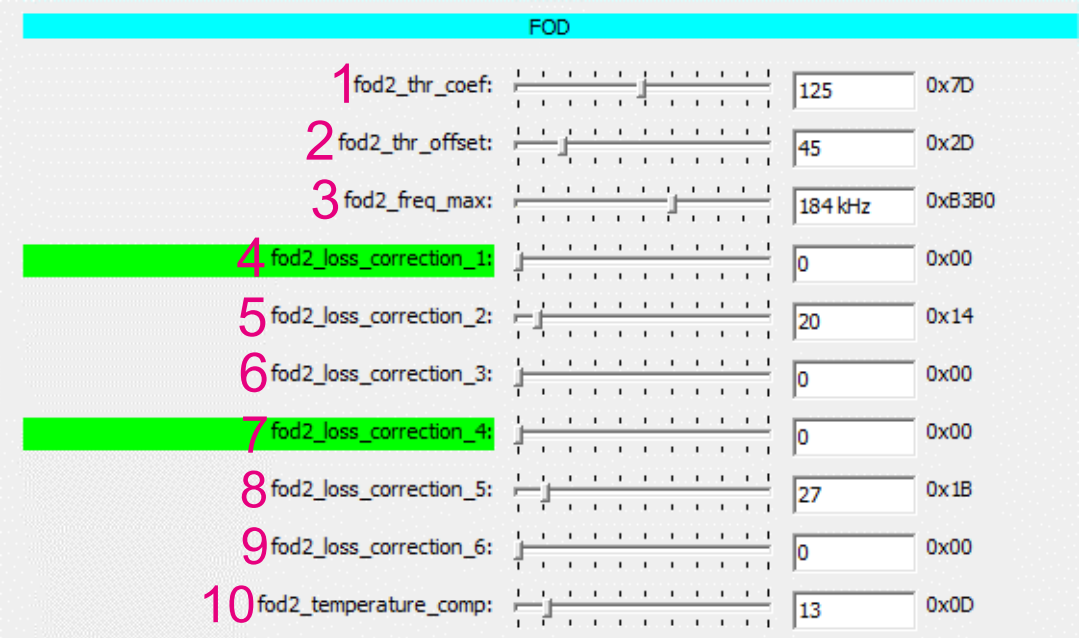


Figure 27. STSW-STWBCGUI - parameter window Q-factor

1. Primary coil inductance for Q factor estimation
2. Scaling coefficient applied on Q factor estimation on the central coil
3. Q factor estimator target value reached after calibration (i.e., when nothing is on TX surface)
4. Coefficient applied to reported Q factor used to calculate threshold for QFOD obtained by multiplying by 100/128
5. Threshold used for early QFOD detection in both MP and LP Rx modes. This threshold is compared to the measured Q factor
6. Margin used for early QFOD detection in both MP and LP Rx mode. This is applied to Q factor estimator 2nd metric (period) to precisely detect whether a FO is present or not.

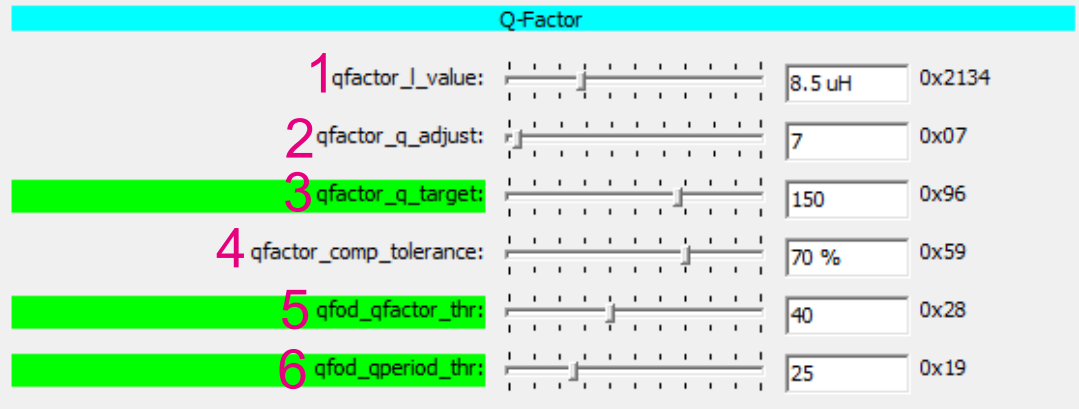
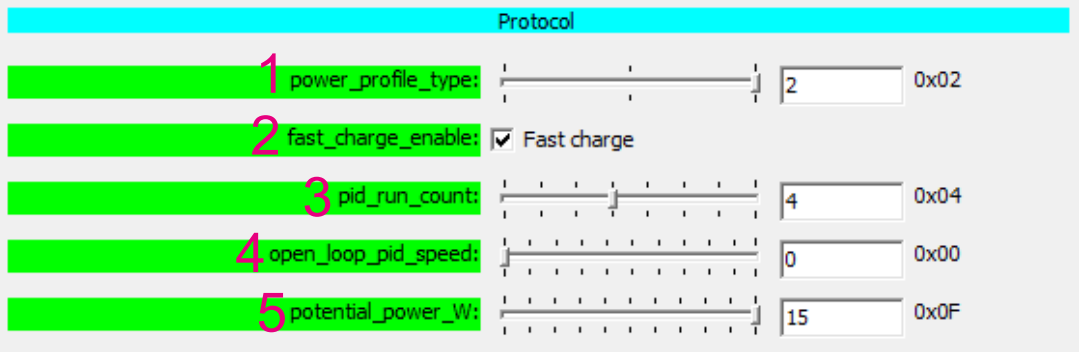


Figure 28. STSW-STWBCGUI - parameter window protocol

1. Indicates the profile of the transmitter:
   - 0 → Baseline Power Profile
   - 2 → Extended Power Profile
2. Enables the fast charge available on some phones:
   - 1 → enabled
   - 0 → disabled
3. Number of iterations during the PID loop. The default value is set to 4
4. Reserved for future use
5. Potential power capability of Tx



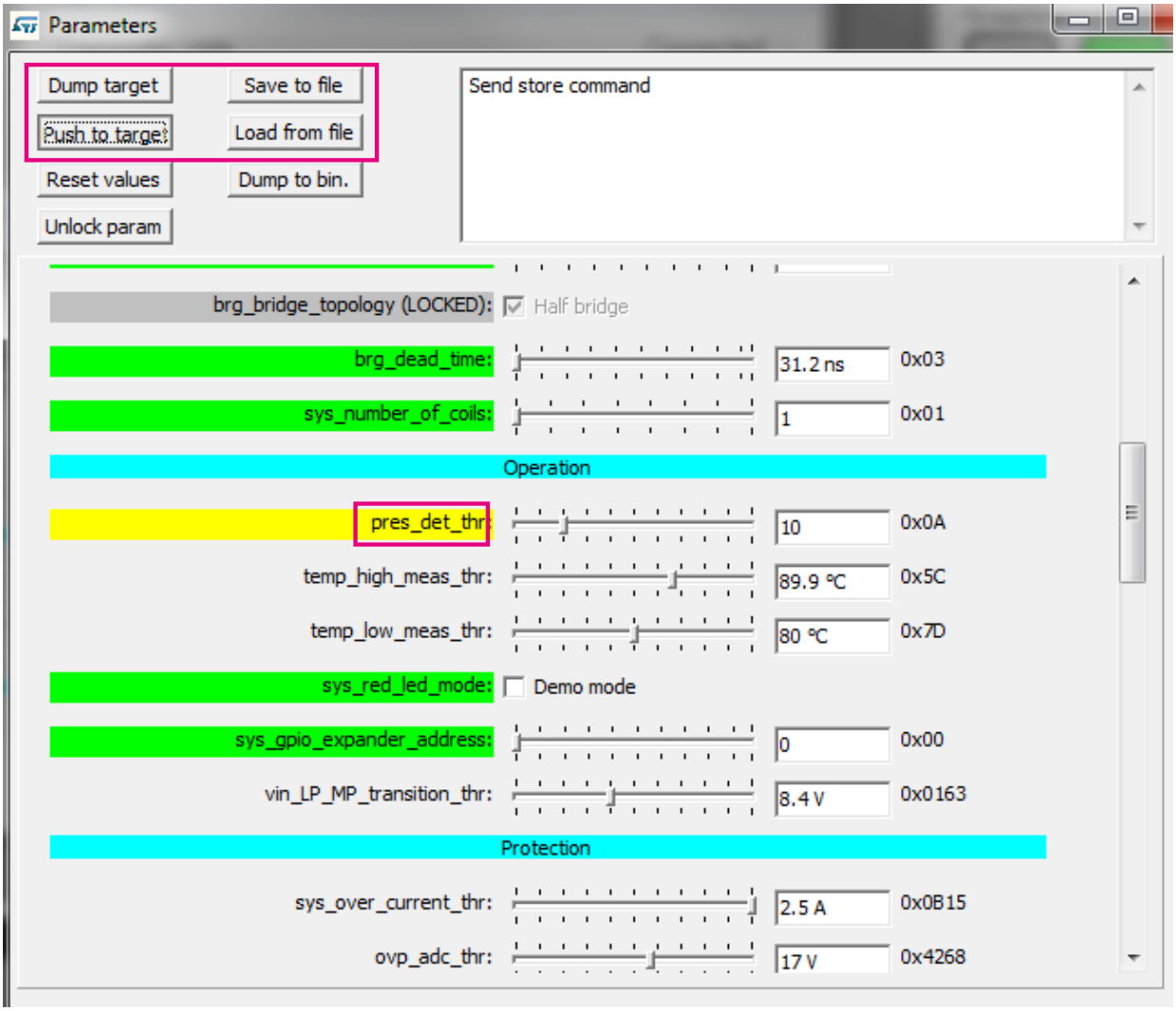
3.2.5 Parameter change and firmware patch

The [**Dump target**] button allows checking the parameters.

They can be modified and tested by clicking [**Push to target**]: you can double-check the parameter modification by clicking on [**Dump target**] button.

Important:
*As most parameters are very critical for the good operation of the transmitter board, proceed with caution. Before any modification, save a backup file using the [**Save to file**] button which allows saving a .txt file containing all the parameters. If case of issues, it can be reload using the [**Load from file**] button.*

Figure 29. STSW-STWBCGUI - parameter modification



The STSW-STWBCGUI includes the STSW-STWBCFWDT firmware downloader (which uses UART connection) and tools to generate binary files with adjusted parameters, and to build a new firmware package with these files.

The STSW-STWBCGUI lets you change the parameters and generate a new cab to program a batch of new boards by dumping the parameters into a bin file (refer to UM2491: "15 W 3-coil fixed frequency Qi-certified wireless charger TX evaluation kit based on STWBC-MC", freely available on www.st.com, for further details on firmware download and required autocalibration).

Figure 30. **STSW-STWBCGUI - saving modified parameters (Dump to bin)**

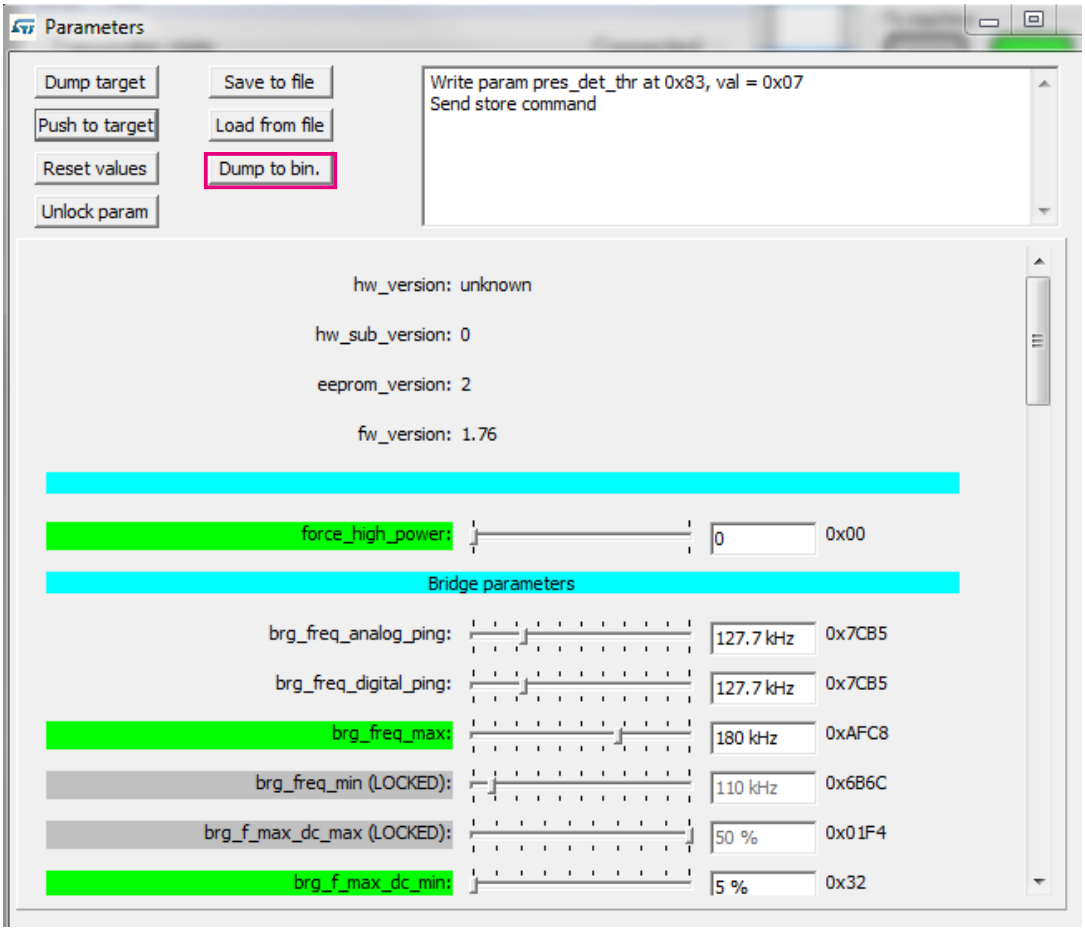
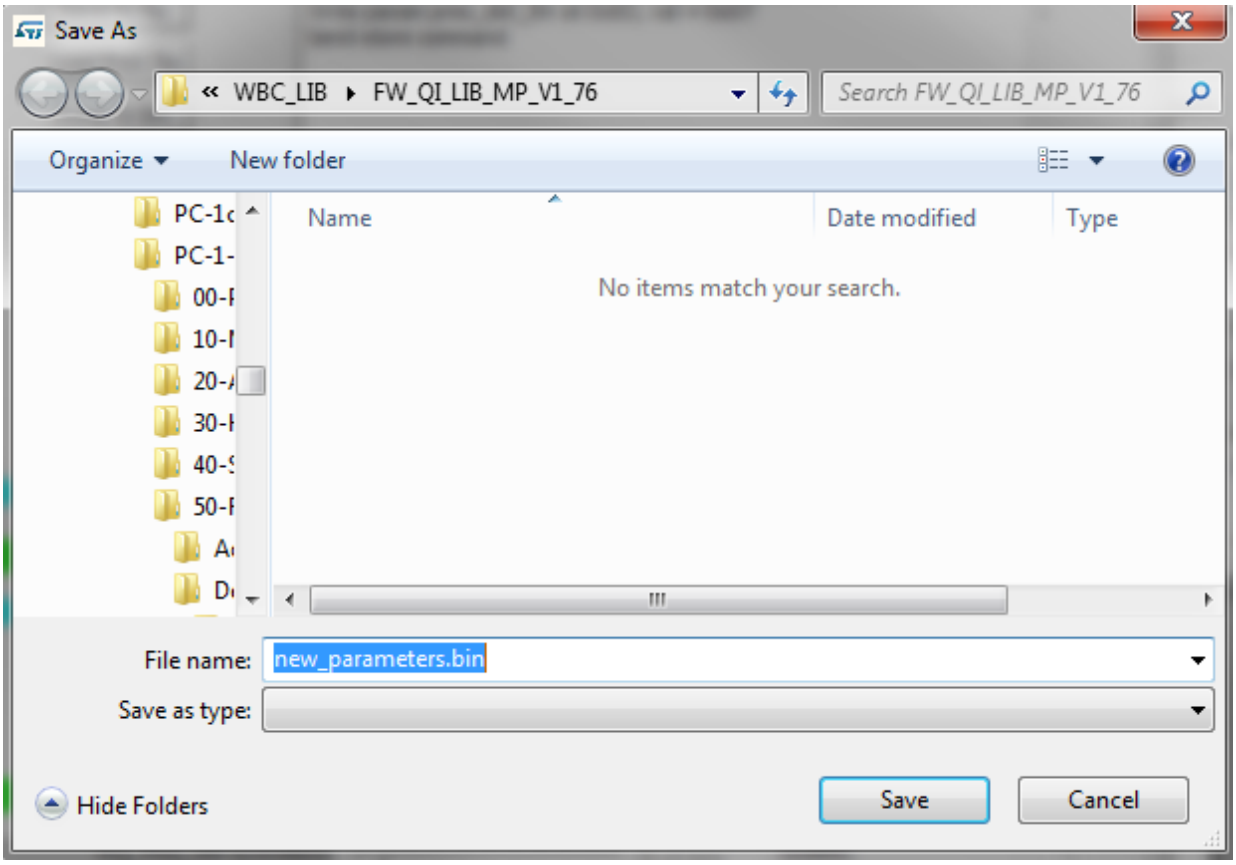
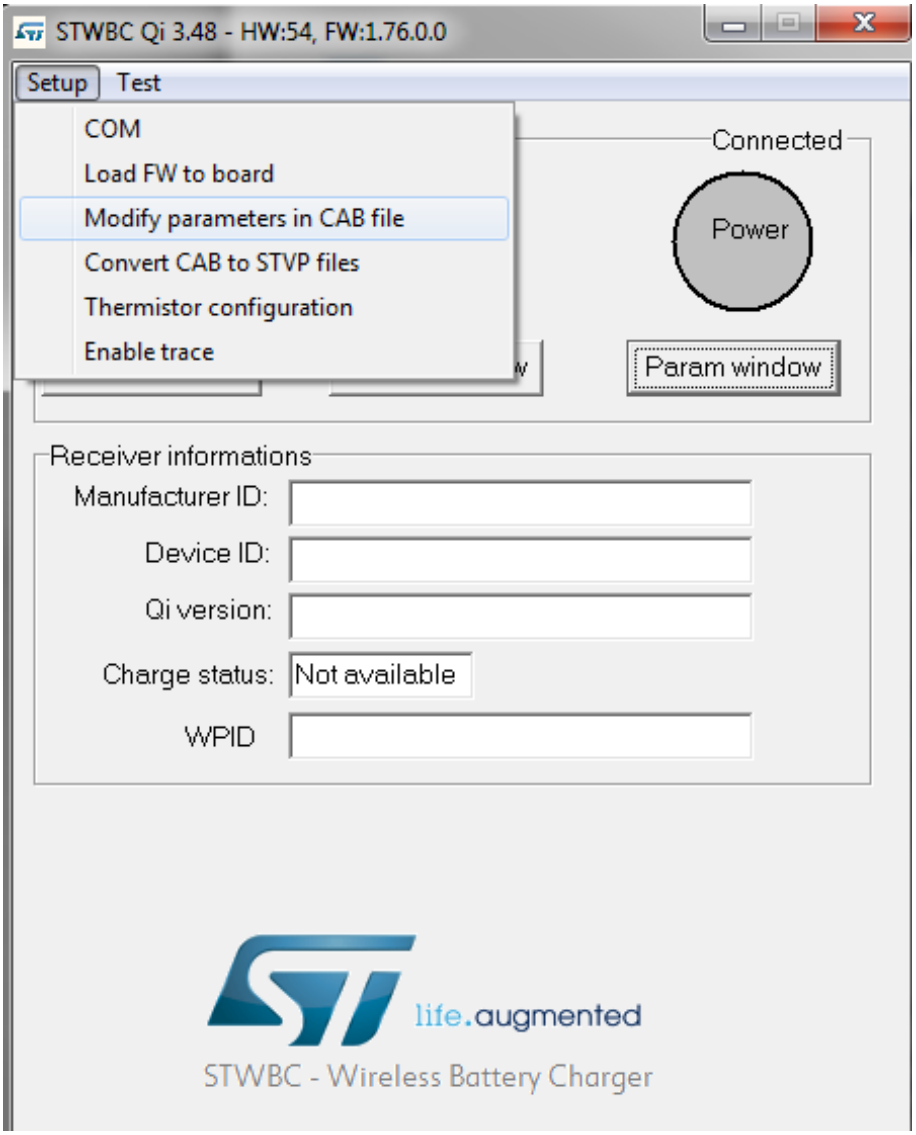


Figure 31. **STSW-STWBCGUI - bin file backup**



You can then select [**Modify parameters in CAB file**] from the Setup menu and select the appropriate firmware CAB file to be patched. This operation alters the firmware file with new tuning parameters, which can be subsequently loaded using the standard procedure.

Figure 32. **STSW-STWBCGUI - CAB file patch button**



4 References

All the following resources are freely available for download from www.st.com:

1. UM2367: "Getting started with the STEVAL-ISB045V1 2.5 W wireless charger transmitter evaluation kit"
2. DS11797: "Digital controller for wireless battery charger transmitters for wearable application"
3. DB3531: "STEVAL-ISB045V1T wireless charging transmitter evaluation board based on STWBC-WA"
4. UM2368: "STWBC 2.5 W Turnkey firmware description"
5. UM2584: "15 W single coil fixed frequency Qi wireless charger Tx evaluation kit based on STWBC-EP"
6. DS12197: "Digital controller for wireless battery charger transmitters for Qi 15 W applications"
7. DB3897: "Qi MP-A15 15 W wireless charging Tx kit based on STWBC-EP"
8. UM2588: "Firmware for the EVALSTWBC-EP 15 W single coil Qi MP-A15 wireless power TX evaluation kit"

Revision history

Table 3. **Document revision history**

Date	Revision	Changes
05-Jun-2020	1	Initial release.

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