

Introduction

The ST25R3911B-DISCO GUI (STSW-ST25R001) is a PC software application, which allows the user to configure, evaluate, and communicate with the ST25R3911B high performance HF reader / NFC initiator.

The software must be used in conjunction with the ST25R3911B-DISCO kit, which includes a ready-to-use board to interface with the host PC through a USB interface. This software allows the evaluation of every feature of the ST25R3911B. The ST25R3911B communicates with the STM32L476 32-bit core MCU via the SPI bus.

The ST25R3911B-DISCO board is powered through the USB port, and no external power supply is required. It includes an ST25R3911B high performance HF reader / NFC initiator, an etched antenna, and the associated tuning components.

Starting with version 1.1.0 the ST25 Tag Editor is included, which allows access to all features of ST25 Tag and Dynamic Tags series.

Contents

1	List of acronyms	7
2	ST25R3911B-DISCO demo kit	8
2.1	ST25R3911B-DISCO board installation	8
2.2	Installing the ST25R3911B-DISCO PC software (STSW-ST25R001)	8
2.3	Firmware update	9
2.4	ST25R3911B Discovery GUI tab	11
2.4.1	StartUp tab	12
2.4.2	Antenna features tab	13
2.4.3	Wakeup tab	14
2.4.4	Polling tab	16
2.4.5	NFCIP tab	18
2.4.6	ISO 14443A tab	19
2.4.7	ISO 14443B tab	20
2.4.8	ISO 15693 tab	21
2.4.9	FeliCa tab	22
2.4.10	NFC Type 1 tab	23
2.4.11	NFC type 2 tab	24
2.4.12	Debug tab	25
2.4.13	Dynamic configuration tab	26
2.5	Register Map	27
3	Using the ST25 Tag Editor software	28
3.1	Main menu	30
3.2	ISO15693 menu	31
3.3	ISO14443-A menu	47
3.3.1	ISO14443-A Cards commands	48
3.3.2	M24SR, SRTAG and ST25TA user interface	49
3.3.3	Password management for M24SR and SRTAG products	60
3.3.4	NFC Type 4A - NDEF Message user interface	61
3.4	ISO14443-B menu	67
3.4.1	ISO14443-B Cards commands	68
3.4.2	ISO14443-B NFC commands	69

3.4.3	NFC Type 4B NDEF Message user interface	70
3.4.4	SRIxx/SRTxx products	71
3.5	ISO18092 menu	72
3.6	Tools menu	73
3.6.1	ST25R3911B-DISCO toolbox	74
3.6.2	Script tool	75
3.7	Help menu	77
3.8	ST25 Tag Editor RF protocol select and Send Receive functions formats	78
3.8.1	ISO15695 RF PROTOCOL	78
3.8.2	ISO14443-A RF PROTOCOL	80
3.8.3	ISO14443-B RF PROTOCOL	82
3.8.4	ISO18092 RF PROTOCOL	84
4	Revision history	86

List of tables

Table 1. List of acronyms 7

Table 2. ISO15695 RF PROTOCOL SELECT 78

Table 3. SEND RECEIVE FUNCTION 79

Table 4. RF PROTOCOL SELECT 80

Table 5. SEND RECEIVE FUNCTION 81

Table 6. RF PROTOCOL SELECT 82

Table 7. SEND RECEIVE FUNCTION 83

Table 8. RF PROTOCOL SELECT 84

Table 9. SEND RECEIVE FUNCTION 85

Table 10. Document revision history 86



List of figures

Figure 1.	Device Manager window.	9
Figure 2.	STM Device in DFU Mode	10
Figure 3.	GUI startup	12
Figure 4.	Antenna features tab	13
Figure 5.	Wakeup window - Capacitive wakeup enabled	14
Figure 6.	Wakeup window - Inductive (phase) wakeup enabled	15
Figure 7.	Wakeup window - Inductive (amplitude) wakeup enabled	16
Figure 8.	Polling tab	17
Figure 9.	NFCIP window	18
Figure 10.	ISO 14443A tab	19
Figure 11.	ISO 14443B tab	20
Figure 12.	ISO 15693 tab	21
Figure 13.	FeliCa tab	22
Figure 14.	NFC Type 1 tab	23
Figure 15.	NFC type 2 tab	24
Figure 16.	Debug tab	25
Figure 17.	Dynamic configuration tab	26
Figure 18.	Register map	27
Figure 19.	Detection message 1/3	28
Figure 20.	Detection message 2/3	29
Figure 21.	Detection message 3/3	29
Figure 22.	Main menu	30
Figure 23.	ISO15693 menu	31
Figure 24.	Example of ISO15693 user interface for M24LR64	33
Figure 25.	Selecting User Mode from ISO15693 user interface	34
Figure 26.	ST25DV user interface: Inventory.	35
Figure 27.	ST25DV user interface: AFI DSFID INFO	36
Figure 28.	ST25DV user interface: EEPROM	37
Figure 29.	ST25DV user interface: display Extended commands	37
Figure 30.	ST25DV user interface: static configuration	38
Figure 31.	ST25DV user interface: Fast Transfer Mode interface	39
Figure 32.	ST25DV user interface: Password management	40
Figure 33.	ST25DV user interface: Energy Harvesting and GPO management	41
Figure 34.	ST25DV user interface: Fast Transfer Mode demo	42
Figure 35.	Read and write NFC Type 5 CC file	43
Figure 36.	Read NFC Type 5 NDEF message	44
Figure 37.	Prepare NFC Type 5 NDEF message	45
Figure 38.	Write NFC Type 5 NDEF message.	46
Figure 39.	ISO14443-A menu	47
Figure 40.	ISO14443-A selected from the list	48
Figure 41.	M24SR user interface	49
Figure 42.	ST25R3911B protocol selection sequence.	50
Figure 43.	Anticollision process results	51
Figure 44.	RF OFF on anticollision RATS PPS button	51
Figure 45.	RF OFF on anticollision RATS PPS results	52
Figure 46.	NFC Type 4A button available	52
Figure 47.	ISO14443-A button available	52
Figure 48.	RF request and RF answer.	52

Figure 49.	“Show Log” button	53
Figure 50.	Log windows of RF request/answer	53
Figure 51.	NFC Type 4A user interface	53
Figure 52.	I_Block, R_Block, S_Block requests	54
Figure 53.	I_Block, R_Block, S_Block answer	54
Figure 54.	Capacity container file selected	55
Figure 55.	Specific CC file array	55
Figure 56.	System file selected	56
Figure 57.	Specific system file array	57
Figure 58.	NDF file is selected	57
Figure 59.	Binary data and NDEF message are detected	58
Figure 60.	Password management button	59
Figure 61.	Password management buttons	59
Figure 62.	NDEF message management button	59
Figure 63.	Password management user interface	60
Figure 64.	NFC Type 4A - NDEF message user interface	61
Figure 65.	Log window of configuration setup	61
Figure 66.	NDEF message is displayed	62
Figure 67.	Log window when occur error on READ NDEF MESSAGE process	63
Figure 68.	Prepare TEXT NDEF record	63
Figure 69.	Prepare URI NDEF record	64
Figure 70.	Prepare SMARTPOSTER NDEF record	64
Figure 71.	Prepare MIME VCARD NDEF record	64
Figure 72.	Prepare MIME BLUETOOTH PAIRING NDEF record	65
Figure 73.	Prepare MIME MEDIA NDEF record	65
Figure 74.	Prepare MIME VARIOUS NDEF record	65
Figure 75.	Write Text NDEF message	66
Figure 76.	ISO14443-B menu	67
Figure 77.	Example of ISO14443-B user interface	68
Figure 78.	Log file	69
Figure 79.	ISO1443-B user interface	69
Figure 80.	ISO14443-B NFC user interface	70
Figure 81.	Example of ISO14443-B user interface for SRIxxx	71
Figure 82.	ISO18092 menu	72
Figure 83.	ISO18092 log window	73
Figure 84.	Tools menu	74
Figure 85.	ST25R3911B-DISCO demonstration board toolbox	74
Figure 86.	Script help page 1/3	75
Figure 87.	Script help page 2/3	76
Figure 88.	Script help page 3/3	76
Figure 89.	Script tool interface	77
Figure 90.	About window	78

1 List of acronyms

Table 1. List of acronyms

Acronyms	Description
CW	Continuous wave
DFU	Device Firmware Upgrade
FeliCa	Contactless RFID smart card system from Sony
GUI	Graphical User Interface
HID	Human Interface Device class
ISO14443-A	Technology A of international standard that defines proximity cards used for identification.
ISO14443-B	Technology B of international standard that defines proximity cards used for identification.
ISO15693	ISO standard for vicinity cards. These cards can be read from a greater distance compared to proximity cards
PUPI	Pseudo Unique Identifier
UID	Unique Identifier
USB	Universal Serial Bus
VICC	Vicinity Integrated Circuit Card according to ISO 15693.

2 ST25R3911B-DISCO demo kit

This section describes the USB driver installation, and the GUI (Graphical User Interface) software for communication between the PC and the ST25R3911B-DISCO board.

2.1 ST25R3911B-DISCO board installation

To install the ST25R3911B-DISCO board, connect it to a PC with a USB cable to a USB port that is capable to deliver more than 250 mA of current. Usually, this kind of port is on a powered USB Hub or directly on a PC.

2.2 Installing the ST25R3911B-DISCO PC software (STSW-ST25R001)

To install the ST25R3911B-DISCO development software (STSW-ST25R001):

- Download the latest version of the ST25R3911B-DISCO development software from www.st.com.
- Execute the installer and follow the GUI install procedure.

When the installation process is complete, the ST25R3911B-DISCO development software can be used.

Note: The ST25R3911B-DISCO board works using USB HID (Human Interface device class). There are no special ST25R3911B-DISCO drivers. Windows® uses stack mouse and keyboard drivers.

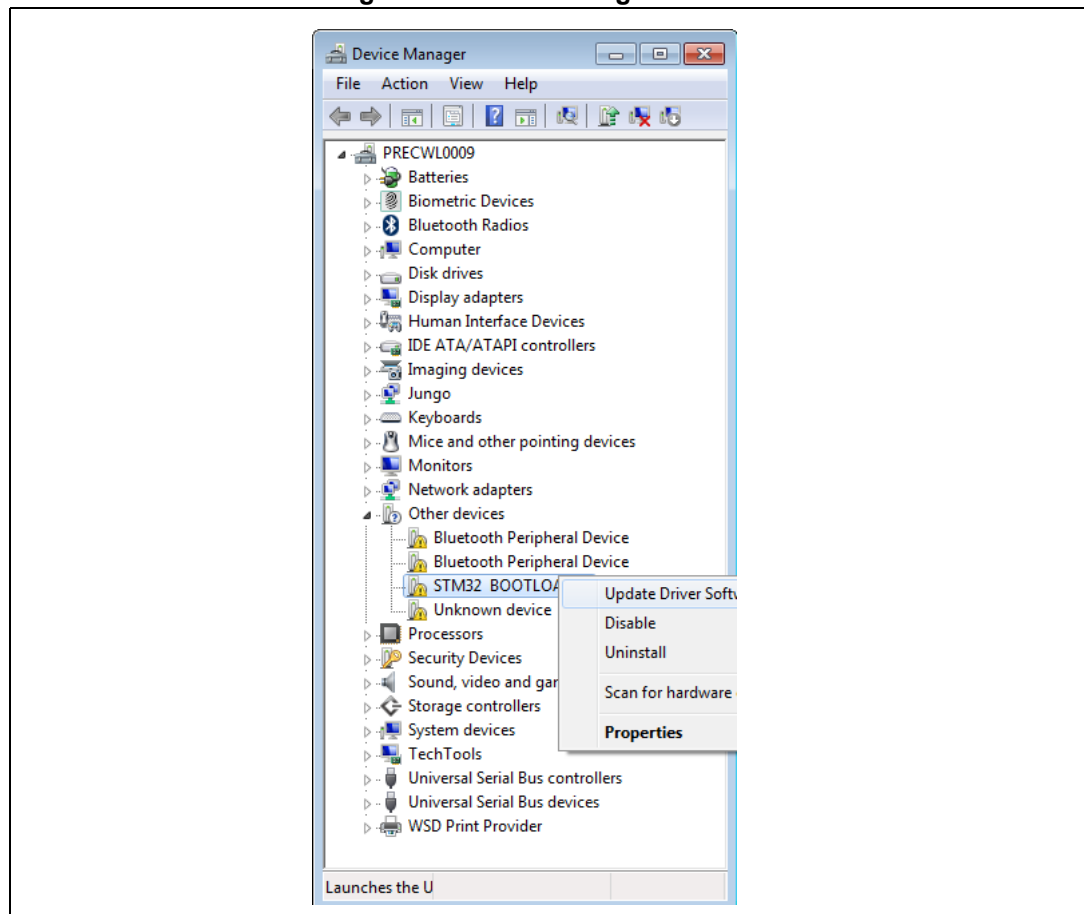
2.3 Firmware update

The ST25R3911B-DISCO demo kit contains a DFU driver, and it is required to update the firmware before using the STSW-ST25R001.

Open the GUI and select “Firmware update”:

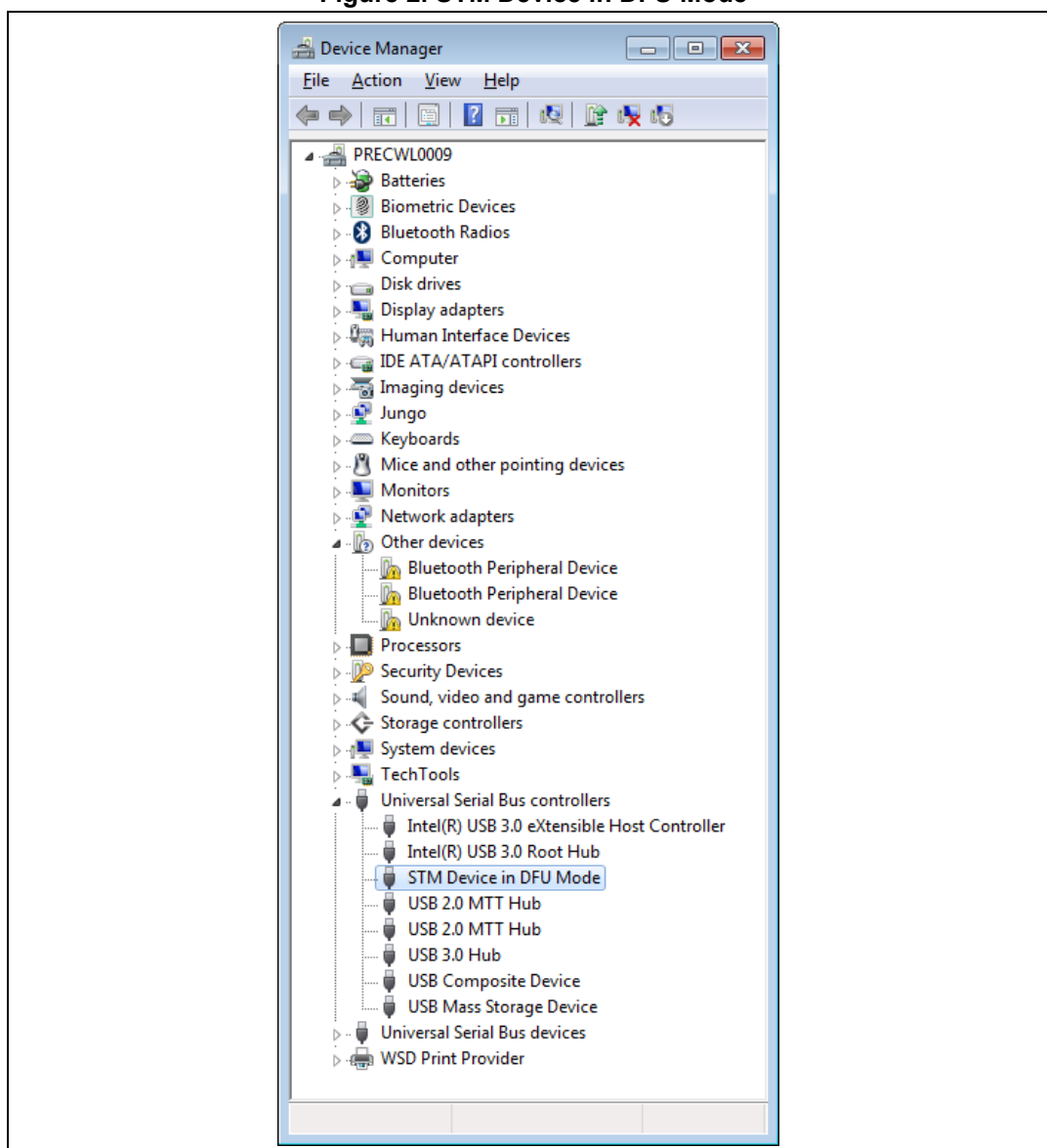
1. Select in the menu “Help” the entry “Firmware Update”. A file chooser opens, there choose the “DISCO_STM32L4x6.hex”. If the DFU driver is already installed the firmware update should finish in few seconds, otherwise go to point 2.
2. If the DFU driver is not installed, open the “Device Manager” window (no need to wait for the GUI’s feedback):
 - a) Select under “Other devices” the “STM32 BOOTLOADER”
 - b) Click on right button of the mouse and select “Update driver software (See [Figure 1](#))

Figure 1. Device Manager window



- c) Select “Browse my Computer for driver software”
- d) Enter “C:\Program Files (x86)\STMicroelectronics\ST25R3911B_Discovery_GUI\Driver” and install it.
- e) Under “Universal Serial Bus controllers” appears an STM Device in DFU Mode. (See [Figure 2](#))

Figure 2. STM Device in DFU Mode



- f) In the meantime the ST25R3911B-DISCO GUI is in timeout, and the USB field in the status bar is red.
- g) To do the update, restart from point 1

Caution: The loading of a wrong firmware makes the board unusable, but the board can be automatically enumerated as an STM Device in DFU Mode forcing the bootloader by pressing the Boot button on the board, holding it and then connecting the USB.

2.4 ST25R3911B Discovery GUI tab

If the software package is installed correctly, and the ST25R3911B-DISCO board is connected to PC USB port, the main menu is displayed (see [Figure 3](#)). The toolbar also contains the ST25 Tag Editor icon, which allows the ST25 Tags editing. To open it, click on the ST25 Tag Editor icon, while a board is connected. The Disco GUI will automatically disconnect from the board, and open the ST25 Tag Editor to take control over the board. To go back to the Disco Reader functionality, just close the ST25 Tag Editor or click on the icon again. The ST25 Tag Editor will be closed automatically in this latter case.

Please see [Section 3: Using the ST25 Tag Editor software](#) for details.

Note: The firmware version number is shown in the status bar of the main window.

This tab allows the user to access several sub-menu:

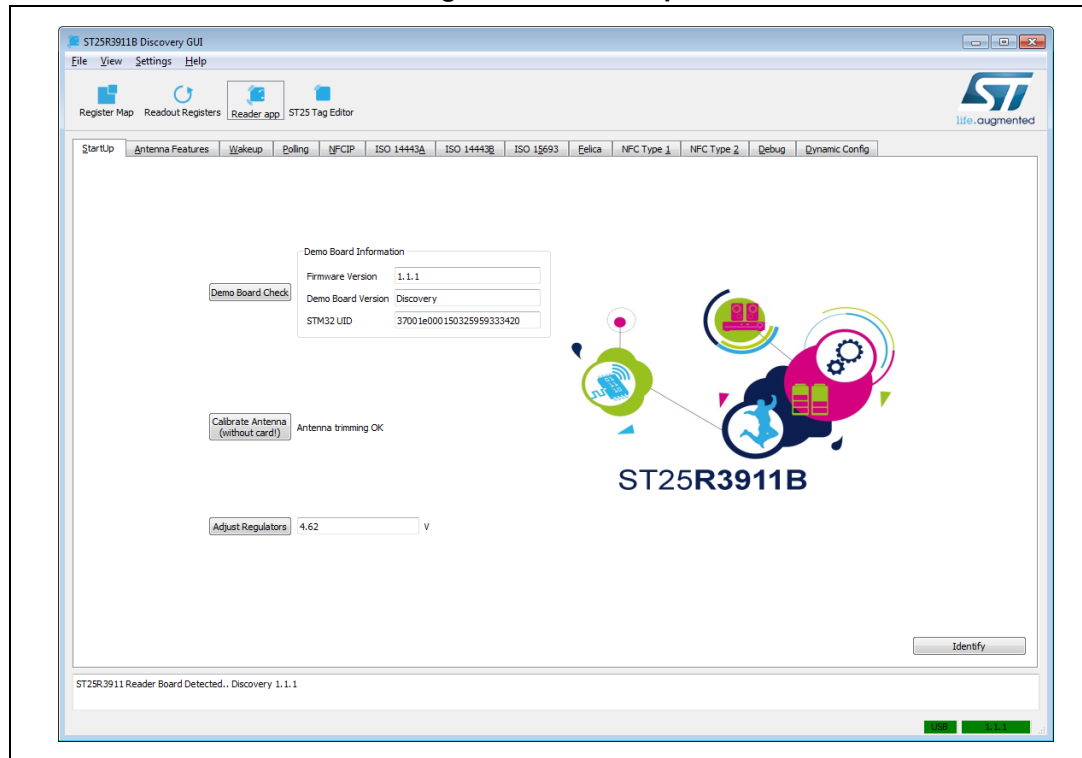
- **StartUp tab** (see [Section 2.4.1](#))
- **Antenna features tab** (see [Section 2.4.2](#))
- **Wakeup tab** (see [Section 2.4.3](#))
- **Polling tab** (see [Section 2.4.4](#))
- **NFCIP tab** (see [Section 2.4.5](#))
- **ISO 14443A tab** (see [Section 2.4.6](#))
- **ISO 14443B tab** (see [Section 2.4.7](#))
- **ISO 15693 tab** (see [Section 2.4.8](#))
- **FeliCa tab** (see [Section 2.4.9](#))
- **NFC Type 1 tab** (see [Section 2.4.10](#))
- **NFC Type 2 tab** (see [Section 2.4.11](#))
- **Debug tab** (see [Section 2.4.12](#))
- **Dynamic Config tab** (see [Section 2.4.13](#))

2.4.1 StartUp tab

Figure 3 shows the startup tab.

The status tab on the bottom right corner shows the connection status. If the HW is successfully connected via USB then the status turns to green, and displays the version of the Firmware.

Figure 3. GUI startup



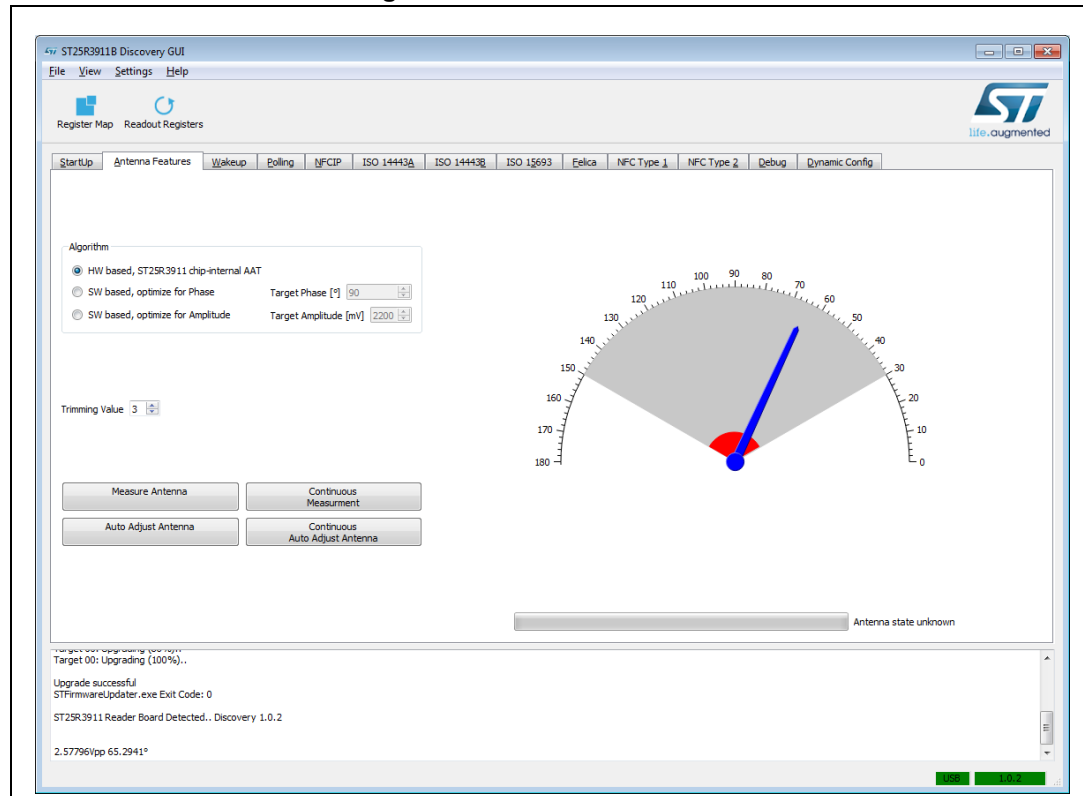
- Click on “Demo Board Check” button. This action checks the USB connection to the demo board, and reads some demo board information, which is required for the GUI operation. The configuration of the ST25R3911B is based on this information.
- Click on “Adjust Regulators” button to automatically set the regulators. This command improves the system Power Supply Rejection Ratio, and the value of regulated voltage is displayed.
- Click on “Calibrate Antenna” button. This command automatically adjusts the resonance frequency of the antenna LC tank. It has to be run again in case the environment of antenna coil is changed (for example in case that some metal object is placed near to the antenna).
- Antenna trimming OK is displayed next to the button.

When the Start-up procedure is done, the user can proceed with using the other tabs.

2.4.2 Antenna features tab

Figure 4 shows the Antenna features tab.

Figure 4. Antenna features tab



- The antenna resonates at 13,56MHz, when the pointer shows maximum input signal amplitude.
- Choose a target phase to use it as a reference for the software algorithm.
- Click on “Measure Antenna” button to measure the amplitude of the input signals and the phase differences between output and input signal. Both are displayed on the graph and the command line on the bottom.

The input amplitude and phase difference can be continuously monitored by using the “Continuous Measurement” button. Moreover, when this option is activated and a piece of metal is approached to the antenna, a detuning effect can be seen.

The “Auto Adjust Antenna” button allows the antenna tuning. This action can be done continuously by pressing the “Continuous Adjust Antenna” button.

Moreover, it is possible to manually adjust the trim value with the List Box “Trimming values”. It is recommended to use the “Continuous Measurement” for this investigation.

Note: *The antenna feature menu can be easily used for matching network evaluation of others ST25R3911B based readers.*

2.4.3 Wakeup tab

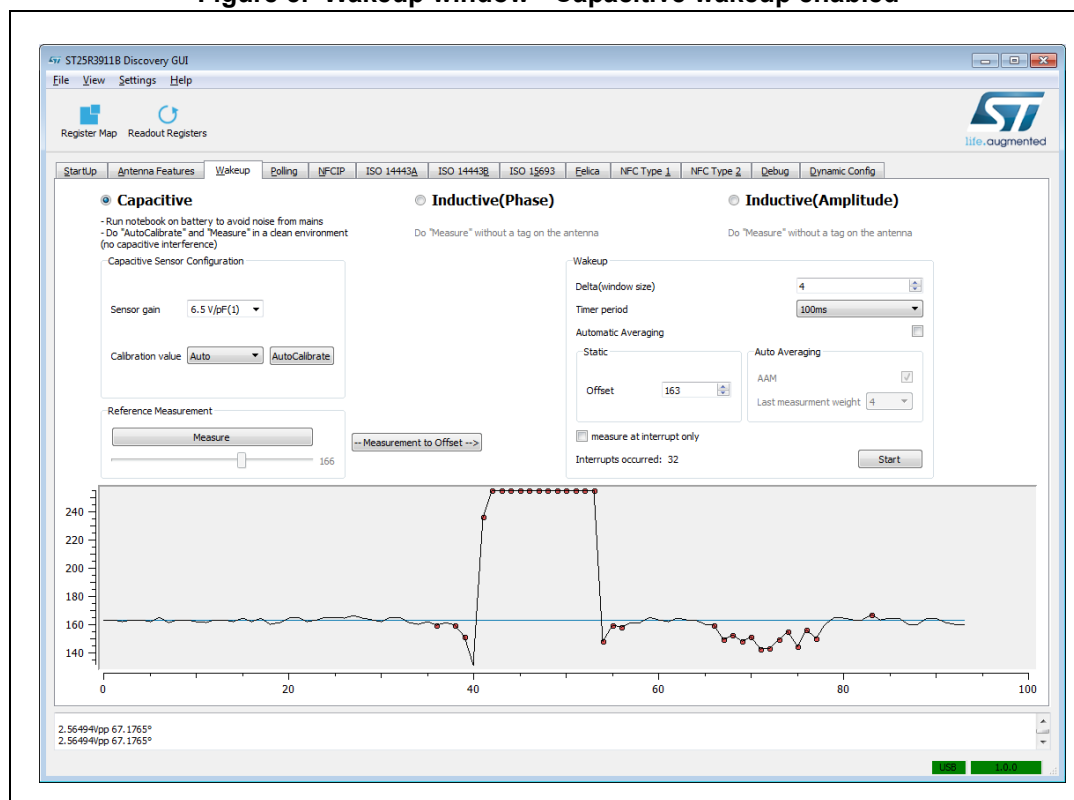
The ST25R3911B offers three wakeup modes (capacitive, inductive (phase) and inductive (amplitude)) that generate an interrupt to a microcontroller in some sleep mode.

Note: *This demonstrator is for evaluation purposes, there are continuous measurements updates happening, which result in extra current consumption.
The “read at interrupt only” switch avoids interaction and minimizes the current.*

Capacitive wakeup

Figure 5 shows the wakeup window with the capacitive wakeup enabled.

Figure 5. Wakeup window - Capacitive wakeup enabled



This method allows to measure the capacitance across two electrodes.

- Click on “AutoCalibrate” button to do the calibration and to remove the parasitic capacitances influence. Alternatively, it is possible to manually set the calibration value.

Note: *The “AutoCalibrate” button only works if the calibration value is set to “Auto”.*

- Click on “Measure” and “Measurement to Offset” button to set the initial status (Offset).
- Click on “Start” button to initiate the autonomous wake up mode of ST25R3911B.

The obtained measurement values are shown in Figure 5.

Note: *Each interrupt is indicated by a red dot.*

Other additional parameters are:

- **Delta (window size)** defines the window in which no interrupt is generated. If the actual measured value is within the window range, no interrupt will be generated.
- **Timer period** defines how often the measurement procedure is executed.
- **Automatic averaging** box selects an automatic or static offset value. In case of an auto averaging, the offset is dynamically adjusted to the environment condition. If this option is active, the offset changes dynamically with a weighted factor which can be selected. The weight option defines how fast the offset value is being adapted to the new environment condition.

Inductive wakeup

The inductive wakeup scans periodically the input signal amplitude and the phase difference of the output and input signal. If there is a change of one of these two antenna tuning parameters an interrupt is generated.

The antenna needs to be tuned before starting the inductive wakeup procedure.

Figure 6. Wakeup window - Inductive (phase) wakeup enabled

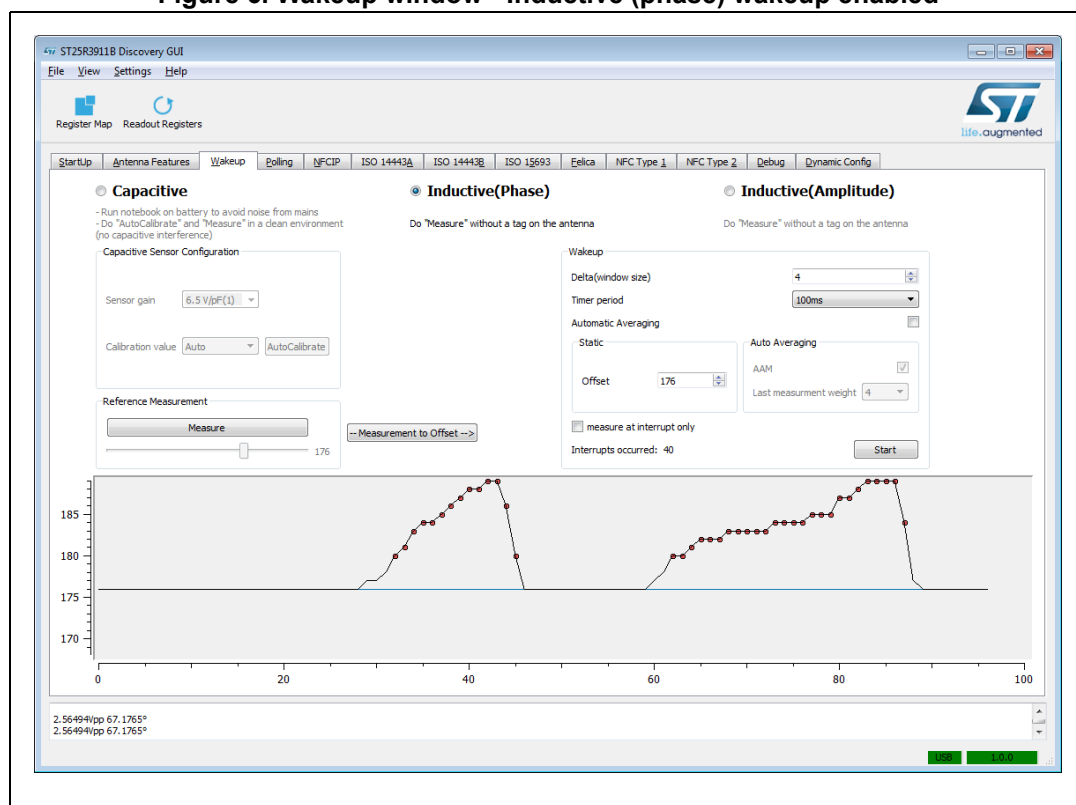
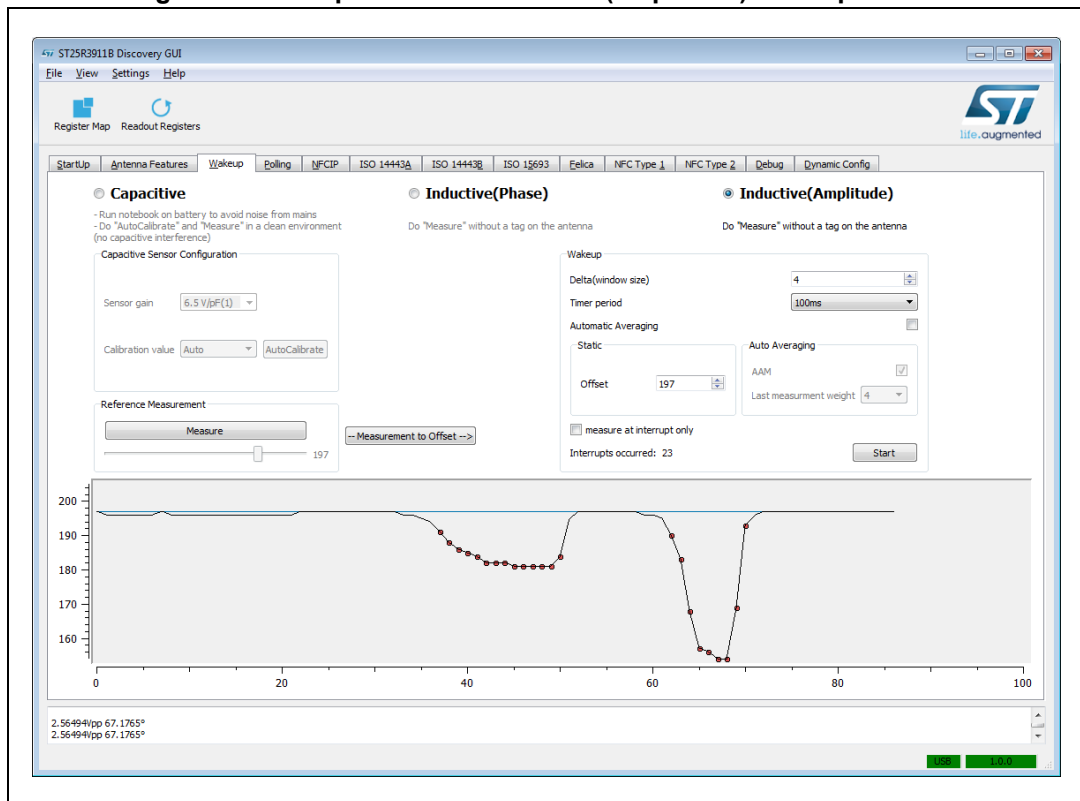


Figure 6 shows the wakeup window with the phase differences measurement enabled. To achieve the offset level, it needs to execute the same procedure of *Capacitive wakeup*. *Figure 7* shows the wakeup window with the input signal amplitude measurement.

Figure 7. Wakeup window - Inductive (amplitude) wakeup enabled



Note: Different wakeup ranges can be achieved with the phase or amplitude method. This depends on the antenna matching network.

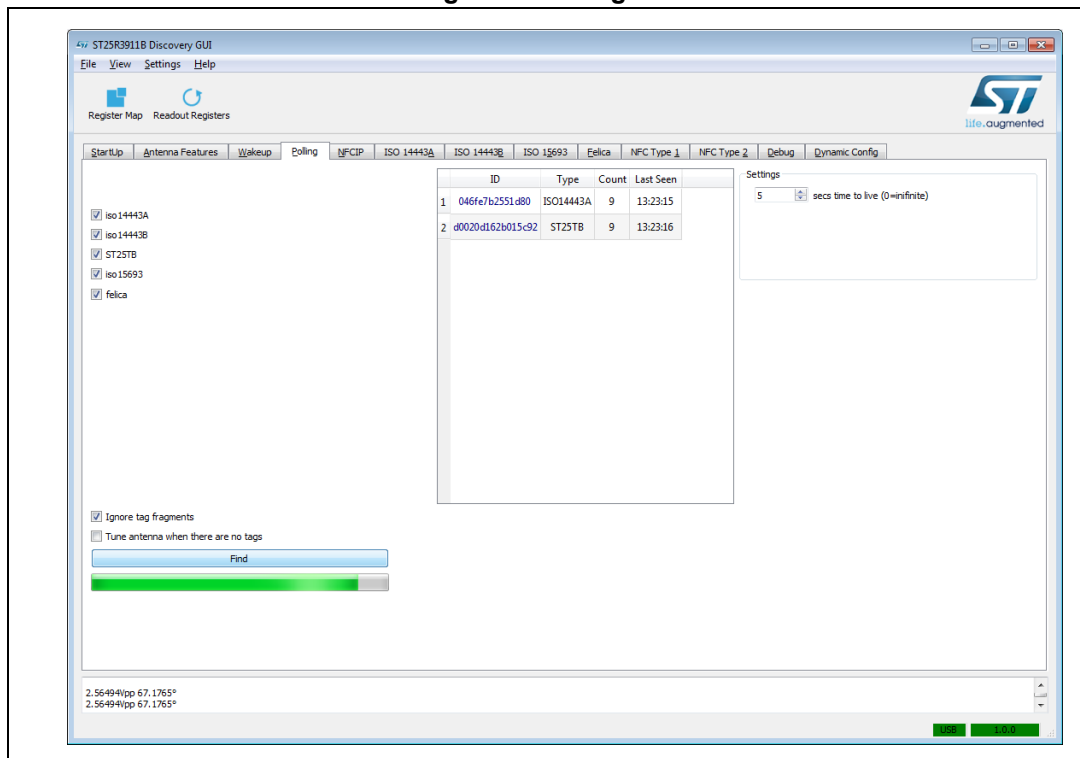
2.4.4 Polling tab

Figure 8 shows the anti-collision and multi-protocol features of ST25R3911B-DISCO board.

In addition to the protocols shown, the following protocols are supported:

- Kovio Barcode 128/256 bit (ISO 14443A checkbox)
- iCLASS (ISO 15693 checkbox)

Figure 8. Polling tab



By default all standards are active.

- Click on the “Find” button. The reader starts to scan for tags that are in the proximity of the reader.
- The polling process stops if clicked on “Stop” button during the polling process.
- The screen log shows the UIDs or PUPIs, the type and how often the tag is detected.
- The time stamp shows the time of the last detection.

2.4.5 NFCIP tab

Figure 9 shows the NFCIP tab, which displays the peer-to-peer functionality of the ST25R3911B.

Figure 9. NFCIP window



Note: This feature requires an NFC enabled device supporting peer to peer protocol.

The ST25R3911B is initially configured to cycle through the initiator and target mode. The default setting for the bit-rate is 424kbps.

The communication starts automatically when the tab is selected.

Once the link is established, the initial gray phone picture on the GUI is replaced by a colored one.

When the connection is established it is possible to transfer an URL to the phone:

- Write the URL and click on “=URL =>” button to start the transfer.
- The browser of the phone opens the requested URL.

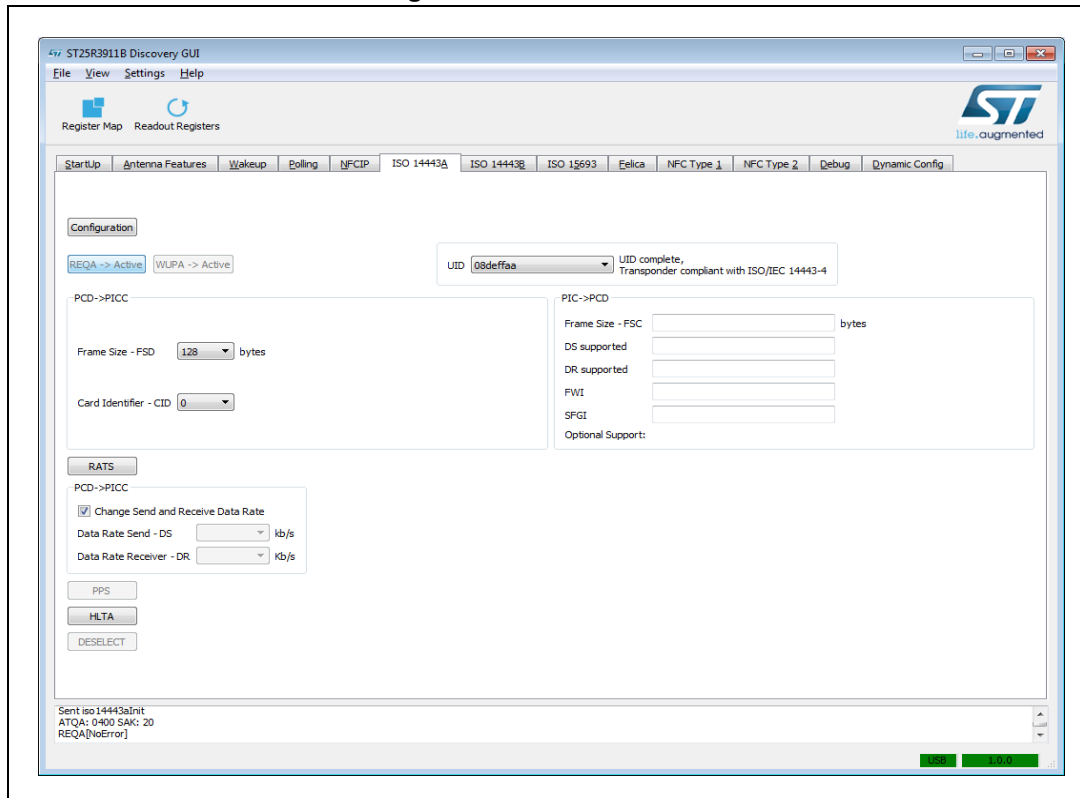
It is possible to transfer pictures to the phone (The GUI provides three samples as example):

- The “Image from Disk” button provides an individual option to select a file.
 - Click on one picture to start the transfer. The picture’s transfer takes several seconds, because the picture contains a large amount of data. For this reason, please wait until the picture is transferred.
 - The phone will display the received picture with the comment “new Tag received”.

2.4.6 ISO 14443A tab

Figure 10 shows the ISO 14443A tab.

Figure 10. ISO 14443A tab



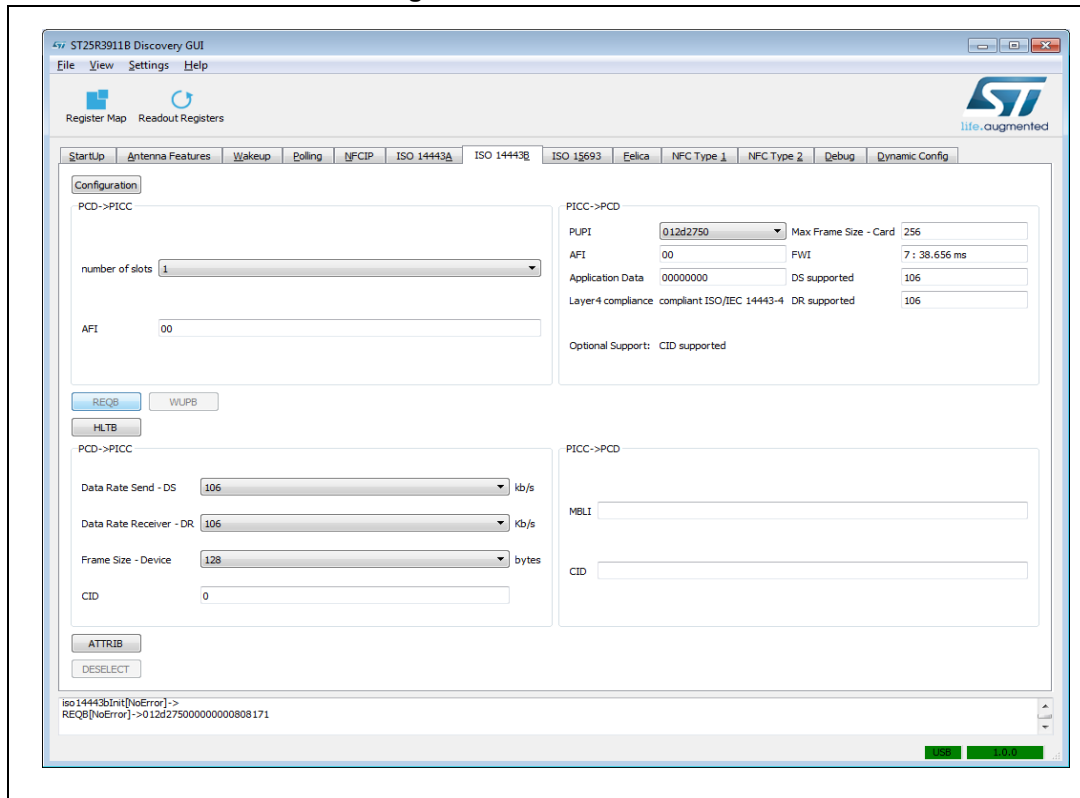
The “Configuration” button prepares the board for ISO 14443-A communication, and the following sequence activates the cards:

- “REQA ->Active” or “WUPA ->Active” starts the anti-collision procedure
- Tag UID is displayed.
- If the card/tag supports ISO 14443-4 then additional commands like RATS or PPS can be carried out.
- Click on RATS or PPS.
- Send arbitrary frames using “Debug” tab (See [Section 2.4.12: Debug tab](#))

2.4.7 ISO 14443B tab

Figure 11 shows the ISO 14443B tab.

Figure 11. ISO 14443B tab



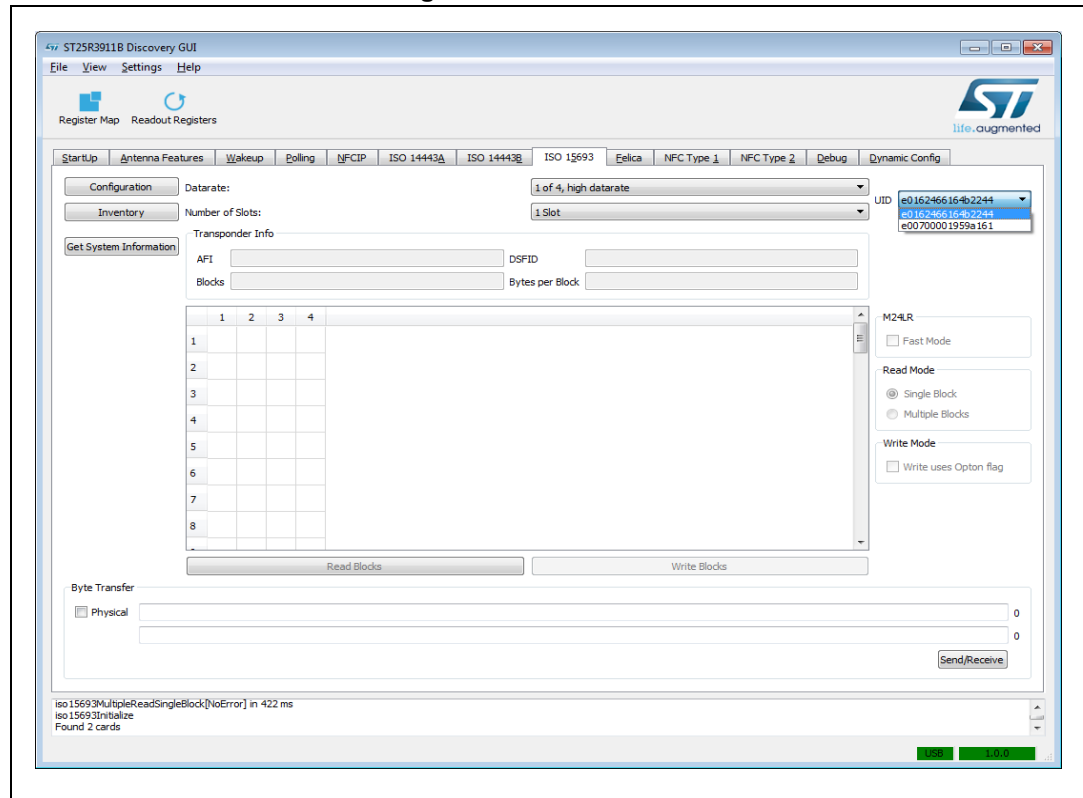
The “Configuration” button prepares the board for ISO 14443-B communication, and the following sequence activates the card:

- Click on “REQB” or “WUPB” button to poll once. The PUPID of a found tag will be displayed.
- If the card/tag supports ISO 14443-4 then additional commands like “ATTRIB” can be carried out.
- Send an arbitrary frames using “Debug” tab (See [Section 2.4.12: Debug tab](#))

2.4.8 ISO 15693 tab

Figure 12 shows the ISO 15693 tab.

Figure 12. ISO 15693 tab



The “Configuration” button prepares the board for ISO 15693 communication, and the following sequence activates multiple cards:

- Click on “Configuration” button
- Set the ISO 15693 parameter to receive data rate, and the number of slots, which are used in the anti-collision loop in the firmware.
- Click on “Inventory” button to scan for Vicinity Integrated Circuit Cards.
- Select one of found UIDs using the drop-down box. Now the “Get System Information” button can be pressed to retrieve more information about the selected card.

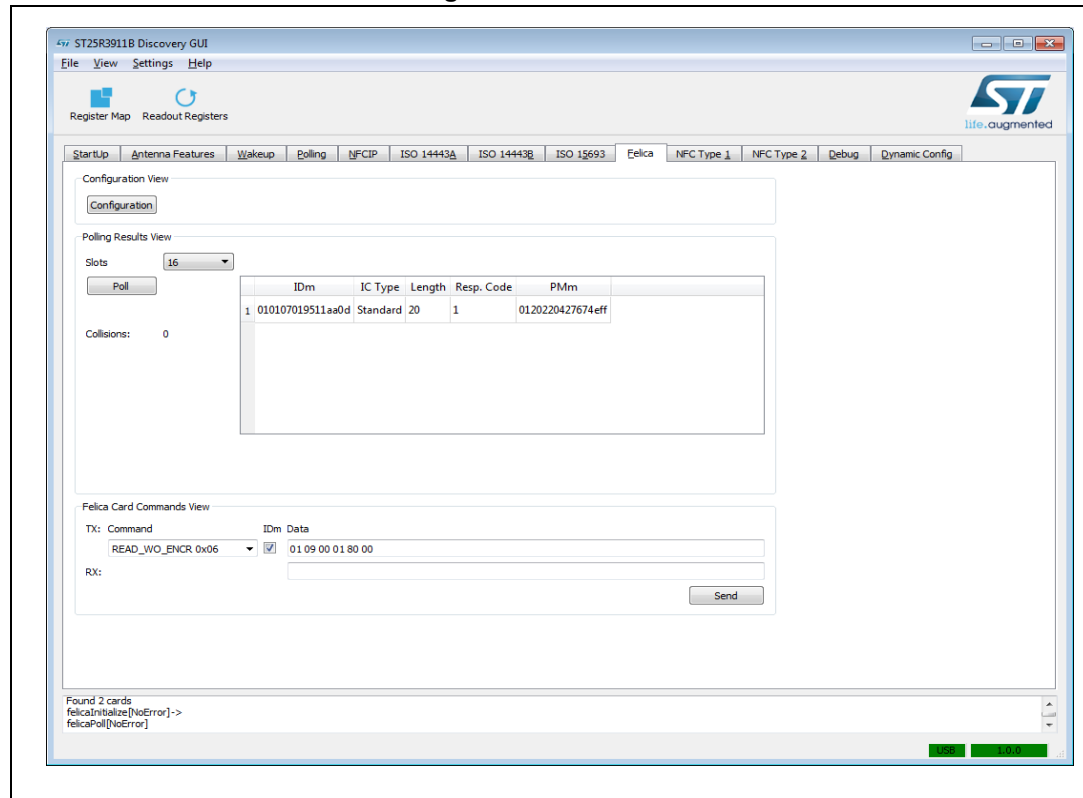
The “Get System Information” will request the card for supported features. The command “Read blocks” will read out and display the memory blocks of the card.

Note: *Not all vicinity cards support “Get System Information” command.*

2.4.9 FeliCa tab

Figure 13 shows the FeliCa tab.

Figure 13. FeliCa tab



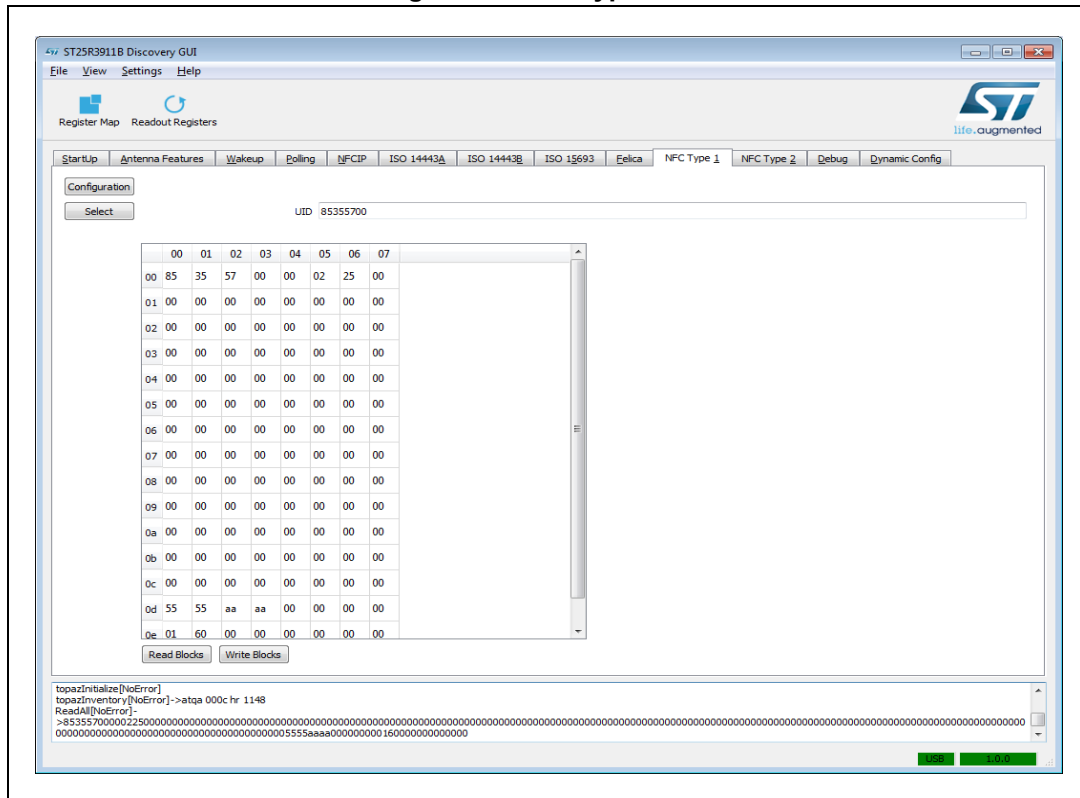
The “Configuration” button prepares the board for FeliCa communication, and the following sequence activates a card:

- Set the number of slots used in the anti-collision
- Click on “Poll” button to poll once for FeliCa cards.
- Arbitrary FeliCa commands can be executed using the “FeliCa Card Commands”. The IDm will be inserted on request.

2.4.10 NFC Type 1 tab

Figure 14 shows the NFC Type 1 tab.

Figure 14. NFC Type 1 tab



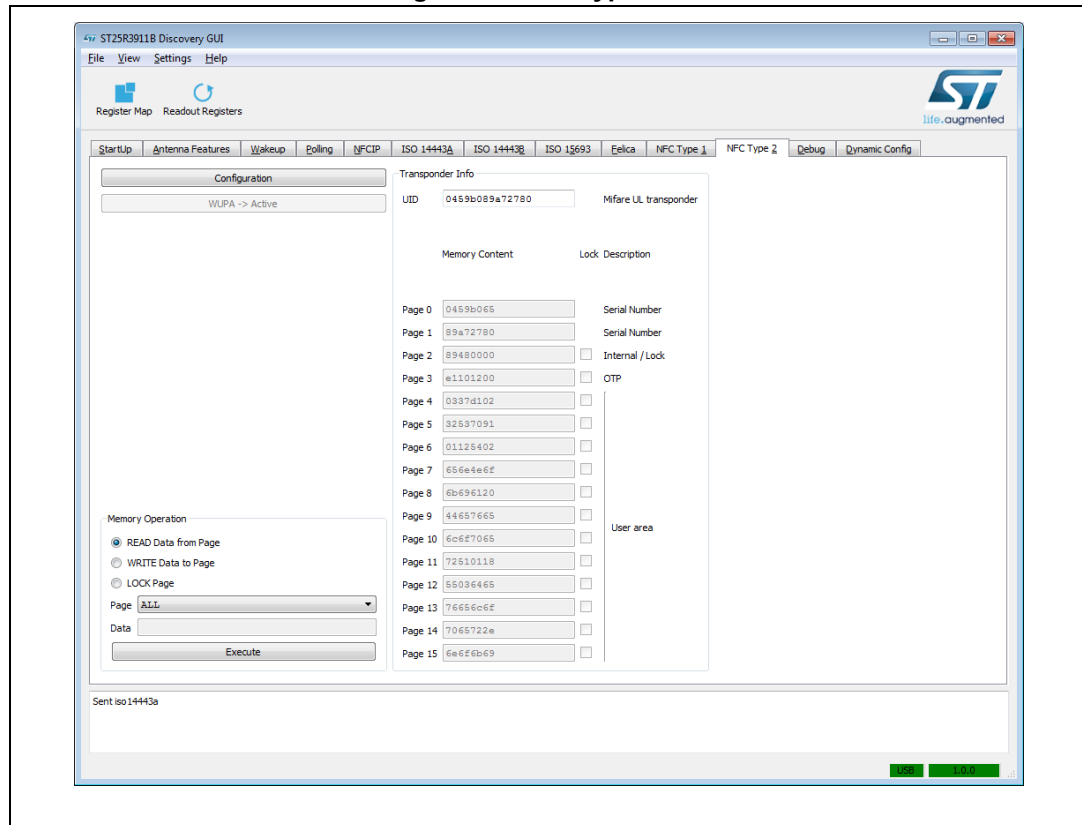
The “Configuration” button prepares the board for NFC Type 1 communication, and the following sequence activates a card:

- Click on “Select” button to send a WUPA. The UID of the Type 1 Tag is shown.
- The commands read and write are available, and it is possible to read and write its memory blocks.

2.4.11 NFC type 2 tab

Figure 15 shows the NFC type 2 tab.

Figure 15. NFC type 2 tab



The “configuration” button prepares the board for ISO 14443A communication and enables the field.

Read data from page sequence:

- Click on “Configuration” button.
- Click on “WUPA->Active” to find a cards.
- Activate the “READ Data from Page” flag
- Click on “Execute” to read the memory card content

Write data from page sequence:

- Click on “Configuration” button.
- Click on “WUPA->Active” to find a card.
- Activate the “WRITE Data from Page” flag
- Click on “Execute” to write the memory card content

The Lock page:

- Click on “Configuration” button.
- Click on “WUPA->Active” to find a card.
- Activate the “LOCK Page” flag
- Click on “Execute” to lock the memory card page content

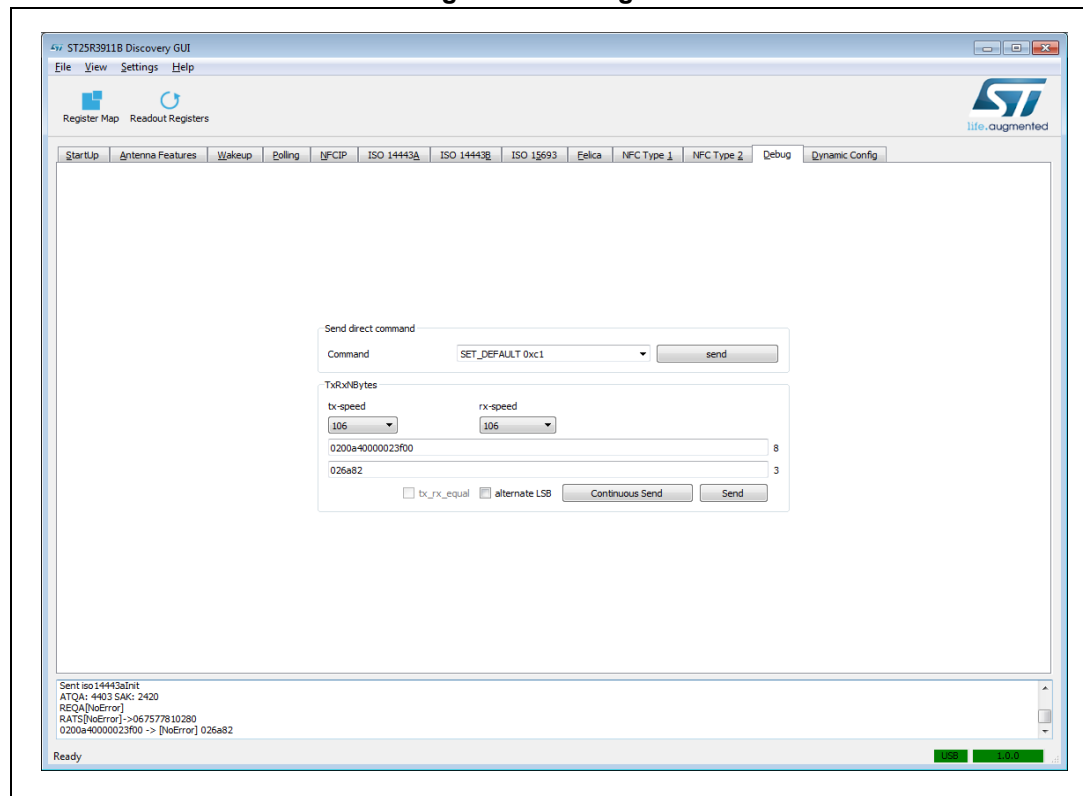
2.4.12 Debug tab

The debug tab is split into two group boxes (see [Figure 16](#)):

- “Send Direct Command” allows sending ST25R3911B direct commands.
- “TxRxNBytes” allows to send the arbitrary hex-encoded byte strings, with the previously selected protocol, directly through the FIFO.

Note: *This is not possible for ISO15693 since for this protocol the firmware has to do the bit coding.*

Figure 16. Debug tab

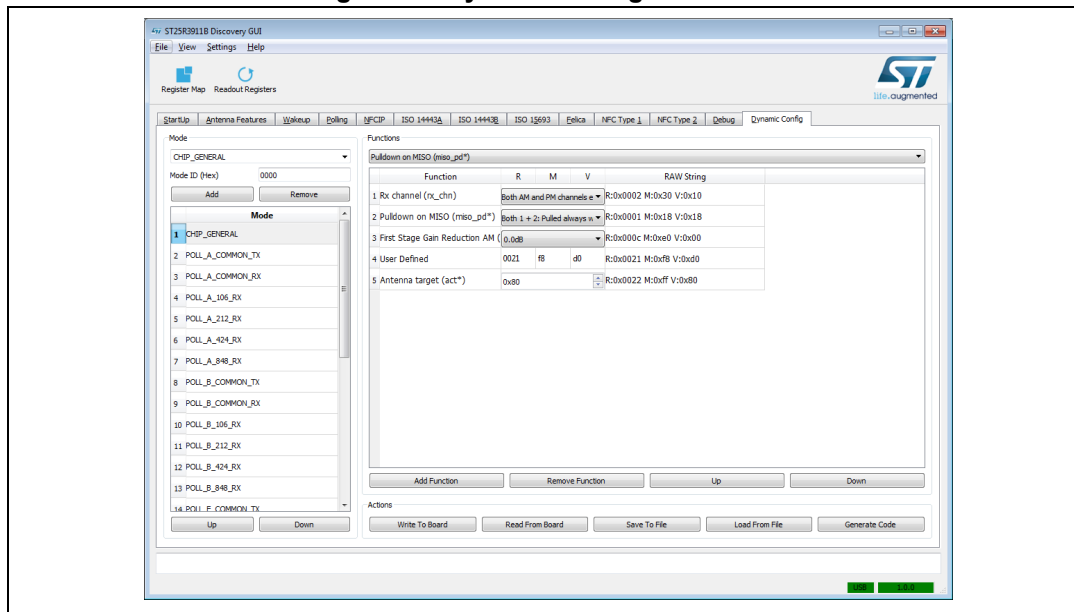


Note: *The usage of this tab is for experienced users only.*

2.4.13 Dynamic configuration tab

The dynamic configuration tab is a powerful instrument to fine-tune the settings of every technology and bit rate.

Figure 17. Dynamic configuration tab



Elements:

- Read from board: Replace the current configuration with the one from the board.
- Write to board: Apply the current configuration on the board. It will be stored in RAM only, and a reset erases it.
- Save to File: Write the settings as an XML to your computer.
- Load From File: Read an existing XML from your computer.
- Generate Code: Generate the table as C-Code to be included in user source code.
- Mode group:
 - Every operation mode of ST25R3911B has a corresponding mode ID. The drop down box allows you to select the pre-defined modes, and add them to the listed modes.
 - It is also possible to define your own modes with own mode IDs but these may not be used by the firmware. Be careful to do that only if you know what you are doing.
- Functions group:

Every mode has associated one or more functions. A function can be:

 - Selected from drop down box
 - Defined by user. In this case it can be defined as triples of register address + register mask + register value. All named functions will just be translated into these register mark value.

If the new function is added to only one of the modes, it will be applied when this mode is selected, but it will not be reset to its initial state after leaving this mode. To be available to all modes, it must be added to all modes on the same level.

Note: The default configuration works in most cases.

2.5 Register Map

The GUI includes a register map window showing the registers of ST25R3911B.

Figure 18. Register map

Register Name	Addr.	7	6	5	4	3	2	1	0	Value
IO Configuration Register 1	0x00	0	0	0	0	1	1	1	1	0x0f
IO Configuration Register 2	0x01	0	0	0	1	1	0	0	0	0xd8
Operation Control Register	0x02	1	1	0	0	1	0	0	0	0xc8
Mode Definition Register	0x03	0	0	0	0	1	0	0	0	0x08
Bit Rate Definition Register	0x04	0	0	0	0	0	0	0	0	0x00
ISO14443A and NFC 106kb/s Settings Register	0x05	0	0	0	0	0	0	0	0	0x00
ISO14443B Settings Register 1	0x06	0	0	0	0	0	0	0	0	0x00
ISO14443B Settings Register 2	0x07	0	0	0	0	0	0	0	0	0x00
Stream Mode Definition Register	0x08	0	0	1	1	1	0	0	0	0x38
Auxiliary Definition Register	0x09	0	1	0	0	0	1	0	0	0x44
Receiver Configuration Register 1	0x0a	0	0	0	0	0	0	0	0	0x00
Receiver Configuration Register 2	0x0b	0	0	0	1	1	0	1	0	0xd1
Receiver Configuration Register 3	0x0c	0	0	0	1	1	0	0	0	0x18
Receiver Configuration Register 4	0x0d	0	0	0	0	0	0	0	0	0x00
Mask Receive Timer Register	0x0e	0	0	0	0	1	1	0	0	0x0c
No-response Timer Register 1	0x0f	0	1	0	1	0	0	1	0	0x52
No-response Timer Register 2	0x10	1	1	0	0	1	0	1	1	0xcb
General Purpose Timer Control Register	0x11	0	0	1	0	0	0	0	0	0x20
General Purpose Timer Register 1	0x12	0	0	0	0	0	0	1	0	0x02
General Purpose Timer Register 2	0x13	1	1	0	0	1	0	0	0	0xc8
Mask Main Interrupt Register	0x14	1	0	0	0	0	1	1	1	0x87
Mask Timer and NFC Interrupt Register	0x15	1	0	1	0	0	1	1	0	0xa6
Mask Error and Wake-up Interrupt Register	0x16	0	0	0	0	1	1	1	1	0x0f
Main Interrupt Register	0x17	0	0	0	0	0	0	1	0	0x02
Timer and NFC Interrupt Register	0x18	0	0	1	0	0	0	0	0	0x20
Error and Wake-up Interrupt Register	0x19	0	0	0	0	0	0	0	0	0x00
FFO Status Register 1	0x1a	0	0	0	0	0	0	1	0	0x02
FFO Status Register 2	0x1b	0	0	0	0	0	0	0	0	0x00
Collision Display Register	0x1c	0	1	0	1	0	0	0	0	0x50
Number of Transmitted Bytes Register 1	0x1d	0	0	0	0	0	0	0	0	0x00
Number of Transmitted Bytes Register 2	0x1e	0	1	0	0	0	0	0	0	0x40
NFCIP Bit rate Detection Display Register	0x1f	0	0	1	0	0	0	0	0	0x20
A/D Converter Output Register	0x20	1	1	0	0	0	1	0	1	0xc5
Antenna Calibration Control Register	0x21	1	0	0	1	1	0	0	0	0x98
Antenna Calibration Target Register	0x22	1	0	0	0	0	0	0	0	0x80
Antenna Calibration Display Register	0x23	0	0	1	1	0	0	0	0	0x30
AM Modulation Depth Control Register	0x24	1	0	0	0	0	0	0	0	0x80
AM Modulation Depth Display Register	0x25	0	0	0	0	0	0	0	0	0x00
RFO AM Modulated Level Definition Register	0x26	1	1	1	1	0	0	0	0	0xf0
RFO Normal Level Definition Register	0x27	0	0	0	0	0	0	0	0	0x00
External Field Detector Threshold Register	0x29	0	0	0	0	0	0	0	0	0x00

This window can be opened by clicking the “Register Map” button in the toolbar, selecting the “View->Register Map” menu entry or pressing “Ctrl-M”.

Typically, the display of the registers is in hex but can also be changed to decimal. Hovering over the icon “bits” opens up a tool tip showing details of the bit/bit fields.

Clicking bits will toggle the bits and entering a value without “0x” into the Value column will allow changing complete registers.

The update of the register map can be manually triggered (“File->Readout Registers”), or be done automatically (“Settings->Automatic Update”).

3 Using the ST25 Tag Editor software

When the ST25 Tag Editor software is launched, a detection process begins (see [Figure 19](#) and [Figure 20](#)) to check:

- the revision of the DLL installed on your computer
- the revision of the ST25R3911B-DISCO's firmware
- the ST25R3911B-DISCO's hardware name

The objective of these checks is to verify that the DLLs installed on your PC is up-to-date, and aligned with the firmware revision of the ST25R3911B-DISCO.

If a problem occurs during the detection, the message shown in [Figure 21](#) is displayed.

Figure 19. Detection message 1/3

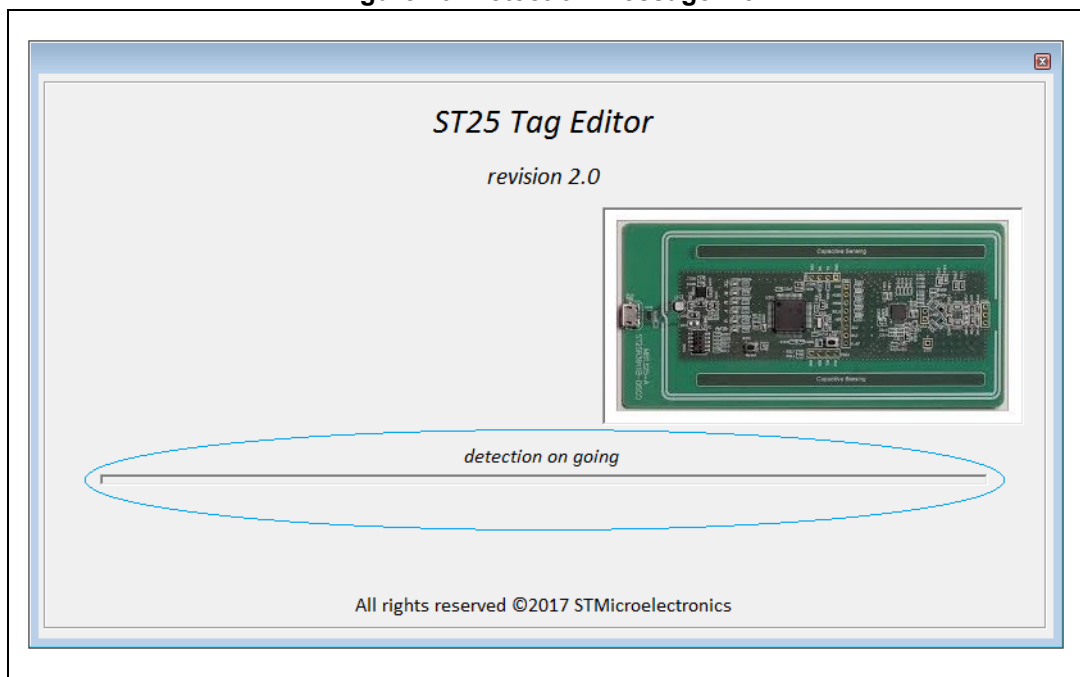


Figure 20. Detection message 2/3

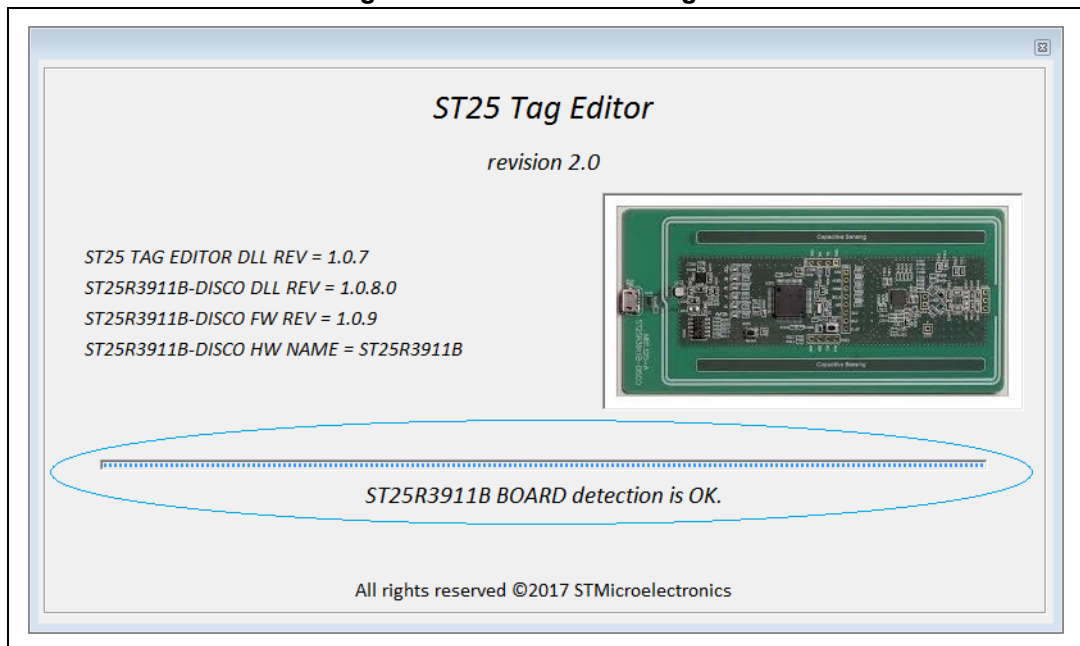


Figure 21. Detection message 3/3



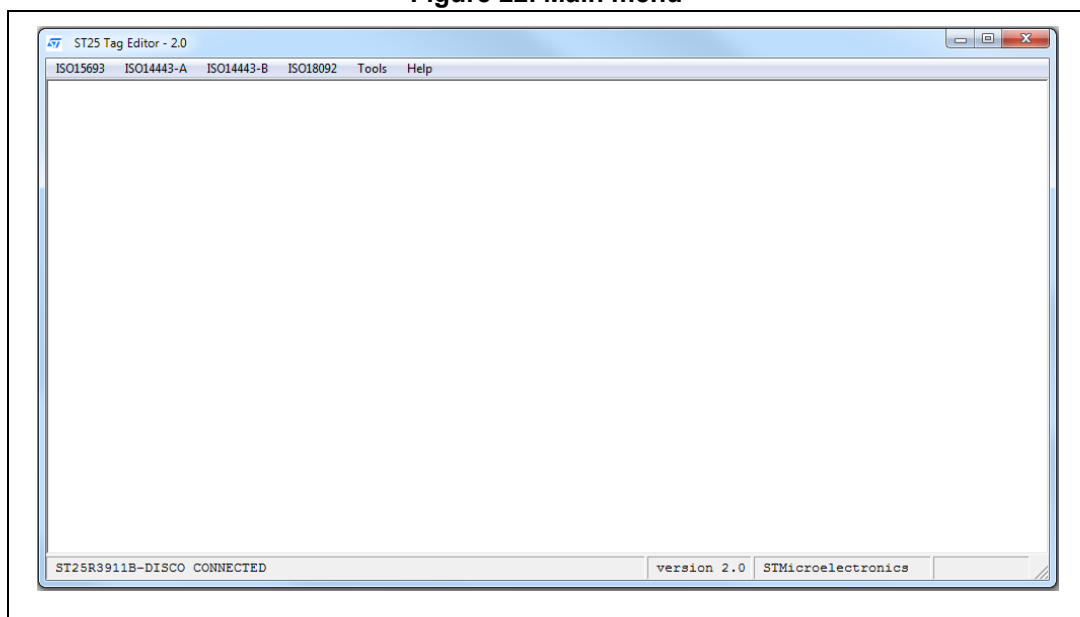
3.1 Main menu

If the software package has been installed correctly and the ST25R3911B-DISCO board is connected to PC USB port, the main menu appears.

This menu allows the user to access several sub-menus:

- **ISO15693** mode (see [Section 3.2](#))
- **ISO14443-A** mode (see [Section 3.3](#))
- **ISO14443-B** mode (see [Section 3.4](#))
- **ISO18092** mode (see [Section 3.5](#))
- **Tools** menu (see [Section 3.6](#))
- **Help** menu (see [Section 3.7](#))

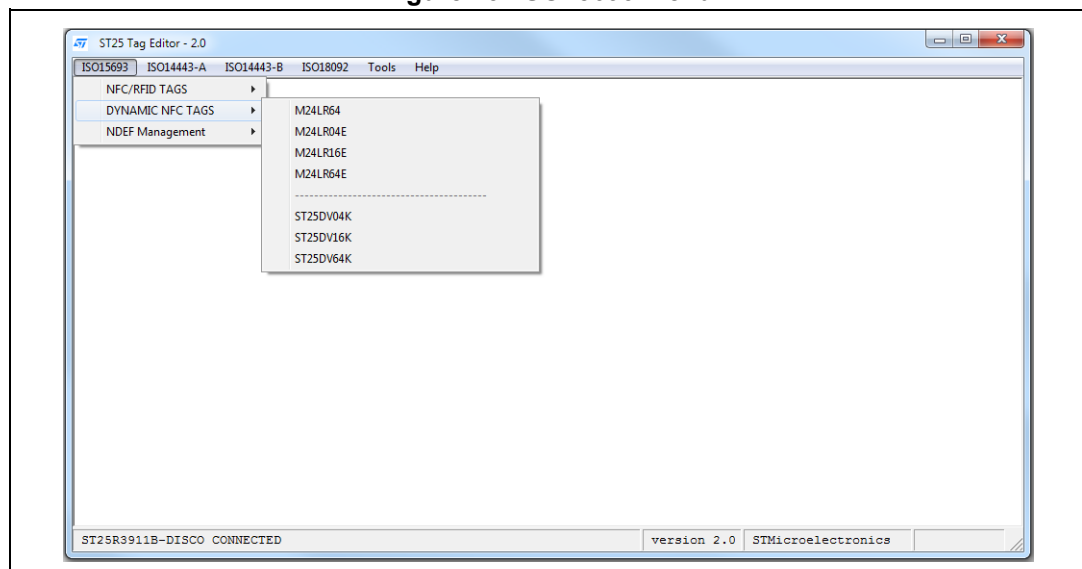
Figure 22. Main menu



3.2 ISO15693 menu

1. Select **ISO15693** from the main menu to use the ST25R3911B-DISCO as an ISO15693 reader (see [Figure 23](#)).
The menu allows to select:
 - NFC/RFID TAGS
 - LRI1K
 - LRI2K
 - LRIS2K
 - LRIS64K
 - DYNAMIC NFC TAGS
 - M24LR64
 - M24LR04E
 - M24LR16E
 - M24LR64E
 - ST25DV04K
 - ST25DV16K
 - ST25DV64K
 - OTHERS
 - PICOPASS
 - NDEF Management
 - Vicinity Tags - NDEF message user interface
 - NFC Type 5 - NDEF message user interface

Figure 23. ISO15693 menu



2. **EXAMPLE 1: M24LR64E USER INTERFACE**
Select a device from the list (see [Figure 24](#) for an example). The board is then

automatically configured as an ISO15693 reader, and the ST25R3911B-DISCO can send/receive ISO15693 frames to/from the tags using the SendRecv command.

ISO15693 communications are configured as follows:

- 100% high data rate
- One subcarrier

The ISO15693 configuration is displayed in the log window.

The upper part of the menu shows buttons which allow to send ISO15693 requests to a tag through the ST25R3911B-DISCO antenna. The main available requests are:

- Inventory
- Select
- Stay Quiet
- Reset to ready
- Get system info
- Initiate
- Inventory initiated
- Fast initiate
- Fast Inventory initiated

By default, the ISO15693 requests are sent in Non-selected/Non-addressed mode, and the requests are decoded by all the tags present in the RF field.

To switch to Addressed mode, follow the steps below:

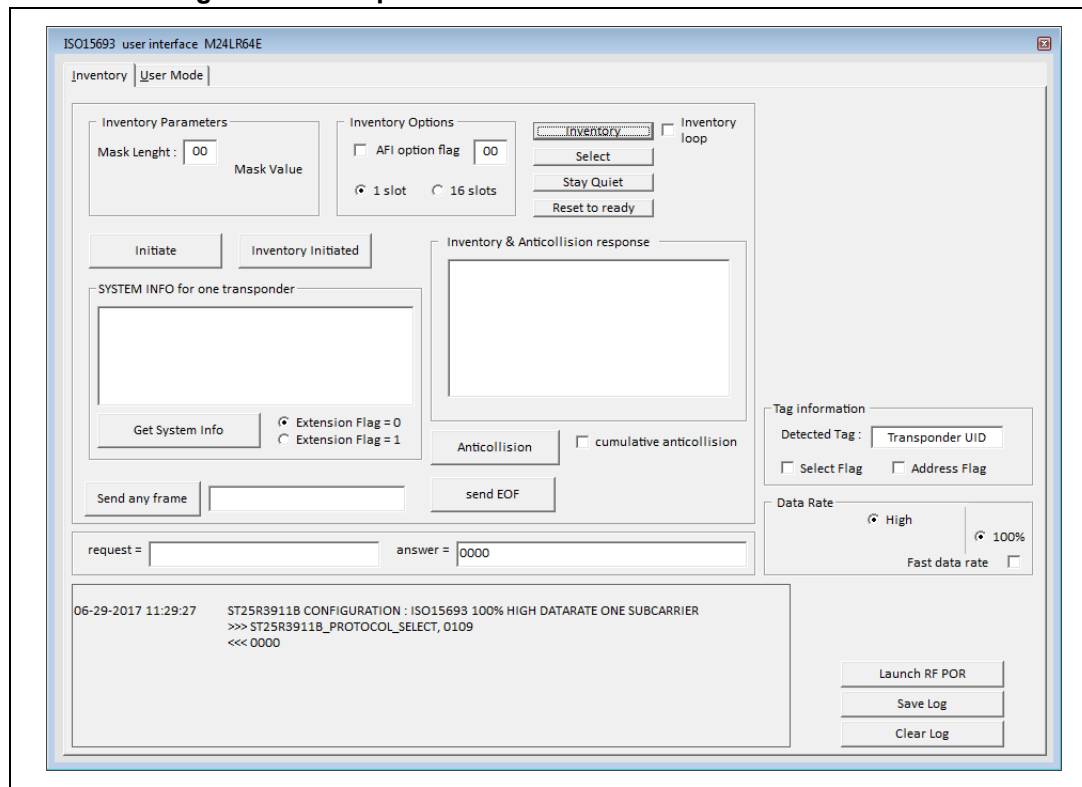
- a) Send an Inventory request to retrieve the tag UID.
- b) Click on the UID displayed in the **INVENTORY response** window to automatically copy the UID into the **Tag information** text box.
- c) Check **Address Flag** to activate the Addressed mode for the coming requests.

The following sequence is required to switch to Selected mode:

- a) Send a Select request in Addressed mode (steps a to c above).
- b) Uncheck **Address Flag**.
- c) Check **Select Flag**.

All the coming requests will be sent to the previously selected tag.

Figure 24. Example of ISO15693 user interface for M24LR64



3. Click **User Mode** from the toolbar of the device ISO15693 user interface to display the ISO15693 requests that can be sent in User mode (see [Figure 25](#)). The main requests are:

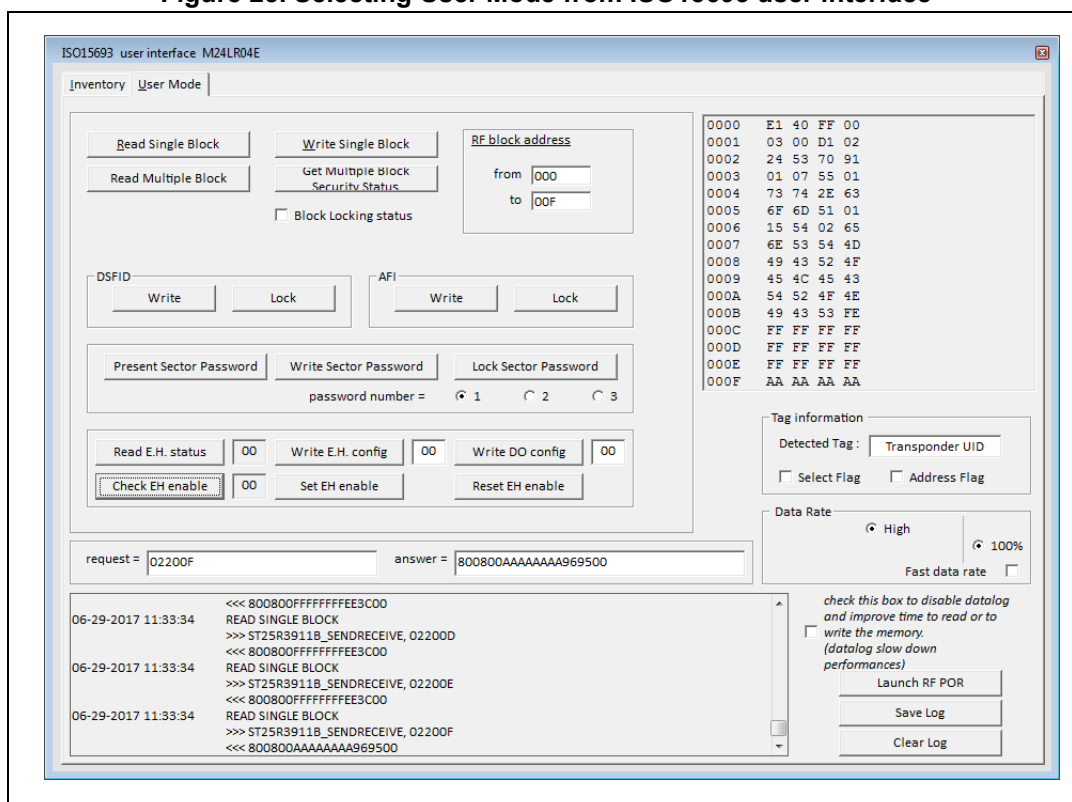
- Read single and multiple block(s)
- Fast read single and multiple block(s)

The ST25R3911B-DISCO is automatically configured in Fast mode, and put back in normal mode when the request is complete.

Other requests are available (DSFID, AFI, ..). Refer to the device datasheet for the full list of ISO15693 requests available for a given product.

Note: The tag answer to a read request is displayed in the right part of the window.

Figure 25. Selecting User Mode from ISO15693 user interface



4. EXAMPLE 2 : ST25DV64K USER INTERFACE.

A specific user interface has been build in order to be able to use ST25DV products. This user interface allows to manage all the features of the ST25DV :

- INVENTORY
- EEPROM
- FTM (FAST TRANSFER MODE)
- CONFIGURATION
- PASSWORD
- ENERGY HARVESTING
- DEMOS
- a) INVENTORY & ANTICOLLISION COMMANDS

This part of the user interface allows the user to send Inventory commands and manage ISO15693 states:

 - Inventory
 - Select
 - Stay Quiet
 - Reset to Ready
 - Anticollision button will allow to launch global anticollision process manage by the STM32 and display up to 5 UID's tags.

Figure 26. ST25DV user interface: Inventory

ST25DV user interface ST25DV64K

INVENTORY | AFI DSFID INFO | EEPROM | CONFIGURATION REGISTERS | FTM | PASSWORD | ENERGY HARVESTING & GPO | FTM DEMOS

Inventory command

Inventory Parameters
Mask Length: 00 Mask Value

Inventory Options
☐ AFI option flag 00
☒ 1 slot ☐ 16 slots
 Inventory
 loop ☐

Inventory & Anticollision response

Anticollision ☐ cumulative anticollision

States
 Select
 Stay Quiet
 Reset to ready
 send EOF

Send any frame

request = answer = 0000

06-29-2017 11:35:04 ST25R3911B CONFIGURATION : ISO15693 100% HIGH DATARATE ONE SUBCARRIER
 >>> ST25R3911B_PROTOCOL_SELECT, 0109
 <<< 0000

Tag information
 Detected Tag : Transponder UID
☐ Select Flag
☐ Address Flag ☐ Option flag

Data Rate
☒ High ☐ 100%
☐ Fast data rate

Launch RF POR
 RF OFF RF ON

Save Log Clear Log

b) AFI, DSFID & SYSTEM INFO COMMANDS (see [Figure 27](#)):

- Write DSFID
- LOCK DSFID
- Write AFI
- LOCK AFI
- Get System Info
- Extended Get System Info

Figure 27. ST25DV user interface: AFI DSFID INFO

ST25DV user interface: ST25DV64K

INVENTORY | **AFI DSFID INFO** | EEPROM | CONFIGURATION REGISTERS | FTM | PASSWORD | ENERGY HARVESTING & GPO | FTM DEMOS

DSFID
 Write DSFID [00] Lock DSFID

AFI
 Write AFI [00] Lock AFI

SYSTEM INFO
 Get System Info

Extended Get System Info Request Field [3F]

Click to change Request Field values

	FLAG NAME	VALUE
b0	DSFID	1
b1	AFI	1
b2	VICC memory size	1
b3	IC reference	1
b4	MOI	1
b5	VICC Command list	1
b6	CSI Information	0
b7	Extended Get System Info parameter	0

request = [] answer = [0000]

06-29-2017 11:35:04 ST25R3911B CONFIGURATION : ISO15693 100% HIGH DATARATE ONE SUBCARRIER
 >>> ST25R3911B_PROTOCOL_SELECT, 0109
 <<< 0000

Tag information
 Detected Tag : TRANSPONDER UID
☐ Select Flag
☐ Address Flag ☐ Option flag

Data Rate
☒ High ☒ 100%
☐ Fast data rate

Launch RF POR
 RF OFF RF ON

Save Log Clear Log

c) EEPROM commands (see [Figure 28](#)):

- Read Single Block
- Write Single Block
- Read Multiple Blocks
- Write Multiple Block
- Get N BSS
- Lock Block (block 0 or Block 1)

Figure 28. ST25DV user interface: EEPROM

ST25DV user interface ST25DV64K

INVENTORY | AFI DSFID INFO | **EEPROM** | CONFIGURATION REGISTERS | FTM | PASSWORD | ENERGY HARVESTING & GPO | FTM DEMOS

Read Single Block

Write Single Block

Get Multiple Blocks Security Status

RF block

from 00 to FF

Lock Block

Block Number 00

send EOF

☐ Extended commands

request = answer = 0000

06-29-2017 11:35:04 ST25R3911B CONFIGURATION : ISO15693 100% HIGH DATARATE ONE SUBCARRIER
>>> ST25R3911B_PROTOCOL_SELECT, 0109
<<< 0000

Tag information

Detected Tag : TRANSPONDER UID

☐ Select Flag

☐ Address Flag

☐ Option flag

Data Rate

☒ High

☐ 100%

☐ Fast data rate

Launch RF POR

RF OFF

RF ON

Save Log

Clear Log

To be able to access to Extended commands, the user will need to click on "Extended commands" check box (see [Figure 29](#)).

Figure 29. ST25DV user interface: display Extended commands

☐ Extended commands

To be able to access to Fast commands, the user will need to click on "Fast data rate" check box.

- d) CONFIGURATION commands:
- Read CONFIG bytes
 - Write CONFIG bytes

Figure 30. ST25DV user interface: static configuration

ST25DV user interface ST25DV64K

INVENTORY | AFI DSFID INFO | EEPROM | **CONFIGURATION REGISTERS** | FTM | PASSWORD | ENERGY HARVESTING & GPO | FTM DEMOS

CONFIGURATION : STATIC REGISTERS

Read Configuration (ALL STATIC REGISTERS) | Read Configuration | Write Configuration | Pointer 00

ADDRESS	NAME	VALUE
0x00	GPO	
0x01	IT_TIME	
0x02	EH_MODE	
0x03	RF_MNGT	
0x04	RFA1SS	
0x05	ENDA1	
0x06	RFA2SS	
0x07	ENDA2	
0x08	RFA3SS	
0x09	ENDA3	
0x0A	RFA4SS	
0x0D	MB_MODE	
0x0E	MB_WDG	
0x0F	LOCK_CFG	

request = answer = 0000

06-29-2017 11:35:04 ST25R3911B CONFIGURATION : ISO15693 100% HIGH DATARATE ONE SUBCARRIER
 >>> ST25R3911B_PROTOCOL_SELECT, 0109
 <<< 0000

Tag information
 Detected Tag : TRANSPONDER UID
☐ Select Flag
☐ Address Flag ☐ Option flag

Data Rate
☒ High ☒ 100%
☐ Fast data rate

Launch RF POR
 RF OFF RF ON

Save Log Clear Log

- e) FTM commands (see [Figure 31](#)):
- Read Len
 - Read Message
 - Write Message
 - Read DYNAMIC register
 - Write DYNAMIC register

Figure 31. ST25DV user interface: Fast Transfer Mode interface

ST25DV user interface ST25DV64K

INVENTORY | AFI DSFID INFO | EEPROM | CONFIGURATION REGISTERS | **FTM** | PASSWORD | ENERGY HARVESTING & GPO | FTM DEMOS

FAST TRANSFER MODE

MAILBOX

Read Message Length: Length value 00

Read Message: MBpointer 00 bytes nb 1

Write Message: bytes nb 1

DYNAMIC CONFIGURATION REGISTER : MB_CTRL_Dyn

	NAME
b0	MB_EN
b1	HOST_PUT_MSG
b2	RF_PUT_MSG
b3	RFU
b4	HOST_MISS_MSG
b5	RF_MISS_MSG
b6	HOST_CURRENT_MSG
b7	RF_CURRENT_MSG

Read Dynamic Configuration: 00

Write Dynamic Configuration

request = answer = 0000

06-29-2017 11:35:04 ST25R3911B CONFIGURATION : ISO15693 100% HIGH DATARATE ONE SUBCARRIER
 >>> ST25R3911B_PROTOCOL_SELECT, 0109
 <<< 0000

Tag information
 Detected Tag : TRANSPONDER UID
☐ Select Flag
☐ Address Flag ☐ Option flag

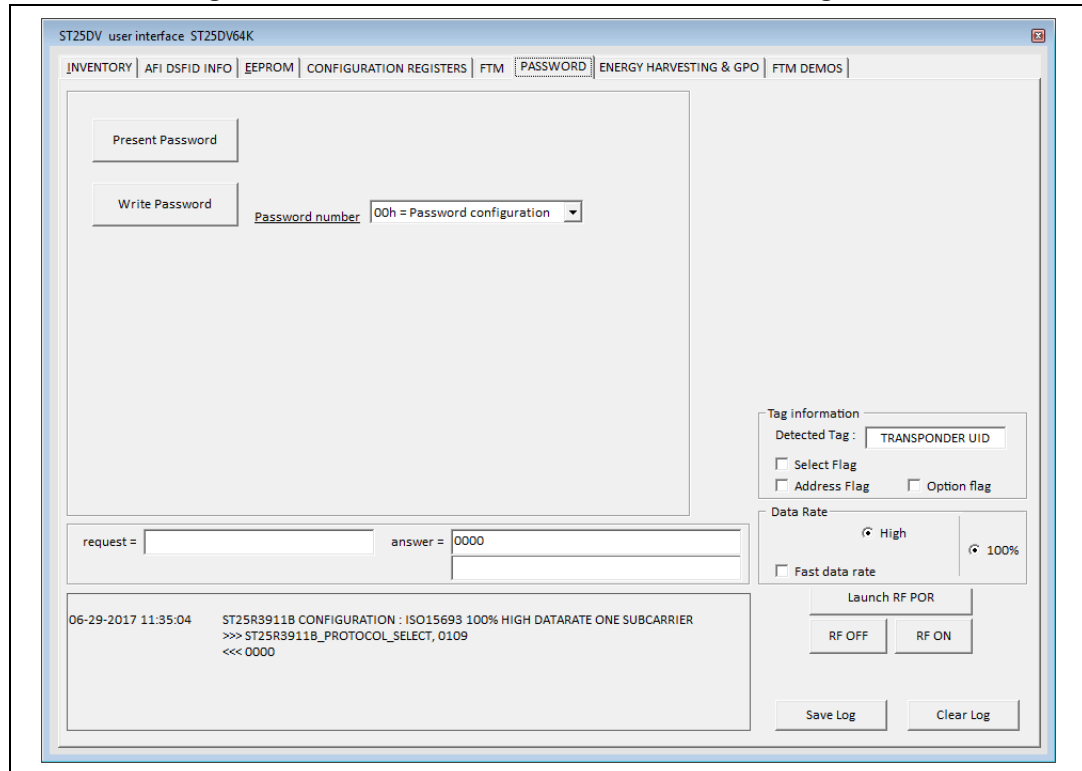
Data Rate
☒ High ☐ 100%
☐ Fast data rate

Launch RF POR
 RF OFF RF ON

Save Log Clear Log

- f) PASSWORD commands (se [Figure 32](#)):
- Present Password
 - Write Password

Figure 32. ST25DV user interface: Password management



- g) ENERGY HARVESTING & GPO commands
 - Read DYNAMIC register
 - WRITE DYNAMIC register
 - Send Interrupt
 - Set GPO
 - Reset GPO

Figure 33. ST25DV user interface: Energy Harvesting and GPO management

The screenshot displays the 'ST25DV user interface ST25DV64K' with a menu bar including INVENTORY, AFI DSFID INFO, EEPROM, CONFIGURATION REGISTERS, FTM, PASSWORD, ENERGY HARVESTING & GPO (selected), and FTM DEMOS.

DYNAMIC REGISTER : EH_CTRL_Dyn

Buttons: Read Dynamic Configuration (EH_CTRL_Dyn), Write Dynamic Configuration (EH_CTRL_Dyn)

	NAME	
b0	EH_EN	
b1	EH_ON	
b2	FIELD_ON	
b3	VCC_ON	
b4	RFU	
b5	RFU	
b6	RFU	
b7	RFU	

DYNAMIC REGISTER : GPO_CTRL_Dyn

Buttons: Read Dynamic Configuration (GPO_CTRL_Dyn)

	NAME	
b0	RF_USER_EN	
b1	RF_ACTIVITY_EN	
b2	RF_INTERRUPT_EN	
b3	FIELD_CHANGE_EN	
b4	RF_PUT_MSG_EN	
b5	RF_GET_MSG_EN	
b6	RF_WRITE_EN	
b7	GPO_EN	

Buttons: Manage GPO command = interrupt, Manage GPO command = set GPO, Manage GPO command = reset GPO

request = answer = 0000

06-29-2017 11:35:04 ST25R3911B CONFIGURATION : ISO15693 100% HIGH DATARATE ONE SUBCARRIER
 >>> ST25R3911B_PROTOCOL_SELECT, 0109
 <<< 0000

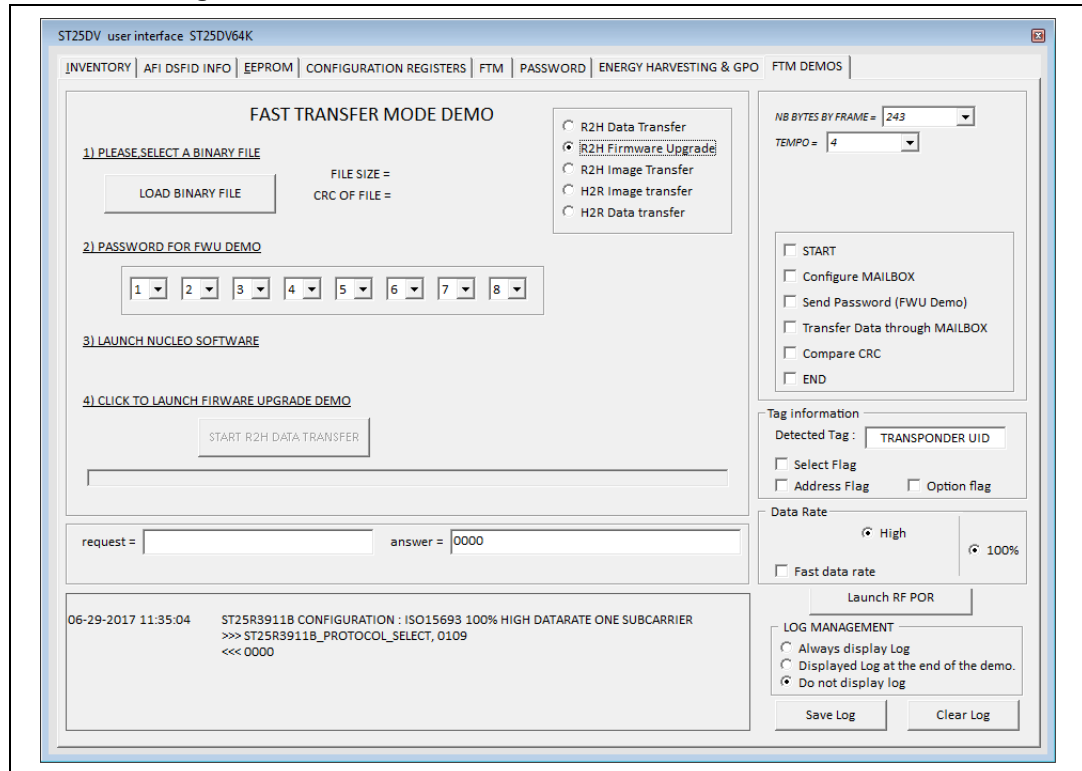
Tag information
 Detected Tag : TRANSPONDER UID
☐ Select Flag
☐ Address Flag ☐ Option flag

Data Rate
☒ High ☐ 100%
☐ Fast data rate

Buttons: Launch RF POR, RF OFF, RF ON, Save Log, Clear Log

- h) DEMOS (see [Figure 34](#)).
 This demos can be played with ST25DV-DISCOVERY boards.
 Refers to user manual UM2062 for more informations about this demos.

Figure 34. ST25DV user interface: Fast Transfer Mode demo



5. NFC type 5: NDEF Message User Interface.
 - a) READ & WRITE CC file (see [Figure 35](#))
 - Read CC File
 - Write CC File

Figure 35. Read and write NFC Type 5 CC file

NFC Type 5 - NDEF Message user interface

NFC Type 5 - NDEF Message user interface

READ WRITE CC FILE READ NDEF MESSAGE PREPARE NDEF MESSAGE WRITE NDEF MESSAGE

BLOCK 0 Byte0: E1 Byte1: 40 Byte2: FF Byte3: 00 ☐ use 8 bytes Capacity Container

Additional informations

☐ bit4: Special Frame format
☐ bit3: support Lock Block commands
☐ bit0: support Multiple Block commands

Magic Number
☒ E1
☐ E2 (Extended cmd supported)

MLEN \ 8
 512bit = 0x08
 1Kbit = 0x10
 2Kbit = 0x20
 4Kbit = 0x40
 Size >= 16kbit : 0x00 and use 8 bytes Capacity Container

READ CC FILE WRITE CC FILE * * Write CCfile will modify your tag CC file

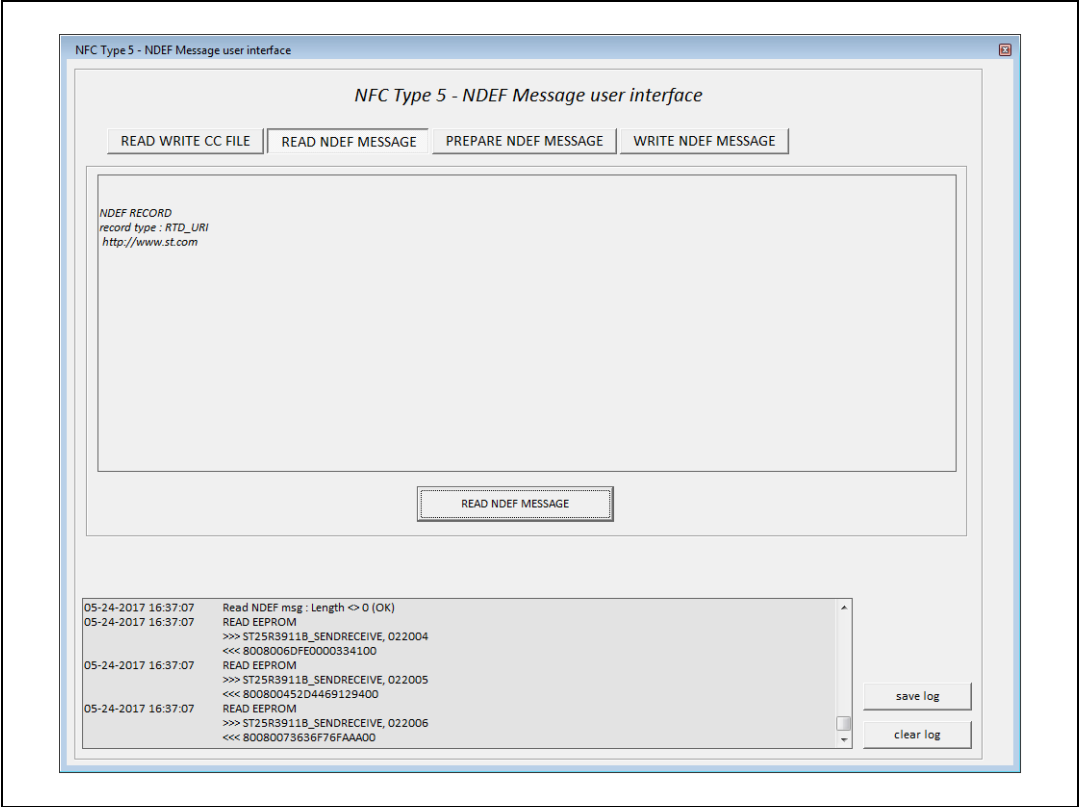
05-24-2017 16:35:30 INVENTORY
 >>> ST25R3911B_SENDRECEIVE, 260100
 <<< 800D00FF6928877855902E0F69800
 Inventory : UID = E0025985778B2869

05-24-2017 16:35:30 READ CC FILE : Block 0
 >>> ST25R3911B_SENDRECEIVE, 022000
 <<< 800800E140FF00F09E00
 CC FILE block 0 : E1 40 FF 00

save log clear log

- b) READ NDEF MESSAGE

Figure 36. Read NFC Type 5 NDEF message



- c) **PREPARE NDEF MESSAGE**
Use User interface to prepare your NDEF message by selecting one of the NDEF record format (Text, Uri, Smartposter, vcard, Bluetooth pairing).
Click on ADD RECORD TO MESSAGE button, will add the record in the NDEF message.

Figure 37. Prepare NFC Type 5 NDEF message

The screenshot shows the 'NFC Type 5 - NDEF Message user interface' window. At the top, there are four tabs: 'READ WRITE CC FILE', 'READ NDEF MESSAGE', 'PREPARE NDEF MESSAGE' (which is selected), and 'WRITE NDEF MESSAGE'. Below the tabs, on the left, is a list of NDEF record formats with radio buttons: Text, Uri, SmartPoster (selected), MIME vcard, MIME Bluetooth Pairing, MIME MEDIA, and MIME various. Below this list is a button labeled 'ADD RECORD TO MESSAGE'. On the right side of the window, under the heading 'Smart Poster message', there are two text input fields. The first is labeled 'Please type in your text :' and contains the text 'STMICROELECTRONICS'. The second is labeled 'Please type in your url :' and contains the text 'http://www.st.com'. Below these fields is a dropdown menu labeled 'List of available prefix :' with a list of prefixes: 'http://www.', 'https://www.', and 'http://'. A note below the dropdown states '* if no prefix is used, all characters are written in the message'. At the bottom of the window, there is a log area with a scroll bar showing several log entries. The most recent entry is '05-24-2017 16:38:26 SMARTPOSTER record added'. To the right of the log area are two buttons: 'save log' and 'clear log'.

NFC Type 5 - NDEF Message user interface

NFC Type 5 - NDEF Message user interface

READ WRITE CC FILE READ NDEF MESSAGE PREPARE NDEF MESSAGE WRITE NDEF MESSAGE

☐ Text
☐ Uri
☒ SmartPoster
☐ MIME vcard
☐ MIME Bluetooth Pairing
☐ MIME MEDIA
☐ MIME various

ADD RECORD TO MESSAGE

Smart Poster message

Please type in your text :
STMICROELECTRONICS

Please type in your url :
http://www.st.com

List of available prefix :
http://www.
https://www.
http://

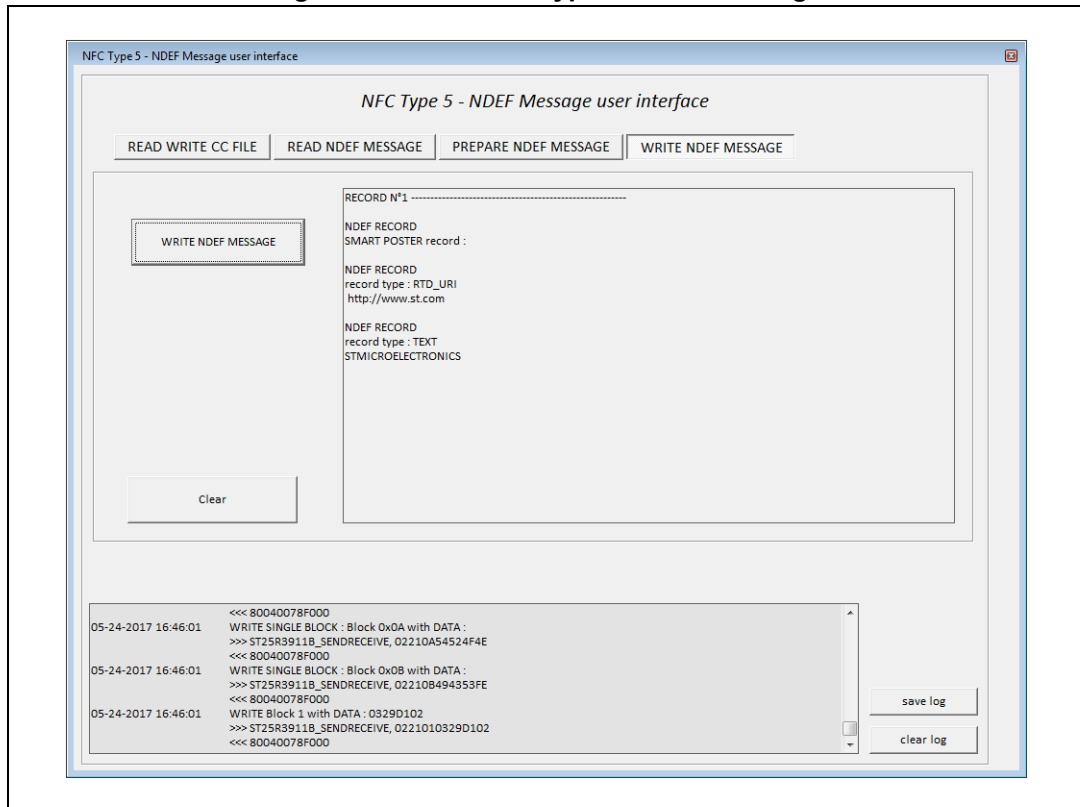
* if no prefix is used, all characters are written in the message

05-24-2017 16:37:07 READ EEPROM
>>> ST25R39118_SENDRECEIVE, 022004
<<< 8008006DFE000334100
05-24-2017 16:37:07 READ EEPROM
>>> ST25R39118_SENDRECEIVE, 022005
<<< 800800452D4469129400
05-24-2017 16:37:07 READ EEPROM
>>> ST25R39118_SENDRECEIVE, 022006
<<< 80080073636F76FAA400
05-24-2017 16:38:26 SMARTPOSTER record added

save log
clear log

d) WRITE NDEF MESSAGE

The prepared NDEF MESSAGE with embedded NDEF records is displayed.
If you need to change anything on the NDEF MESSAGE, click on Clear and go back to PREPARE NDEF MESSAGE to create a new one.
Click on WRITE NDEF MESSAGE to write the NDEF message to the NFC Tag.

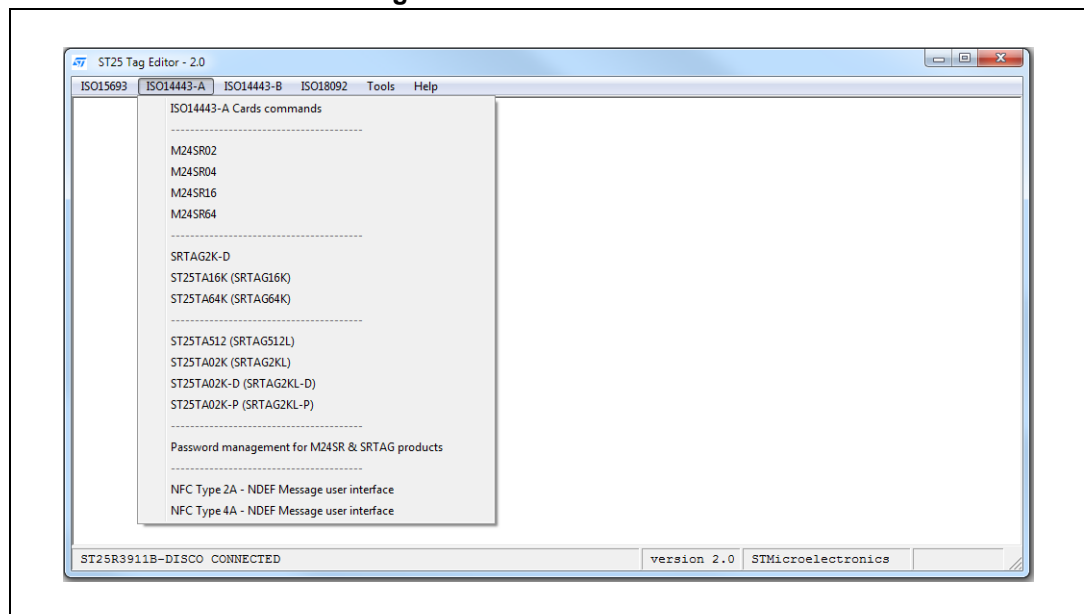
Figure 38. Write NFC Type 5 NDEF message

3.3 ISO14443-A menu

Select the ISO14443-A from the main menu to use the ST25R3911B-DISCO as an ISO14443-A reader. The menu allows to select:

- ISO14443-A cards commands
- M24SR products
- ST25TA Tags
- Password management for M24SR & ST25TA
- NFC Type 2A & 4A NDEF Messages management
- ISO14443-A Cards commands: (see [Section 3.3.1](#)).
This menu allows the user to send any ISO14443-A requests
- M24SR02, M24SR04, M24SR16, M24SR64 (see [Section 3.3.2](#)).
This menu allows the user to send any ISO14443-A requests or APDU request to M24SR product
- NFC Type_4A NDEF Message user interface (see [Section 3.3.4](#)).
This menu allows the user to read and write NDEF message to Tag Type 4A
- SRTAG2K-D, ST25TA16K, ST25TA64K (see [Section 3.3.2](#)).
This menu allows the user to send any ISO14443-A requests or APDU request to SRTAG product.
- ST25TA512, ST25TA02K, ST25AT02K-D, ST25TA02K-P (see [Section 3.3.2](#)).
This menu allows the user to send any ISO14443-A requests or APDU request to ST25TA product.
- Password management for M24SR & SRTAG products (see [Section 3.3.3](#)).
This menu allows the user to manage password and access rights on M24SR and SRTAG products

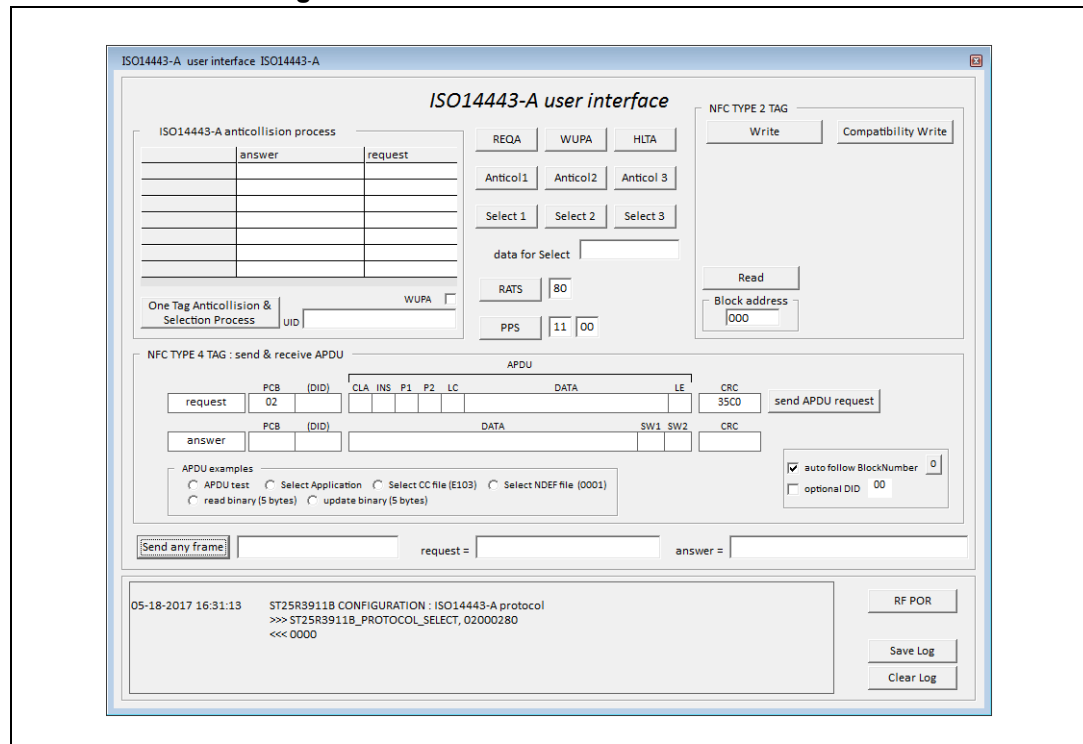
Figure 39. ISO14443-A menu



3.3.1 ISO14443-A Cards commands

Select ISO14443-A from the list (see [Figure 40](#) for an example). This automatically configures the ST25R3911B-DISCO as an ISO14443-A reader and displays all the ISO14443-A requests.

Figure 40. ISO14443-A selected from the list



The ISO14443-A configuration is displayed in the log window as shown in [Figure 40](#).

The upper part of the window contains buttons allowing to send ISO14443-A requests to tags through the ST25R3911B-DISCO.

Refer to the device datasheet for the full list of ISO14443-A requests available for a given product.

Anticollision process will try to communicate with your Tag and try to select it. This automatic process is only for 1 tag.

It sends successively:

- ReqA
- Anticol1
- Select1
- Anticol2
- Select2
- Anticol3
- Select3

The process will be stopped as soon as an error occurs or if the anticollision process is finished (4 bytes or 7 bytes or 10 bytes UID).

Other commands can be sent such as:

- RATS
- PPS
- READ
- WRITE

Send Receive APDU can be used to send APDU requests.

3.3.2 M24SR, SRTAG and ST25TA user interface

The selected product user interface has been separated into two different windows to improve the visibility of the tool.

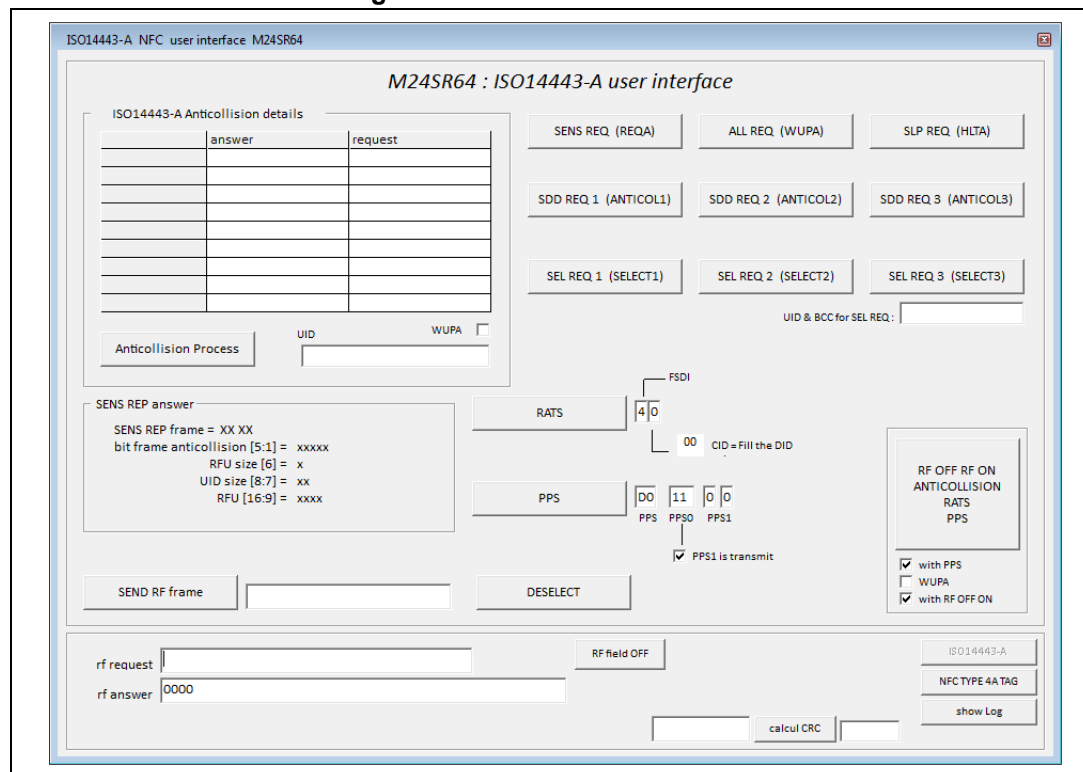
We have separated this two windows following the “life” of the selected product (see [Figure 41](#)):

- after a RF POR or a deselect command, the selected product is in the ISO14443-A world
- after RATS or PPS command, the selected product enter in the NFC world.

First, selected product among the list of products (M24SR, SRTAG, ST25TA).

When selecting the device, the ISO14443-A window appears.

Figure 41. M24SR user interface



As soon as the window appears, the ISO14443-A protocol selection is done in background. Click on show log to display the log window and see the ST25R3911B-DISCO protocol selection sequence (see [Figure 42](#))

Figure 42. ST25R3911B protocol selection sequence



ISO1443-A screen

The first screen (see [Figure 41](#)) is displayed when the M24SR is selected in the option menu. Several buttons are displayed in this window. The buttons represent all the available commands in the ISO14443-A world:

Some buttons are used to send single commands:

- **SENS REQ (REQA)**: send a REQA to the M24SR
- **ALL REQ (WUPA)**: send WUPA command to the M24SR
- **SLP REQ (HLTA)**: send HLTA command to the M24SR
- **SDD REQ 1 2 3 (ANTICOL 1 2 3)**: send Anticol command to the M24SR
- **SEL REQ 1 2 3 (SELECT 1 2 3)**: send Select command to the M24SR
- **RATS**: send RATS command to the M24SR
- **PPS**: send PPS command to the M24SR
- **DESELECT**: send Deselect command to the M24SR

Two additional buttons allow to accelerate the communication with the M24SR:

- **Anticollision Process** button
can be used to detect a Tag and read the UID of this tag
when clicking on this button, the anticollision sequence is sent (beginning by a REQA or WUPA) depending of the Option button.
The REQA/WUPA answer is detailed in SENS REQ answer screen.
The anticollision sequence is summarized in the array.
The sequence is launched and stopped when an error occurred.
At the end of the sequence, if no error is found, the UID of the selected M24SR is displayed in UID field as show on [Figure 43](#)

Figure 43. Anticollision process results

ISO14443-A Anticollision details		
REQ A	26	4200
ANTICOL 1	9320	880286000C
SELECT 1	9370880286000CC620	04DA17
ANTICOL 2	9520	0042C5098E
SELECT 2	95700042C5098ED927	20FC70

Anticollision Process UID: 0286000042C509 WUPA: ☐

- **RF OFF RF ON ANTICOLLISION RATS PPS** button can be used the whole anticollision process with RATS with PPS to reach NFC type 4A world.
This button can be configured by enabling or disabling
- RF OFF/ON
- Replace REQA command by WUPA command
- PPS request added to the sequence

Figure 44. RF OFF on anticollision RATS PPS button

RF OFF RF ON
ANTICOLLISION
RATS
PPS

☒ with PPS
☐ WUPA
☒ with RF OFF ON

The sequence is launched and stopped when an error occurred.

At the end of the sequence, if no error is found,

- The UID of the selected M24SR is displayed in UID field.
- RATS answer
- PPS Answer (if option selected)
- The log windows is filled with RF request & RF answer

As shown on [Figure 45](#)

Figure 45. RF OFF on anticollision RATS PPS results

ISO14443-A Anticollision details		
REQ A	26	4200
ANTICOL 1	9320	880286000C
SELECT 1	9370880286000CC620	04DA17
ANTICOL 2	9520	0042C5098E
SELECT 2	95700042C5098ED927	20FC70
RATS	E0403DB5	0578009002D0A3
PPS	D0110052A6	D07387

Anticollision Process UID: 0286000042C509 WUPA: ☐

At the end of this action, if no error is occurred and M2SR answers are Ok, the window will automatically switch to the windows called **NFC Type 4A**.

How to access to ISO14443-A command and NFC Type 4A commands:

- When the ISO14443-A windows is displayed, the “NFC Type 4A” button is available to switch to NFC Type 4A window.

See [Figure 46](#)

Figure 46. NFC Type 4A button available

rf request: D0110052A6 RF field ON ISO14443-A NFC TYPE 4A TAG show Log

rf answer: D07387 calcul CRC

- When the NFC Type 4A windows is displayed, the **ISO14443-A** button is available to switch to iso14443-A window.

See [Figure 47](#)

Figure 47. ISO14443-A button available

rf request: D0110052A6 RF field ON ISO14443-A NFC TYPE 4A TAG show Log

rf answer: D07387 calcul CRC

As already explained in the user manual, the “RF request” and “RF answer” fields contains the send command and the answer from M24SR.

Figure 48. RF request and RF answer

rf request: 0300B000000FA5A2

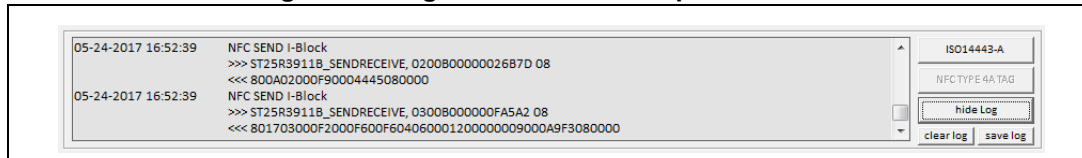
rf answer: 03000F2000F600F604060001200000009000A9F3

The **show log** button is available to be able to see the history of RF request and RF answer. See [Figure 49](#) and [Figure 50](#).

Figure 49. "Show Log" button



Figure 50. Log windows of RF request/answer

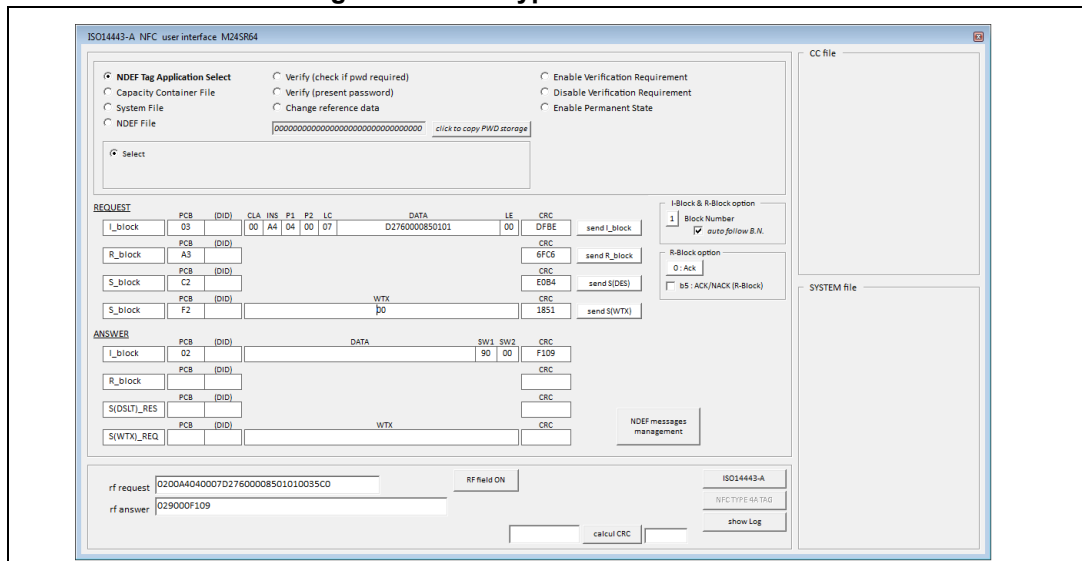


The formatted request (ex: ST25R3911B_SENDRECEIVE, 0300B000000FA5A2 08) can be used in script tool.

NFC Type 4A screen

This window will allow to send NFC APDU requests to be able to play with the M24SR tag in NFC world (see [Figure 51](#)). This window is automatically reached when the "RF OFF RF ON ANTICOLLISION RATS PPS" button is used and all the processes are done successfully or when the user click on "NFC Type 4A" button.

Figure 51. NFC Type 4A user interface



The middle part of the window is used to generate the RF frame to be sent to the M24SR: I_Block, R_Block, S(DES)_Block and S(WTX)_Block request.

All this field can be changed by clicking and modifying data

Four buttons are available to send I_Block, R_Block, S_Block requests.

Figure 52. I_Block, R_Block, S_Block requests

REQUEST											
	PCB	(DID)	CLA	INS	P1	P2	LC	DATA	LE	CRC	
I_block	03		00	A4	04	00	07	D2760000850101	00	DFBE	send I_block
R_block	PCB	(DID)								CRC	send R_block
	A3									6FC6	
S_block	PCB	(DID)								CRC	send S(DES)
	C2									E0B4	
S_block	PCB	(DID)						WTX		CRC	send S(WTX)
	F2							00		1851	

The answer of the M24SR is filled in I_Block, R_Block, S_Block answer fields depending on the request sent to the M24SR.

Figure 53. I_Block, R_Block, S_Block answer

ANSWER						
	PCB	(DID)	DATA	SW1	SW2	CRC
I_block	02			90	00	F109
R_block	PCB	(DID)				CRC
S(DSLT)_RES	PCB	(DID)				CRC
S(WTX)_REQ	PCB	(DID)	WTX			CRC

The higher part of the window can be used to automatically fill the I_Block request.

The goal is to facilitate the communication with the M24SR (following NFC forum and M24SR datasheet).

Several option buttons are available:

- NDEF Tag Application select**
 When this option is selected, the I_Block frame is filled with adequate data.
 Once the command option is selected, the data in I_Block rf frame are filled, you can press the button "send I_Block" to send RF frame.
- Capacity Container file**
 Selecting Capacity Container File option will allow other option to appear
 clicking on one of this option will fill, the I_Block frame is filled with adequate data.

Figure 54. Capacity container file selected

The screenshot shows the 'NDEF Tag Application Select' section with 'Capacity Container File' selected. Below it, there are radio buttons for 'System File' and 'NDEF File'. A 'select & read sequence' button is present. To the right, there are options for 'Verify (check if pwd required)', 'Verify (present password)', and 'Change reference data'. Further right, there are checkboxes for 'Enable Verification Requirement', 'Disable Verification Requirement', and 'Enable Permanent State'. At the bottom, there are radio buttons for 'Select', 'Read Binary (length)', and 'Read Binary'. A text field displays a long hexadecimal string, and a 'click to copy PWD storage' button is next to it.

- **Select command:**
fill data with CC file Select command
- **Read binary (length) command**
fill data with read binary command on CC file in order to read the length of the cc file
- **Read binary command**
fill data with read binary command on CC file

Once the command option is selected, the data in I_Block rf frame are filled, you can press the button “send I_Block” to send RF frame.

- **Select & read sequence** button will launch automatically all the procedure and will display it in a CC file result window

Select cc file

Read cc file length

Read cc file data

Display data in a specific CC file array (available only of no error detected)

Figure 55. Specific CC file array

The screenshot shows a window titled 'CC file' containing a table with three columns: 'File offset', 'Meaning', and 'Value'. The table lists various fields and their corresponding values. Below the table, there are radio buttons numbered 1 through 8, with button 1 selected.

File offset	Meaning	Value
0x0000	CC file length	000F
0x0002	Mapping version	20
0x0003	Max bytes (read)	00F6
0x0005	Max bytes (written)	00F6
0x0007	T field	04
0x0008	L field	06
0x0009	Field ID	0001
0x000B	Max NDEF file size	0200
0x000D	Read access	00
0x000E	Write access	00

- **System file**
Selecting System File option will allow other option to appear.
Clicking on one of this option will fill, the I_Block frame is filled with adequate data.

Figure 56. System file selected

The screenshot shows the 'NDEF Tag Application Select' section with the following options:

- ☐ NDEF Tag Application Select
- ☐ Capacity Container File
- ☒ System File
- ☐ NDEF File

Below the 'System File' option is a button labeled 'select & read sequence'. To the right of this button is a text field containing '00000000000000000000000000000000' and a button labeled 'click to copy PWD storage'.

Below the 'select & read sequence' button are three radio buttons:

- ☒ Select
- ☐ Read Binary (length)
- ☐ Read Binary

To the right of these radio buttons are three radio buttons:

- ☐ Verify (check if pwd required)
- ☐ Verify (present password)
- ☐ Change reference data

Below these radio buttons are three radio buttons:

- ☐ Send Interrupt GPO
- ☐ State Control : Set GPO
- ☐ State Control : Reset GPO

Below these radio buttons are three radio buttons:

- ☐ Enable Verification Requirement
- ☐ Disable Verification Requirement
- ☐ Enable Permanent State

- **Select command:**
fill data with System file Select command
- **Read binary (length) command:**
fill data with read binary command on System file in order to read the length of the system file
- **Read binary command:**
fill data with read binary command on System file
- **Send Interrupt GPO**
- State control: Set GPO
- State control: Reset GPO

Once the command option is selected, the data in I_Block rf frame are filled, you can press the button send I_Block to send RF frame.

- **Select & read sequence** button will launch automatically all the procedure and will display it in System file result window

Select system file

Read system file length

Read system file data

Display data in a specific System file array (available only if no error detected)

Figure 57. Specific system file array

SYSTEM file	
<input type="radio"/> length	0012
<input type="radio"/> i2c protect	01
<input type="radio"/> i2c wdg	00
<input type="radio"/> GPO	11
<input type="radio"/> ST reserved	00
<input type="radio"/> RF enable	81
<input type="radio"/> NDEF File Nb	00 (1 files)
<input type="radio"/> UID	0286000042C509
<input type="radio"/> Memory Size	01FF
<input type="radio"/> Product Code	86
<input checked="" type="radio"/> read all system file	

- **NDEF file**

Selecting NDEF File option will allow other option to appear.

Clicking on one of this option will fill, the I_Block frame is filled with adequate data.

Figure 58. NDF file is selected

☐ NDEF Tag Application Select
☐ Capacity Container File
☐ System File
☒ **NDEF File**

☐ Verify (check if pwd required)
☐ Verify (present password)
☐ Change reference data

☐ Enable Verification Requirement
☐ Disable Verification Requirement
☐ Enable Permanent State

☒ Select
☐ Read Binary (length)
☐ Read Binary
☐ Extended Read Binary

- **Select command:**
fill data with NDEF file Select command
- **Read binary (length) command:**
fill data with read binary command on NDEF file in order to read the length of the cc file
- **Read binary command**
fill data with read binary command on NDEF file
- **Extended Read binary command**
fill data with extended read binary command on NDEF file
- **Update Binary command**
Fill data with update binary command on NDEF file

In case of M24SR request a WTX , this button will automatically manage it. The M24SR will reply with a Window Extension request (that will be displayed in S(WTX) answer array), then the tool will automatically send a S(WTX) request to the M24SR

All this request / answer communication will be displayed in Log window.

Once the command option is selected, the data in I_Block rf frame are filled, you can press the button "send I_Block" to send RF frame.

- **Select & read sequence** button will launch automatically all the procedure and will display it in NDEF file result window (NDEF file can be decoded)

Select NDEF file

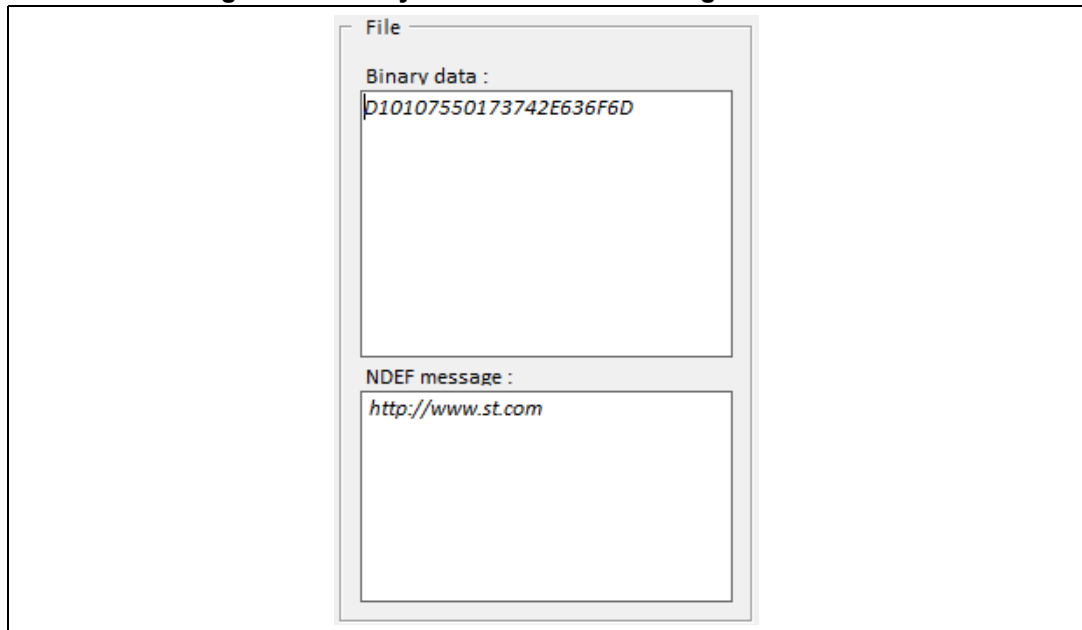
Read NDEFfile length

Read NDEF file data

Display binary data in a field (available only if no error detected)

Display decoded NDEF message if any is in a field (available only if no error detected)

Figure 59. Binary data and NDEF message are detected



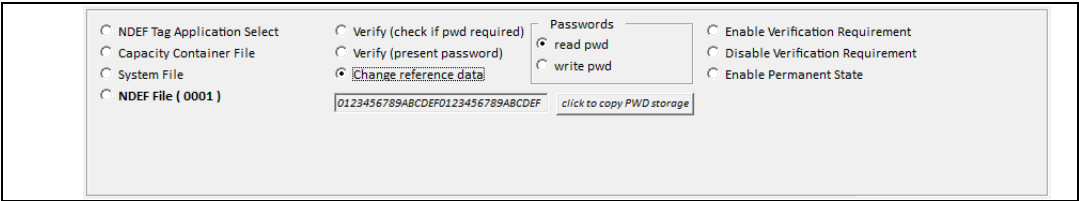
- Commands to manage Password and Access Rights

Three command can be used to manage Passwords (Read password or Write password).

- **Verify (check if password is required)**
fill data with Verify command
- Verify (present password)
fill data with Verify command
- **Change reference data (change password value)**
fill data with Verify command

Note: Notes that a NDEF file has to be selected previously (see Datasheet)
The command sent will be applied to selected NDEF file

Figure 60. Password management button

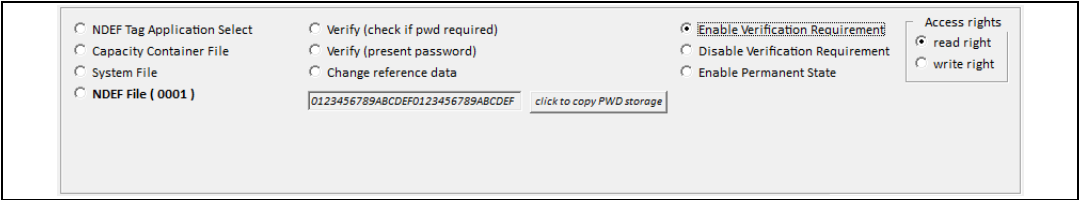


Three commands can be used to manage Access right and M24SR state (see [Figure 60](#)).

- **Enable Verification requirement**
fill data with Verify command
- **Disable Verification requirement**
fill data with Verify command
- **Enable Permanent State**
fill data with Verify command

Note: Notes that a NDEF file has to be selected previously (see Datasheet)
The command sent will be applied to selected NDEF file

Figure 61. Password management buttons



NDEF Messages management button

It allows directly access to NFC Type_4A NDEF Message user interface (see [Section 3.3.4](#))

Figure 62. NDEF message management button



3.3.3 Password management for M24SR and SRTAG products

This tool allows to manage Password and access rights.

Figure 63. Password management user interface

The screenshot displays the 'Password Management user interface' window. The main title is 'READ & WRITE ACCESS RIGHTS MANAGEMENT ON NDEF FILE'. It is divided into three main sections:

- READ ACCESS RIGHT MANAGEMENT ON NDEF FILE :**
 - LOCK READ ACCESS WITH PASSWORD *** (button) → **RESULT** (field). Below: **Write password required to Lock Read access*
 - UNLOCK READ ACCESS *** (button) → **RESULT** (field). Below: **Write password required to Unlock Read access*
 - PERMANENT LOCK READ ACCESS *** (button) → **RESULT** (field). Below: **Write password required to Permanently Lock Read access*
 - Check if READ password is required for read on NDEF file** (button) → **RESULT** (field)
- WRITE ACCESS RIGHT MANAGEMENT ON NDEF FILE :**
 - LOCK WRITE ACCESS WITH PASSWORD *** (button) → **RESULT** (field). Below: **Write password required to Lock Write access*
 - UNLOCK WRITE ACCESS *** (button) → **RESULT** (field). Below: **Write password required to Unlock Write access*
 - PERMANENT LOCK WRITE ACCESS *** (button) → **RESULT** (field). Below: **Write password required to Permanently Lock Write access*
 - Check if WRITE password is required for write on NDEF file** (button) → **RESULT** (field)
- CHANGE READ & WRITE PASSWORD :**
 - CHANGE READ PASSWORD **** (button) → **RESULT** (field). Below: ***Write password required to Change READ password*
 - CHANGE WRITE PASSWORD ***** (button) → **RESULT** (field). Below: ****Write password required to Change WRITE password*

At the bottom right, there is a 'clear log' button.

- READ access right commands are available:
 - LOCK UNLOCK
 - PERMANENT LOCK
 - CHECK
- WRITE ACCESS RIGHT commands are available:
 - LOCK
 - UNLOCK
 - PERMANENT LOCK
 - CHECK on WRITE
- CHANGE PASSWORD commands are available to change password:
 - READ password
 - WRITE password

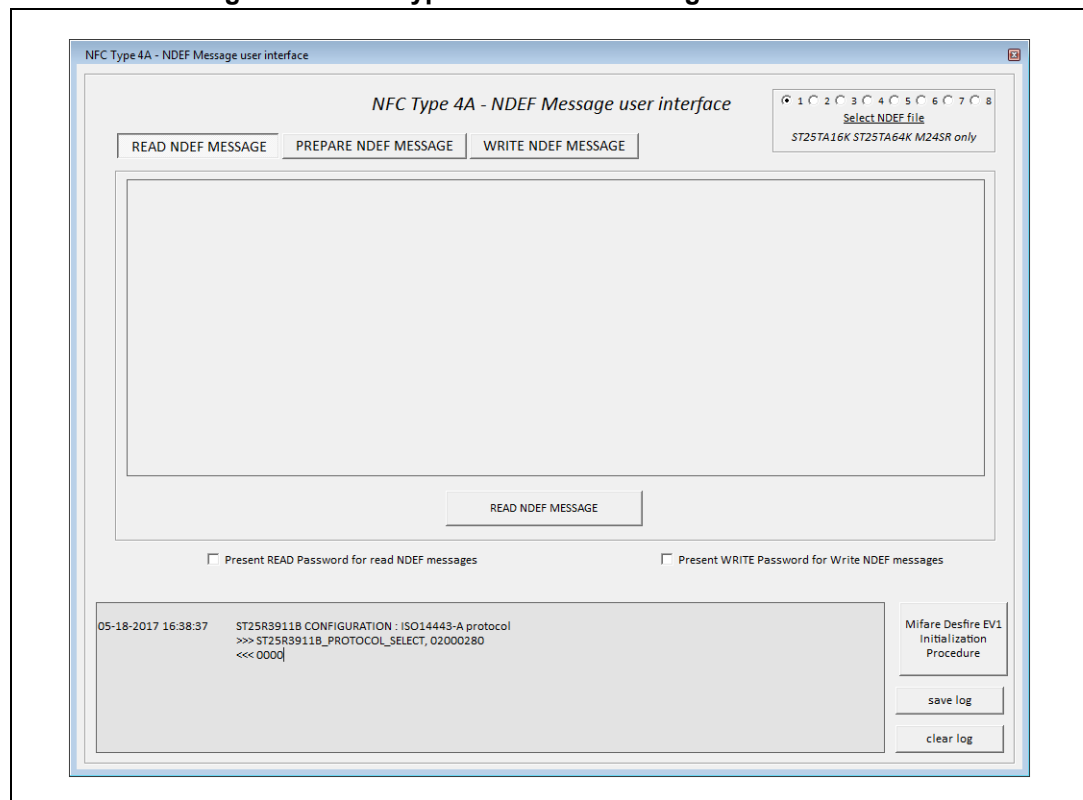
3.3.4 NFC Type 4A - NDEF Message user interface

This tool allows to read or write a NDEF file.

This user interface can manage type 2A and type 4A, type 4B, type 3, type 5 and Vicinity cards. It can be accessed by selecting the item in the menu.

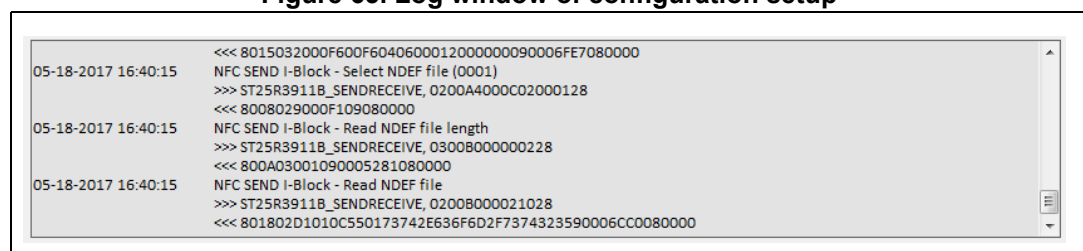
Once the NDEF message management menu is selected, the ST25R3911B is set following the selected RF protocol (Configuration) and the User interface appears.

Figure 64. NFC Type 4A - NDEF message user interface



When this tool is selected, the ST25R3911B-DISCO is configured as a ISO14443-A reader. See the log window to know the configuration set up.

Figure 65. Log window of configuration setup



READ NDEF MESSAGE button

The READ NDEF message button is used to launch all the procedure to select the device and read the NDEF message. This whole process is described bellow.

READ NDEF MESSAGE process:

- The RF field is disabled in order to deselect the tag (RF Por).
- The RF field is enabled.
- The Anticollision sequence is launched (ReqA, Anticol, select, RATS, PPS). The result is that the device is put in the NFC world.
- Select Application launched
- Read CC file process is launched (select, read length, read CC file)
The goal is to identify NDEF file ID
- Read NDEF file process is launched (select, read length, read NDEF message)
- Decoding of NDEF message
- The available message is displayed on the screen (see [Figure 66](#))

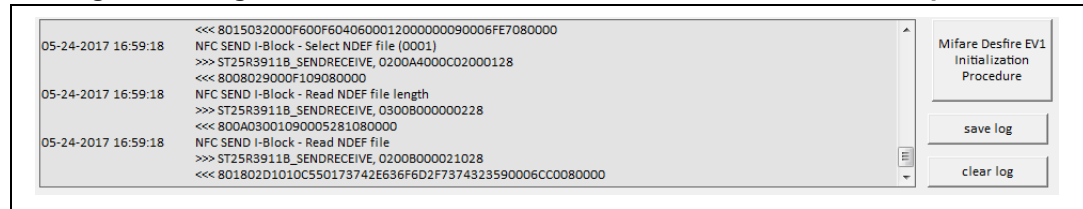
Figure 66. NDEF message is displayed



This process is automatically stopped if any error or “no answer” is detected.

The Log window at the bottom of the screen will help to understand the issue in case of error.

Figure 67. Log window when occur error on READ NDEF MESSAGE process



PREPARE NDEF MESSAGE

This item will allow to create a NDEF Message with a single NDEF record or several NDEF record.

Notes that the NDEF message will not be written to the Tag. To be able to write the NDEF message to the Tag, you will need to click on WRITE NDEF MESSAGE

Figure 68. Prepare TEXT NDEF record

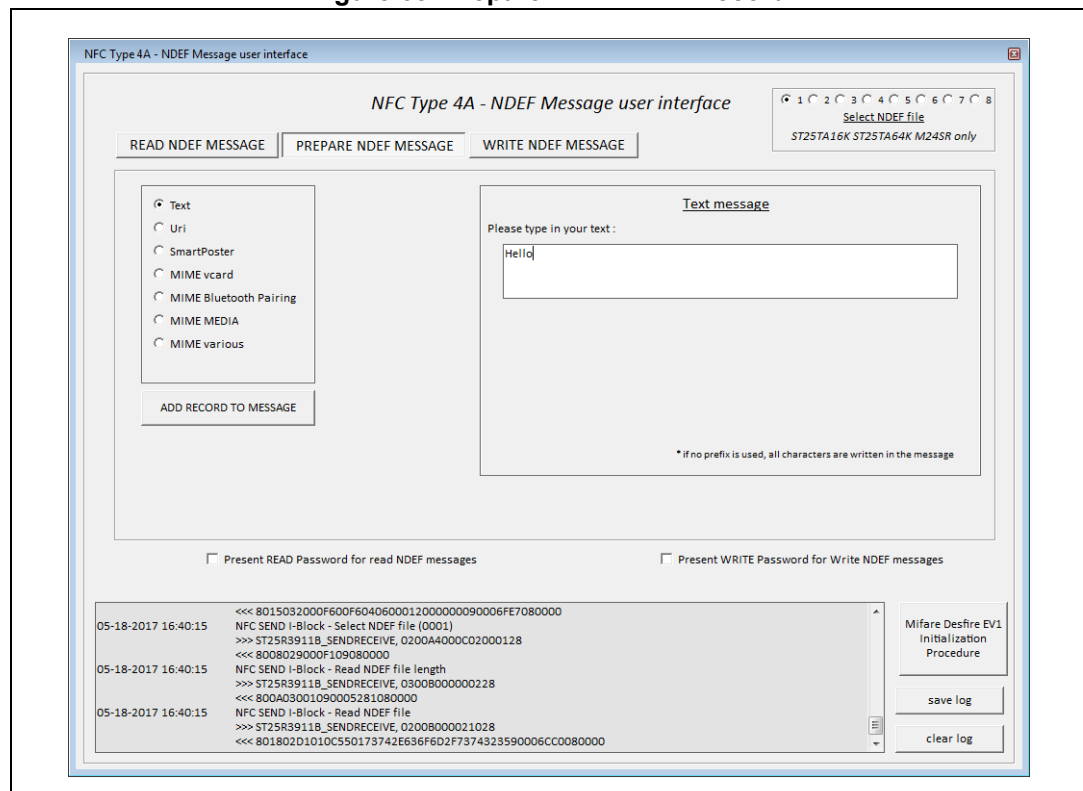


Figure 69. Prepare URI NDEF record

☐ Text

☒ Uri

☐ SmartPoster

☐ MIME vcard

☐ MIME Bluetooth Pairing

☐ MIME MEDIA

☐ MIME various

ADD RECORD TO MESSAGE

Please type in your url :

http://www.st.com

List of available prefix :

http://www.

https://www.

http://

* if no prefix is used, all characters are written in the message

Figure 70. Prepare SMARTPOSTER NDEF record

☐ Text

☐ Uri

☒ SmartPoster

☐ MIME vcard

☐ MIME Bluetooth Pairing

☐ MIME MEDIA

☐ MIME various

ADD RECORD TO MESSAGE

Smart Poster message

Please type in your text :

Hello

Please type in your url :

http://www.st.com

List of available prefix :

http://www.

https://www.

http://

* if no prefix is used, all characters are written in the message

Figure 71. Prepare MIME VCARD NDEF record

☐ Text

☐ Uri

☒ SmartPoster

☐ MIME vcard

☐ MIME Bluetooth Pairing

☐ MIME MEDIA

☐ MIME various

ADD RECORD TO MESSAGE

Smart Poster message

Please type in your text :

Hello

Please type in your url :

http://www.st.com

List of available prefix :

http://www.

https://www.

http://

* if no prefix is used, all characters are written in the message

Figure 72. Prepare MIME BLUETOOTH PAIRING NDEF record

The screenshot shows the 'Configure with your Bluetooth device Informations' window. On the left, a list of record types includes 'MIME Bluetooth Pairing', which is selected. Below this list is a button labeled 'ADD RECORD TO MESSAGE'. The main configuration area contains the following fields and options:

- Bluetooth device address: A field showing '00 : 00 : 00 : 00 : 00 : 00'.
- ☒ Bluetooth local name: A text field containing 'Logitech Boombox'.
- ☒ Class of Device: A field showing '24 | 24 | 14', with labels 'Minor Device class', 'Major Device class', and 'Service class' pointing to the respective parts.
- ☒ 16-bit Service Class UUID list: A field showing '1108' and a dropdown menu labeled 'Example of existing UUID'.
- At the bottom, there are two links: 'set default values for BT pairing demo' and 'Simplified Tag format for a single Bluetooth Carrier'.

Figure 73. Prepare MIME MEDIA NDEF record

The screenshot shows the 'MIME' configuration window. On the left, the same list of record types is shown, with 'MIME MEDIA' selected. The 'ADD RECORD TO MESSAGE' button is present. The main configuration area includes:

- A 'Select MIME type' dropdown menu.
- A text area labeled 'Please type in your message :' for entering the message content.

Figure 74. Prepare MIME VARIOUS NDEF record

The screenshot shows the 'MIME' configuration window. On the left, 'MIME various' is selected. The main configuration area includes:

- A 'Write your MIME type' text field.
- A text area labeled 'Please type in your message :' for entering the message content.
- At the bottom, there are two radio buttons: 'TNF_MIME_MEDIA' and 'TNF_EXTERNAL_TYPE', with the latter being selected.

WRITE NDEF MESSAGE

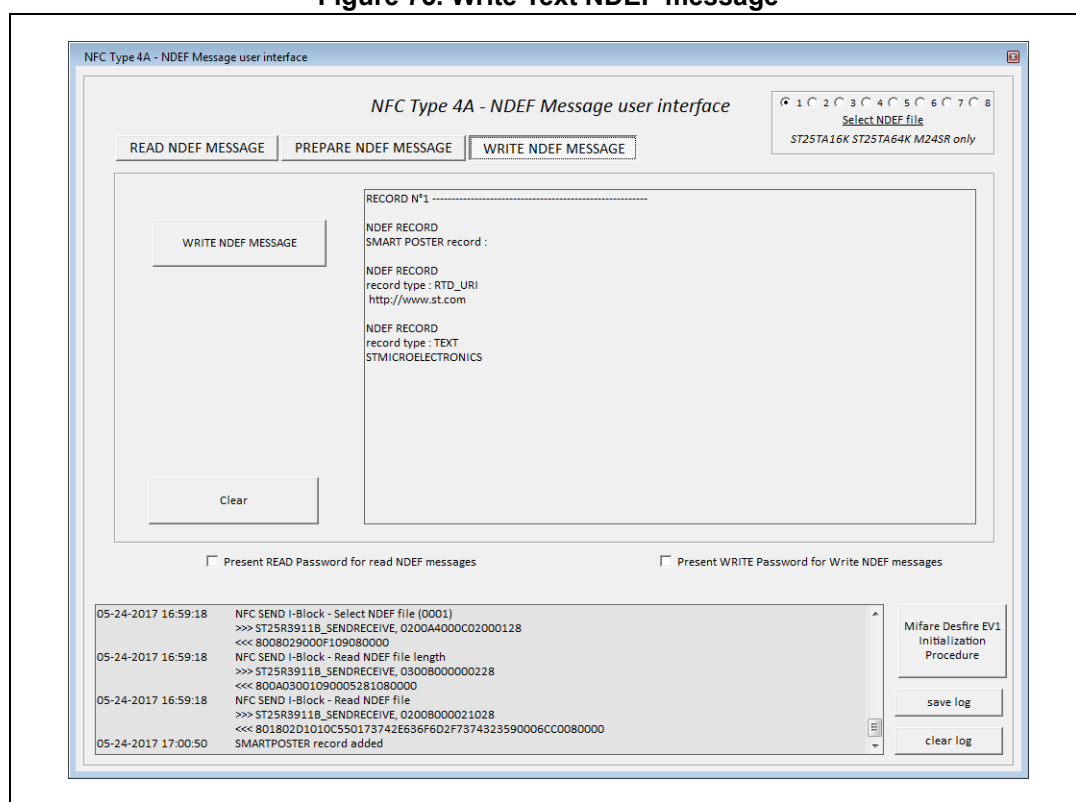
Once one or more NDEF records have been selected, The user are able to write the whole NDEF message in the tag selecting WRITE NDEF MESSAGE ITEM.

The user can now check NDEF message. Then click on WRITE NDEF MESSAGE to write it.

If the user want to change message, he can click on CLEAR then return on PREPARE NDEF MESSAGE to build a new one.

At the right of the window, the user will be able to prepare and write a NDEF message from a list of NDEF message types.

Figure 75. Write Text NDEF message



WRITE NDEF MESSAGE process:

- The RF field is disabled in order to deselect the tag (RF Por).
- The RF field is enabled.
- The Anticollision sequence is launched (ReqA, Anticol, select, RATS, PPS). The result is that the device is put in the NFC world.
- Select Application launched
- Read CC file process is launched (select, read length, read CC file)
The goal is to identify NDEF file ID
- Write the Encoded NDEF message This process is automatically stopped if any error or “no answer” is detected.

The Log window at the bottom of the screen will help to understand the issue In case of error.

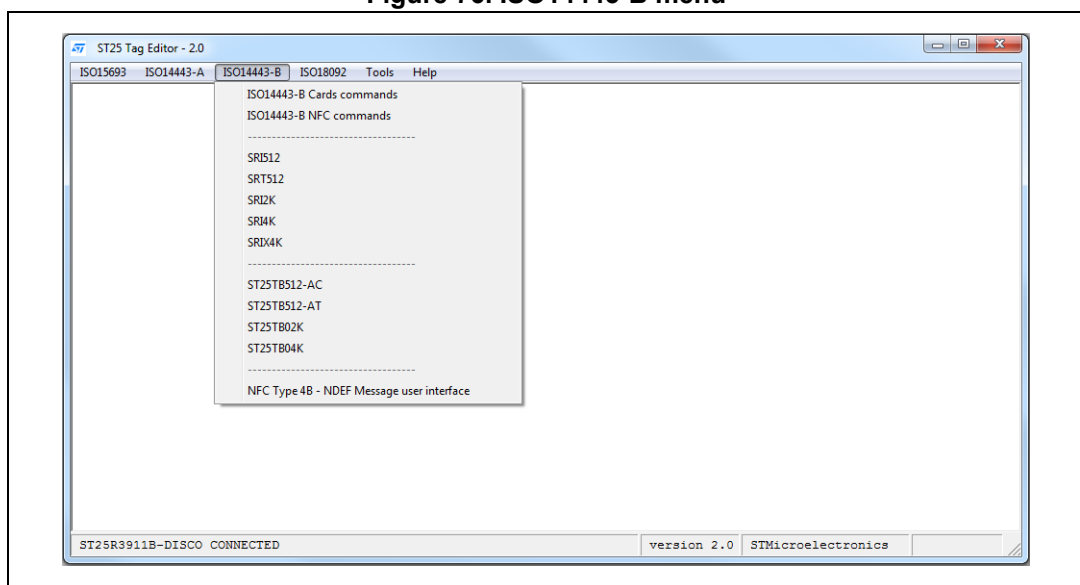
3.4 ISO14443-B menu

This section allows to communicate with ISO14443-B tags.

Select ISO14443-B from the main menu to use the ST25R3911B-DISCO as an ISO14443-B reader. You can then choose between:

- ISO14443-B cards
- ISO14443-B with NFC features
- SRIxx & SRT devices

Figure 76. ISO14443-B menu



Select a device from the list (see [Figure 77](#) and [Figure 78](#) for an example). This automatically configures the board as an ISO14443-B reader and displays all the ISO14443-B requests.

ISO14443-B communications are configured as follows:

- 106 kbits/s data rate for both transmission and reception
- CRC appended

The ISO14443-B configuration is displayed in the log window.

The upper part of the window contains buttons allowing to send ISO14443-B requests to tags through the ST25R3911B-DISCO antenna (refer to the device datasheet).

Select the ISO14443-B menu to launch one of the following user interface (see [Figure 78](#)):

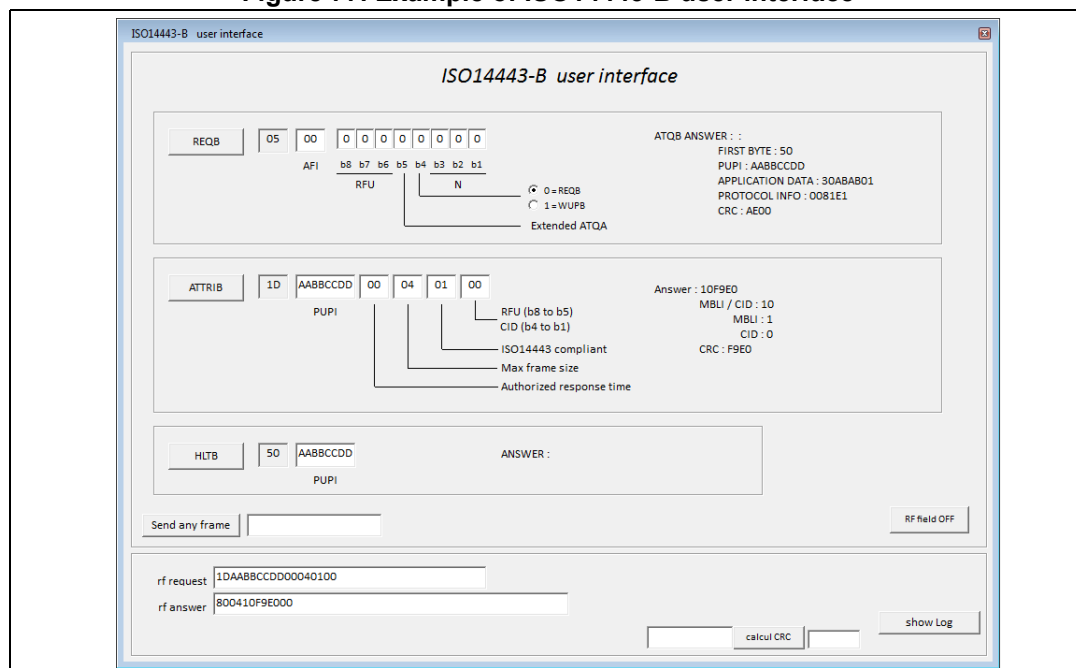
- ISO14443-B Cards commands: (see [Section 3.4.1](#))
This menu allows the user to send any ISO14443-B requests
- ISO14443-B NFC commands: (see [Section 3.4.2](#))
This menu allows the user to send any ISO14443-B requests
- SRI512 SRT512 SRI2K SRI4K SRX4K (see [Section 3.4.3](#))
This menu allows the user to send any ISO14443-B requests to SRxxx product
- NFC Type 4B NDEF Message user interface (see [Section 3.4.4](#))
This menu allows the user to read and write NDEF message to Tag Type 4B

3.4.1 ISO14443-B Cards commands

This window allows to communicate to any ISO14443-B card.

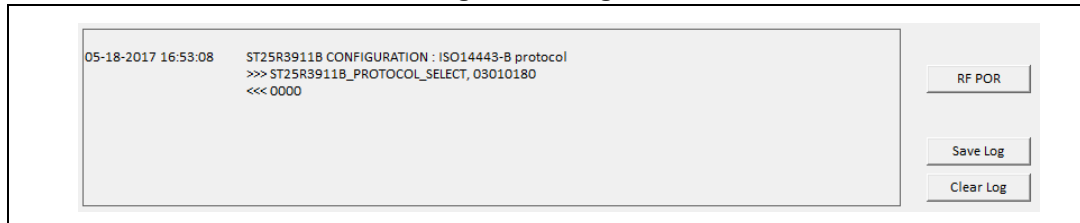
When selecting the ISO14443-B Card commands, the user interface is displayed, as shown in [Figure 78](#)

Figure 77. Example of ISO14443-B user interface



The protocol selection is launched immediately. The summary of the commands sent to the ST25R3911B-DISCO are included in the log window. Click on “show log” to display it (see [Figure 79](#))

Figure 78. Log file



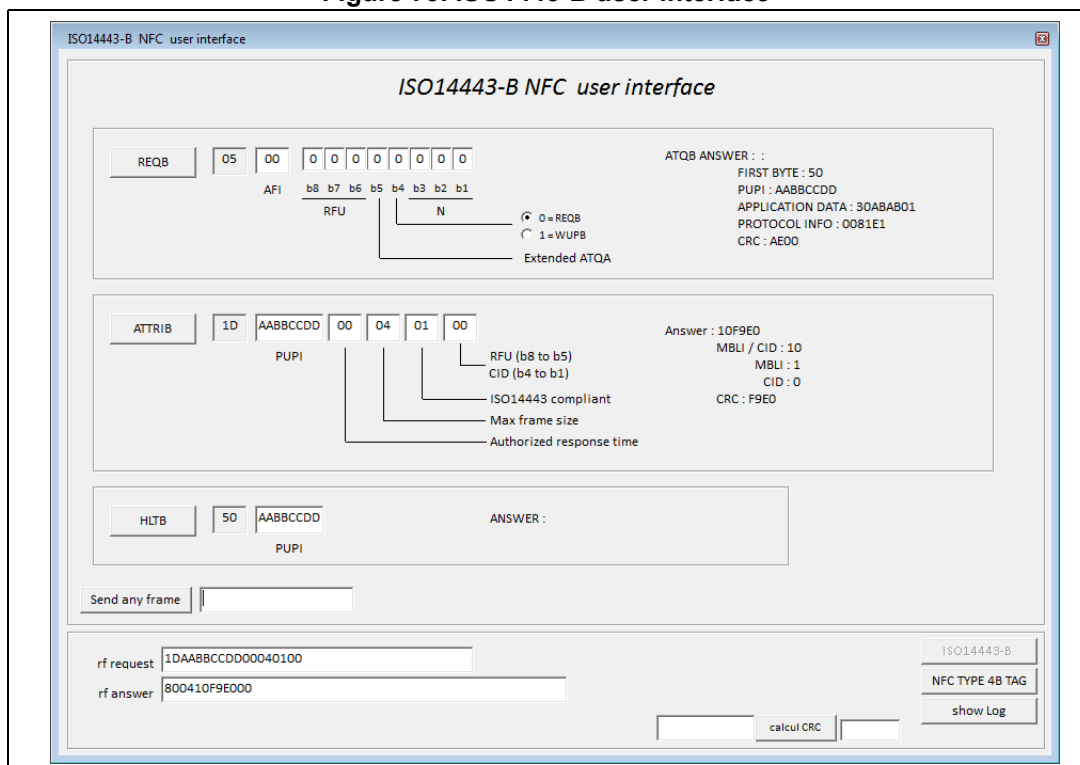
Some basic commands are available to be able to play with ISO14443-B cards such as:

- REQB
- WPUB
- ATTRIB

Log window can be displayed by clicking on “Show log” button.

3.4.2 ISO14443-B NFC commands

Figure 79. ISO1443-B user interface



The protocol selection is launched immediately. The summary of the commands sent to the ST25R3911B-DISCO are included in the log window.

This screens allow to send ISO14443-A commands:

- REQB
- WUPB
- ATTRIB

REQB & ATTRIB commands are mandatory to put the ISO14443-B NFC card into NFC world.

As soon as this commands have been sent successfully, you will be able to send NFC commands.

This commands are available on a second window. To show this window, please click on NFC TYPE 4B TAG button.

This window will allows to send NFC APDU in order to play with the NFC Type 4B tag.

Figure 80. ISO14443-B NFC user interface

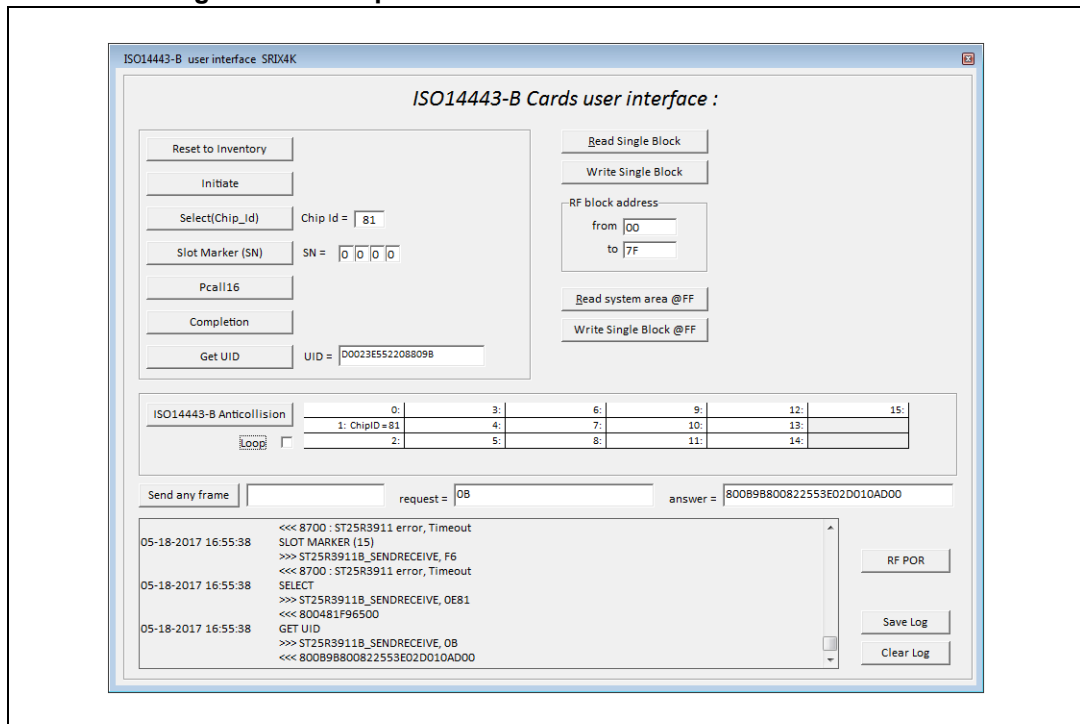
For more informations about the use of each button, please refers to [Section 3.3.2](#).

3.4.3 NFC Type 4B NDEF Message user interface

The functionality of this tool is the same as the NFC TYPE 4A TAG that can be found in ISO14443-A (see to [Section 3.3.4](#) for more informations about how to use it).

3.4.4 SRlxx/SRTxx products

Figure 81. Example of ISO14443-B user interface for SRlxxx



The ISO14443-B configuration is displayed in the log window as shown in figure.

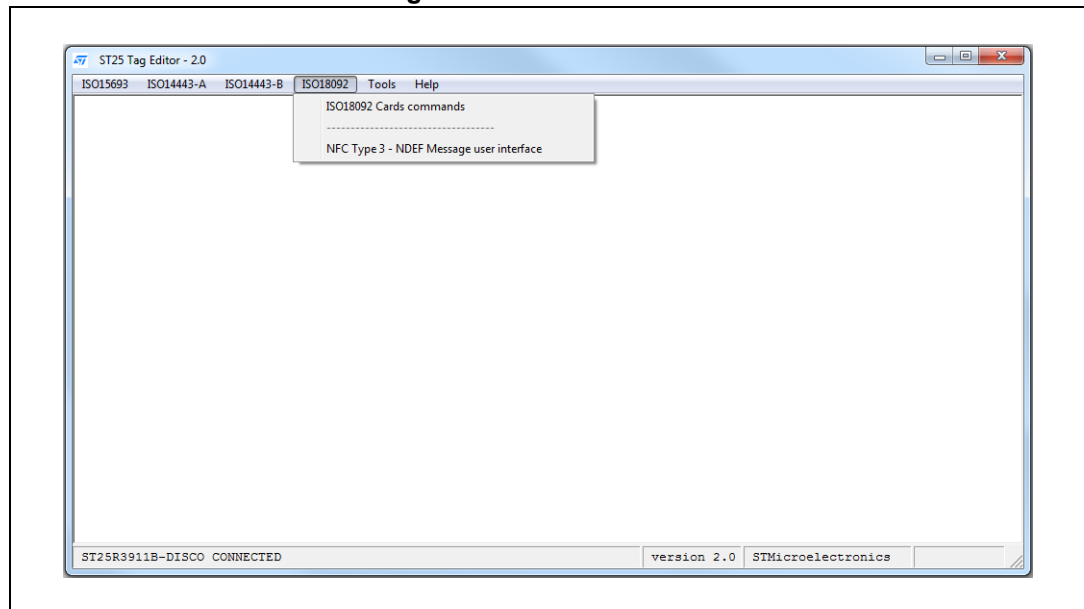
The window allows to send all the command of the datasheet for this products :

- Reset to Inventory
- Initiate
- Select
- Slot Marker
- Pcall16
- Completion
- Get UID
- Read Single Block
- Read System area (address 0xFF)
- Write Single Block
- A single button allows to launch all the Anticollision sequence.

3.5 ISO18092 menu

1. Select ISO18092 from the main menu to use the ST25R3911B-DISCO as an ISO18092 reader (see [Figure 82](#)).

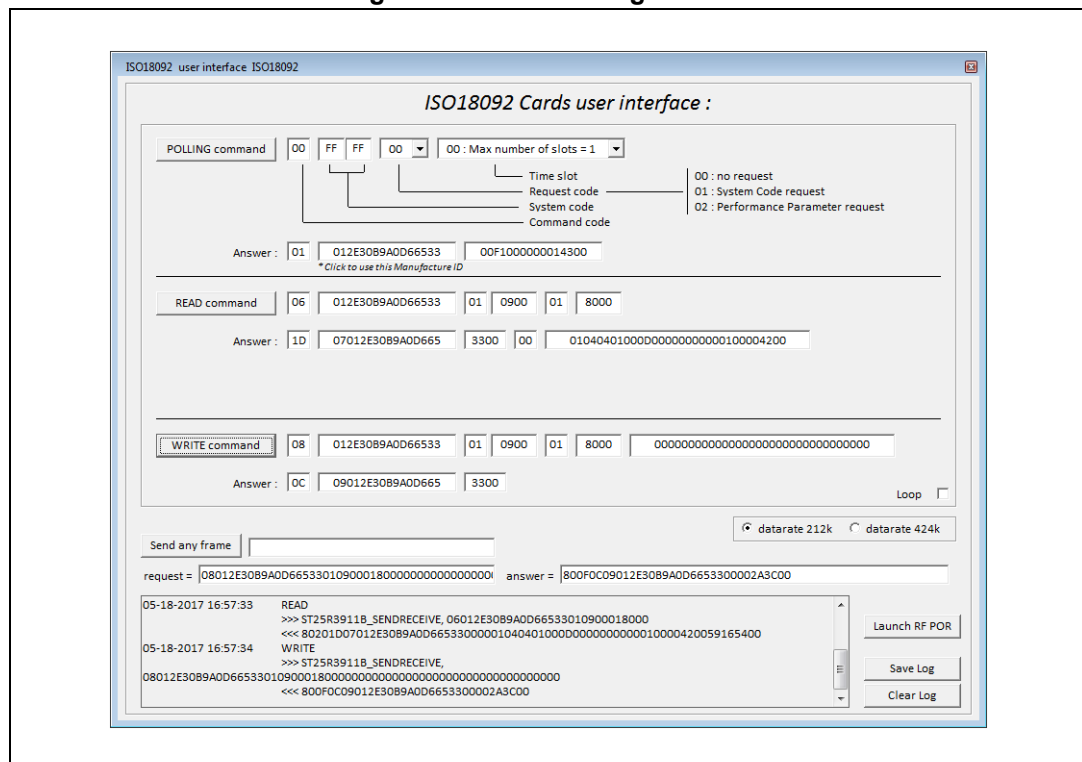
Figure 82. ISO18092 menu



2. Select ISO18092 Cards commands from the list. This automatically configures the board as an ISO18092 reader and displays all the ISO18092 requests.

The ISO18092 configuration is displayed in the log window as shown in [Figure 83](#).

Figure 83. ISO18092 log window



Polling command can be done to communicate with an ISO18092 card. The response of the tag will be displayed in several fields.

ManufactureID is displayed in the second field. Click on this field to fill the Read & Write commands with this mandatory field.

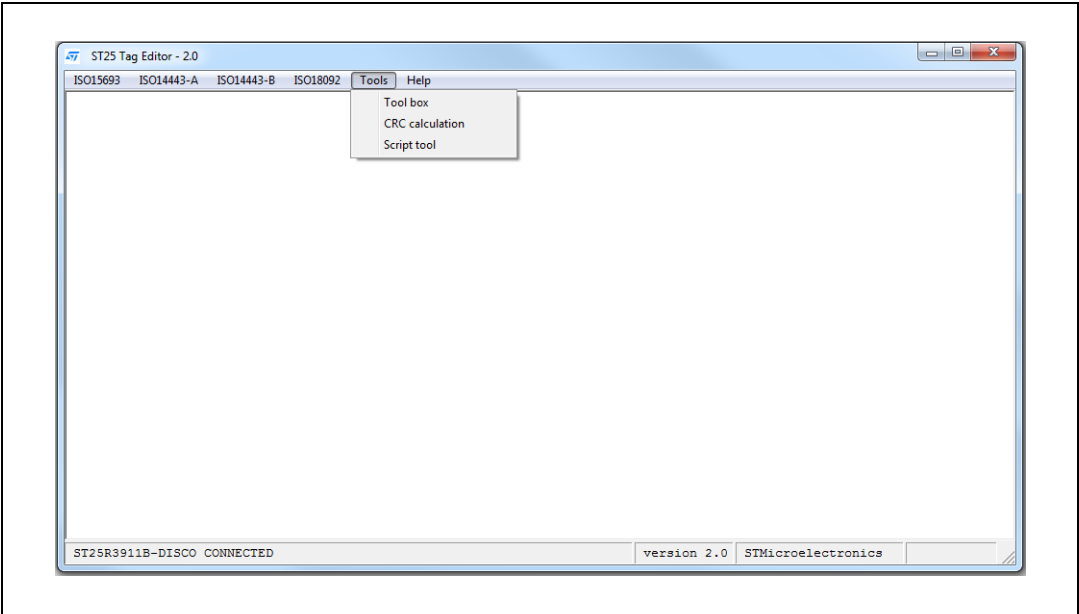
Read command and Write command are also available.

3.6 Tools menu

Select the **Tools** menu to launch one of the following tools (see [Figure 84](#)):

- **ST25R3911B-DISCO** tool box (see [Section 3.6.1: ST25R3911B-DISCO toolbox](#))
This menu allows the user to send requests to the ST25R3911B-DISCO.
- **Script tool** (see [Section 3.6.2: Script tool](#))
This menu allows to transmit and execute a sequence of ST25R3911B-DISCO requests.

Figure 84. Tools menu

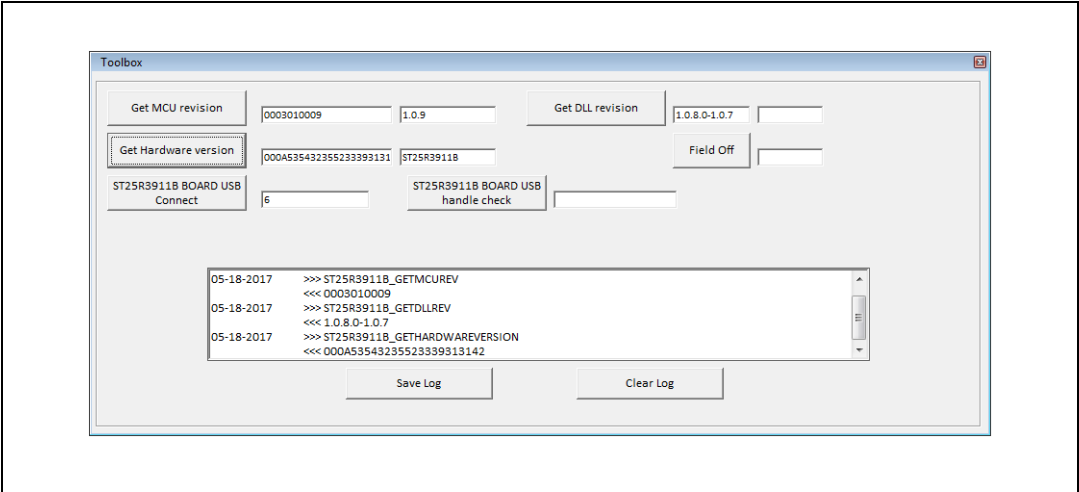


3.6.1 ST25R3911B-DISCO toolbox

The toolbox allows to send the following requests to the ST25R3911B-DISCO (see [Figure 85](#)):

- **Get MCU revision:** reads the revision of the STM32 microcontroller firmware.
- **Get DLL revision:** reads the revision of the DLL installed on your PC.
- **Field Off:** turns the RF field off.

Figure 85. ST25R3911B-DISCO demonstration board toolbox



3.6.2 Script tool

The **Script** tool allows playing a script containing a sequence of ST25R3911B-DISCO commands (see [Figure 89](#)). The following functions are available:

- **Save Script** saves the script in a text file.
- **Load Script** loads a script file
- **Launch Script** runs the script. The script is executed until an error occurs. Read the log to identify the cause of the error and correct your script. This can be due to a syntax error. Refer to the Script Help to correct it.
- **Help**: display the list of commands that can be used to program the script.

Figure 86. Script help page 1/3

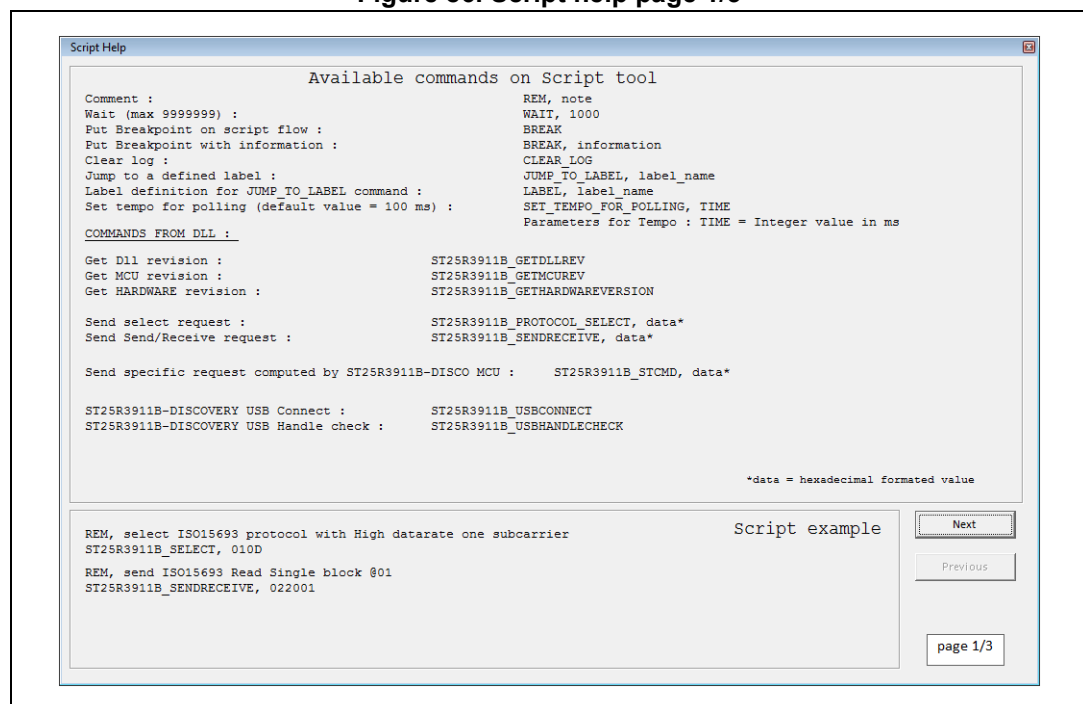


Figure 87. Script help page 2/3

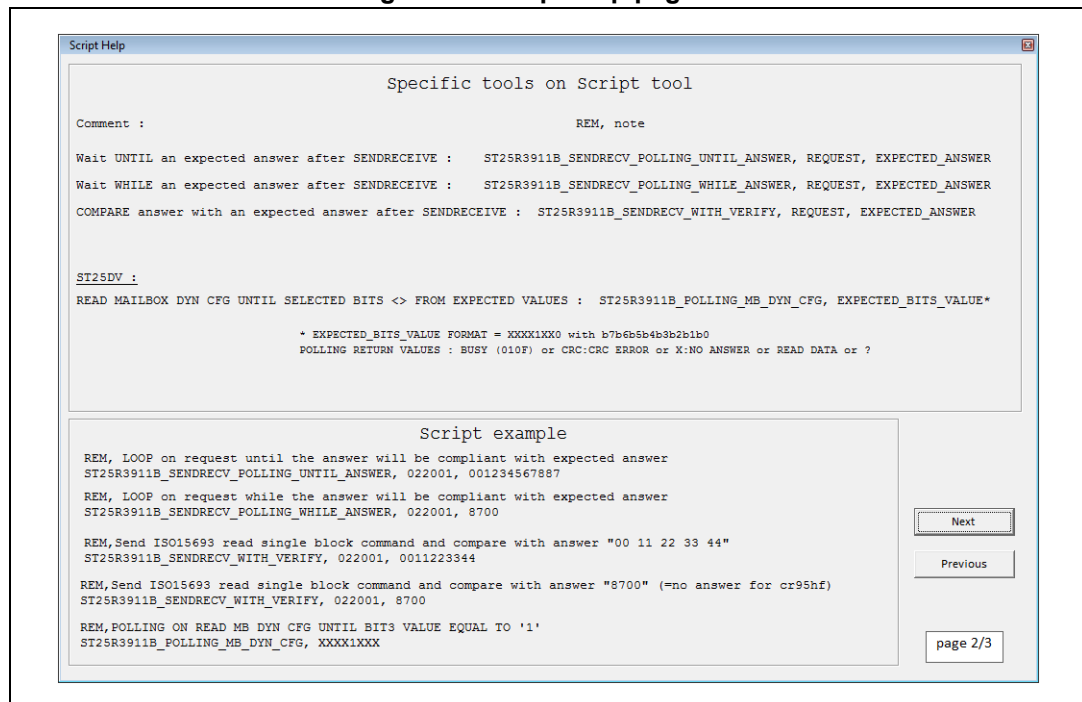
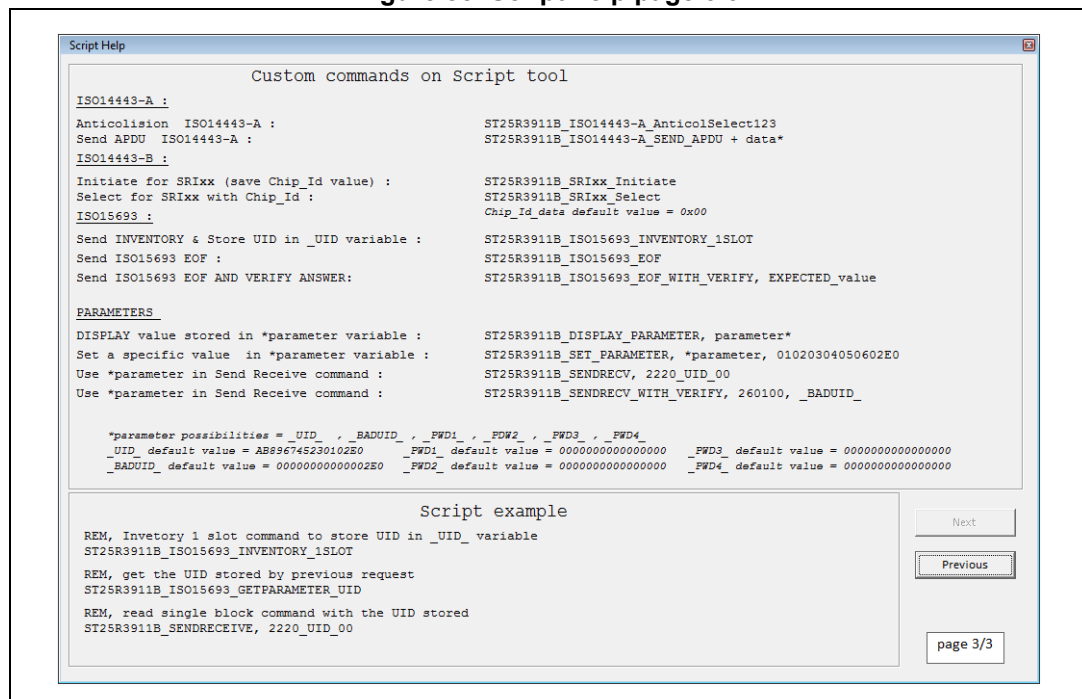


Figure 88. Script help page 3/3



The Script Help (see [Section 3.7: Help menu](#)) describes the syntax of all the commands that can be sent to the ST25R3911B-DISCO.

The screenshot shows the 'ST25R3911B script tool' interface. The main window contains a script editor and a log area.

Script Editor Content:

```
ST25R3911B_PROTOCOL_SELECT, 0109

REM, INVENTORY
ST25R3911B_SENDRECEIVE, 260100

REM, PRESENT PASSWORD
ST25R3911B_SENDRECEIVE, 02B302000000000000000000

REM, WRITE CONFIGURATION (STATIC REGISTER)
ST25R3911B_SENDRECEIVE, 02A1020D01

REM, READ CONFIGURATION (STATIC REGISTER)
ST25R3911B_SENDRECEIVE, 02A0020A
```

Script Automation Log:

```
05-18-2017 17:15:18 REM, ISO15693 100% HIGH DATARATE ONE SUBCARRIER
05-18-2017 17:15:18 >>> ST25R3911B_PROTOCOL_SELECT, 0109
05-18-2017 17:15:18 <<< 0000

05-18-2017 17:15:18 REM, INVENTORY
05-18-2017 17:15:18 >>> ST25R3911B_SENDRECEIVE, 260100
05-18-2017 17:15:18 <<< 800D000038AE6D02002402E0F1D000

05-18-2017 17:15:18 REM, PRESENT PASSWORD
05-18-2017 17:15:18 >>> ST25R3911B_SENDRECEIVE, 02B302000000000000000000
05-18-2017 17:15:18 <<< 80040078F000

05-18-2017 17:15:18 REM, WRITE CONFIGURATION (STATIC REGISTER)
05-18-2017 17:15:18 >>> ST25R3911B_SENDRECEIVE, 02A1020D01
05-18-2017 17:15:18 <<< 80040078F000

05-18-2017 17:15:18 REM, READ CONFIGURATION (STATIC REGISTER)
05-18-2017 17:15:18 >>> ST25R3911B_SENDRECEIVE, 02A0020A
05-18-2017 17:15:18 <<< 80050000470F00
```

Right Sidebar Controls:

- Buttons: Load Script, Save Script, Launch Script, Help, Save Log, Clear Log.
- Checkbox: ☐ LOOP ON SCRIPT
- Text input: 0
- Text: 0 for infinity loop

Select the **Help** menu to access the following functions (see [Figure 84](#)):

- **Script Help**
This function allows to get information on ST25R3911B-DISCO function syntax (see [Figure 86](#), [Figure 87](#) and [Figure 88](#)). It is particularly useful when developing a script (see [Section 3.6.2: Script tool](#)).
- **About ...**
Click **About ...** to get information on the ST25 Tag Editor software (see [Figure 90](#)).

Figure 90. About window



3.8 ST25 Tag Editor RF protocol select and Send Receive functions formats

The ST25 Tag Editor software uses a specific format of parameters (log and script tool) for ST25R3911B_PROTOCOL_SELECT and ST25R3911B_SENDSRECEIVE functions. (See below sections).

This function's descriptions will help to understand log window and develop scripts for script tool. Parameter and responses formats depend on selected RF protocol.

3.8.1 ISO15695 RF PROTOCOL RF PROTOCOL SELECT

Script Prototype:

```
>>> ST25R3911B_PROTOCOL_SELECT, PARAM
<<< RESPONSE
```

Table 2. ISO15695 RF PROTOCOL SELECT

Name		Format	Description
Input parameter	PARAM	0109	ISO15693: High data rate (100%) and CRC calculated and added by ST25R3911B-DISCO
		0108	ISO15693 High data rate(100%)
Returned response	RESPONSE	0000	RF protocol selected successfully
		8300	Parameter error
		8900	USB connection error

Example: Select ISO15693 RF protocol High Data rate 100%

```
>>> ST25R3911B_PROTOCOL_SELECT, 0109
```

```
<<< 0000
```

0000: No error

SEND RECEIVE FUNCTION

Script Prototype:

```
>>> ST25R3911B_SENDRERECEIVE, RF_REQUEST
```

```
<<< RESPONSE
```

Table 3. SEND RECEIVE FUNCTION

Name		Format		Description
Input parameter	RF_REQUEST	RF Frame (ex: 0220000)		– Format after PROTOCOL SELECT 0109 ISO15693 RF REQUEST The CRC of RF REQUEST is calculated and added by ST25R3911B-DISCO
		RF Frame + CRC (ex: 0220004750)		– Format after PROTOCOL SELECT 0108 ISO15693 RF REQUEST
Returned response	RESPONSE	Error	8700	No RF response detected
			8D00	RF Answer detected with collision
			8A00	RF framing error
			8900	USB connection error
		No error: RF response returned	Byte 1	80 (status byte)
			Byte 2	Length of output parameter
			Byte 3	Byte 3 to N-1 Byte N-1 = RF Answer
			Byte N	Protocol error status byte (00: OK, else CRC Error)

Example: Read Single Block @00

```
>>> ST25R3911B_SENDRERECEIVE, 022000
<<< 800800E1404005FB7000

80          RF Answer OK
08          Length
00E1404005FB70 RF Response (00:flag, E1404005:Data, FB70:CRC)
00          No error
```

3.8.2 ISO14443-A RF PROTOCOL

RF PROTOCOL SELECT

Script Prototype:

```
>>> ST25R3911B_PROTOCOL_SELECT, PARAM
<<< RESPONSE
```

Table 4. RF PROTOCOL SELECT

Name		Format	Description
Input parameter	PARAM	02000280	ISO14443-A Tx=106k / Rx=106k
Returned response	RESPONSE	0000	RF protocol selected successfully
		8300	Parameter error
		8900	USB connection error

Example: Select ISO15693 RF protocol High Data rate 100%

```
>>> ST25R3911B_PROTOCOL_SELECT, 02000280
<<< 0000

0000: No error
```

SEND RECEIVE FUNCTION

Script Prototype:

```
>>> ST25R3911B_SENDRERECEIVE, RF_REQUEST
<<< RESPONSE
```


Table 5. SEND RECEIVE FUNCTION

Name		Format		Description	
Input parameter	RF_REQUEST	ISO14443-A RF REQUEST + CONTROL BYTE Where: CONTROL BYTE = 0xXY	X = 0	RF frame is sent as it is.	
			X= 2	CRC of the RF frame is calculated and added to the RF frame sent.	
			Y	Number of bits of the last byte to be sent.	
Returned response	RESPONSE	Error	8700		No RF response detected
			8D00		RF Answer detected with collision
			8A00		RF framing error
			8900		USB connection error
		No error: RF response returned	Byte 1		80 (status byte)
			Byte 2		Length of output parameter
			Byte 3 to Byte N-1		RF Answer
			Byte N-2 to N = XY ZZZZ Protocol error status bytes	X = 0	CRC included in RF answer
				X = 2	NO CRC included in RF answer
				Y	Number of bits of the last received byte
				ZZZZ = 0000	No framing error detected in RF Answer

Example: REQA

```
>>> ST25R3911B_SENDRERECEIVE, 26 07
<<< 80054200280000

80          RF Answer OK
05          Length
4200        RF Answer
280000      NO CRC included in RF answer / Last byte is 8 bits size /
            No error detected
```

Example: READ BINARY 5 BYTES @ 0000

```
>>> ST25R3911B_SENDRERECEIVE, 0300B0000005FF0D 08
<<< 800D030010D1010C90006CC9080000

80          RF Answer OK
0D          Length
030010D1010C90006CC9 RF Answer
080000      CRC included in RF answer / Last byte is 8 bits size / No
            error detected
```

3.8.3 ISO14443-B RF PROTOCOL**RF PROTOCOL SELECT****Script Prototype:**

```
>>> ST25R3911B_PROTOCOL_SELECT, PARAM
<<< RESPONSE
```

Table 6. RF PROTOCOL SELECT

	Name	Format	Description
Input parameter	PARAM	03010180	ISO14443-B: Tx=106k / Rx=106k and CRC calculated and added in the RF Frame to be sent.
Returned response	RESPONSE	0000	RF protocol selected successfully
		8300	Parameter error
		8900	USB connection error

Example: Select ISO14443-B RF protocol Tx=106k / Rx=106k

```
>>> ST25R3911B_PROTOCOL_SELECT, 03010180
<<< 0000

0000: No error
```

SEND RECEIVE FUNCTION

Script Prototype:

```
>>> ST25R3911B_SENDRERECEIVE, RF_REQUEST
<<< RESPONSE
```

Table 7. SEND RECEIVE FUNCTION

Name		Format		Description
Input parameter	RF_REQUEST	-		ISO14443-B RF REQUEST
Returned value	RESPONSE	Error	8700	No RF response detected
			8D00	RF Answer detected with collision
			8A00	RF framing error
			8900	USB connection error
		No error: RF response returned	Byte 1	80
			Byte 2	Length of output parameter
			Byte 3 to Byte N-1	RF Answer
			Byte N = XX	Protocol error status byte

Example: POLLING

```
>>> ST25R3911B_SENDRERECEIVE, 00FFFF0000
<<< 8012010110031014111A24100B4B428485D0FF00

80 RF Answer OK
12 Length
010110031014111A24100B4B428485D0FF RF Answer
00 No error detected
```

Example: READ

```
>>> ST25R3911B_SENDRERECEIVE, 06012E30B9A0D66533010900018001
<<< 801D07012E30B9A0D66533000001D220236170706C69636174696F6E2F7600

80 RF Answer OK
1D Length
07012E30B9A0D66533000001D220236170706C69636174696F6E2F76RF Answer
00 No error detected
```

3.8.4 ISO18092 RF PROTOCOL**RF PROTOCOL SELECT****Script Prototype:**

```
>>> ST25R3911B_PROTOCOL_SELECT, PARAM
<<< RESPONSE
```

Table 8. RF PROTOCOL SELECT

Name		Format	Description
Input parameter	PARAM	0451100500	ISO18092-B Tx=212k Rx=212k and CRC calculated and added in RF Frame to be sent
Returned response	RESPONSE	0000	RF protocol selected successfully
		8300	Parameter error
		8900	USB connection error

Example: Select ISO8092 RF protocol Tx=212k / Rx=212k

```
>>> ST25R3911B_PROTOCOL_SELECT, 0451100500
<<< 0000

0000: No error
```

SEND RECEIVE FUNCTION

Script Prototype:

```
>>> ST25R3911B_SENDRERECEIVE, RF_REQUEST
<<< RESPONSE
```

Table 9. SEND RECEIVE FUNCTION

Name		Format		Description
Input parameter	RF_REQUEST	-		ISO18092: RF REQUEST
Returned response	RESPONSE	Error	8700	No RF response detected
			8D00	RF Answer detected with collision
			8A00	RF framing error
			8900	USB connection error
		No error: RF response returned	Byte 1	80
			Byte 2	Length of output parameter
			Byte 3 to Byte N-1	RF Answer
			Byte N = XX	Protocol error status byte

Example: INITIATE

```
>>> ST25R3911B_SENDRERECEIVE, 0600
<<< 8004A6443000

80                      RF Answer OK
04                      Length
A64430                  RF Answer
00                      No error detected
```

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
24-Mar-2017	1	Initial release.
29-Jun-2017	2	Updated: <ul style="list-style-type: none">– Introduction– Section 2.4: ST25R3911B Discovery GUI tab– Table 3: SEND RECEIVE FUNCTION Added: <ul style="list-style-type: none">– Section 3: Using the ST25 Tag Editor software– Section 3.8: ST25 Tag Editor RF protocol select and Send Receive functions formats

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2017 STMicroelectronics – All rights reserved