UM2444
User manual

Software toolbox for NFC tags

Introduction

ST25PC-NFC (part number STSW-ST25PC001) for Windows® is the reference software developed by STMicroelectronics for the ST25 NFC / RFID Tags. It relies on the publicly available Java™ ST25 SDK.

This document aims to help the user understand how to install and use the software.

ST25PC-NFC operates with the products listed in *Table 1*.

Table 1. Applicable products

Type	Applicable products
NFC/RFID tags	ST25TA, ST25TB, ST25TN and ST25TV series NFC tags
	ST25DV-I2C and ST25DV-PWM series Dynamic NFC Tags
	M24LR and M24SR series Dynamic NFC Tags

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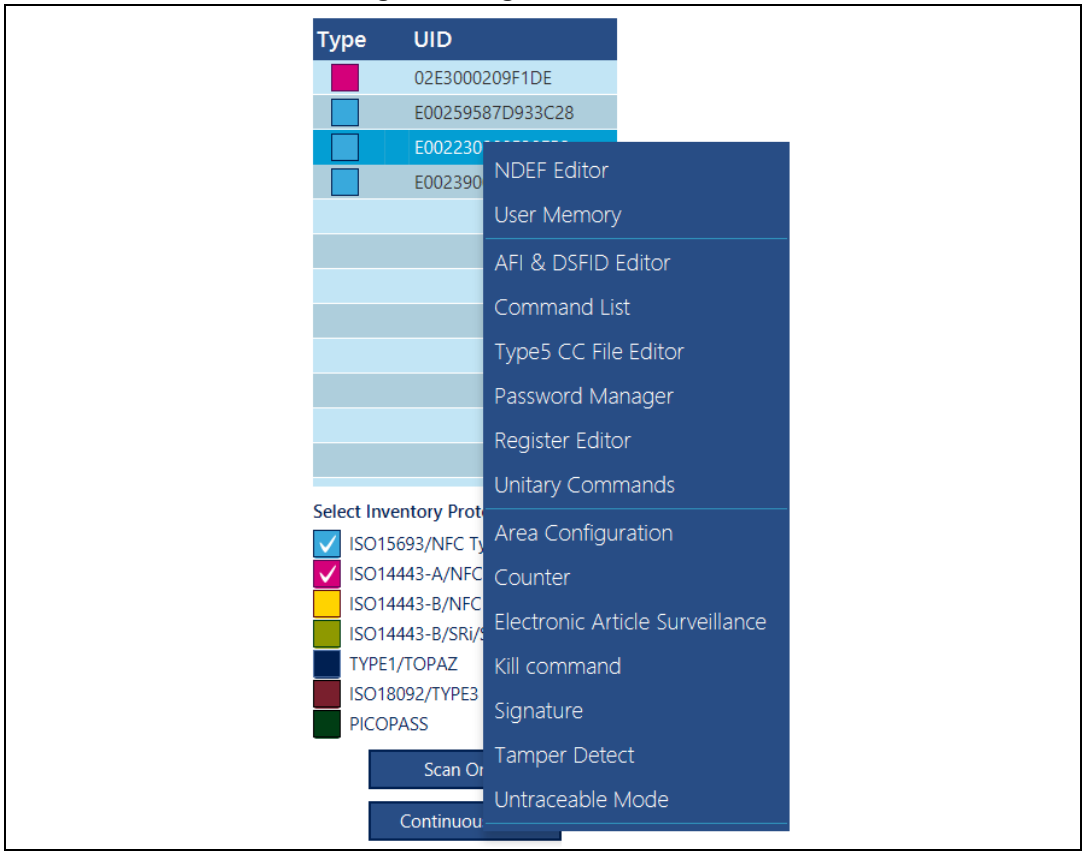
1 Quick start

Once the software is installed (see *Section 3*), connect your USB reader (one from the list in *Section 2.1*) and launch the ST25PC-NFC program.

To detect tags, place them in the RF field generated by the reader and hit the *Scan Once* button for a 1-shot run of anti-collision sequence for the selected protocols.

From the *Tag Inventory* table, right-click on an item to launch all available actions for the selected tag, and follow the instructions on the display.

Figure 1. Tag contextual menu



2 Features

ST25PC-NFC is a 64-bit application based on Java™ ST25 SDK. It can be used with all readers supported in the SDK:

- ST demonstration boards for ST25R95 (CR95HF), ST25R3911B-DISCO, ST25R3916-DISCO, STEVAL-25R3916B, and STEVAL-25R200
- FEIG ELECTRONIC readers: MR102, LR1002, CPR30/30+/30pro

Depending on the reader capabilities, ST25PC-NFC software detects tags from the following protocols and displays basic tag information:

- ISO 15693
- ISO 14443-A
- ISO 14443-B
- ISO 14443-B SR protocol for ST25TB series
- NFC Forum Type 5
- NFC Forum Type 4A
- NFC Forum Type 4B
- NFC Forum Type 3
- NFC Forum Type 2
- NFC Forum Type 1

Generic features include:

- EEPROM content editor:
  - Display memory content
  - Write bytes of memory
  - Save to/Load from file
- NDEF builder:
  - Read/Write NDEF message from/to tag
  - Add/Delete records to/from the NDEF message
- Capability Container File editor:
  - Type 2 CC File reader
  - Type 4 CC File reader
  - Type 5 CC File read/modify
- Password manager:
  - Open sessions protected by password
  - Set value for all passwords
- Register editor:
  - Read and display all register values from the system area
  - Write new values (requires good password presentation)
- Unitary RF commands:
  - ISO 15693 and ST proprietary command builder
  - ISO 14443-A / Type 4A commands

In addition to generic features, all specific features of ST25 tags are available in specific menus:

- ST25DV-I2C
  - Fast transfer mode
  - Multi area editor and area configuration
- ST25DV-PWM
  - PWM settings
- ST25TV
  - Tamper detect
  - Counter
  - Electronic article surveillance
  - Untraceable mode
- ST25TVC
  - ANDEF configuration
  - Lock configuration
  - Privacy configuration
  - Tamper detect
  - Unique tap code
- M24LR series
  - Sector management
- ST25TN series
  - ANDEF configuration
  - Kill commands
  - Lock configuration
  - Memory configuration
  - Register editor
  - Signature
- ST25TA series
  - Access rights management
  - GPO features
- M24SR series
- ST25TB SRi/SRT series

Another menu called *Demos* allows the user to directly access specific demonstration tools:

- Fast Transfer Mode demonstrations with ST25DV-DISCOVERY boards
- NFCSensorTag demonstration of STEVAL-SMARTAG1 and SMARTAG2 (information about the NFC dynamic SensorTag evaluation board is available on *www.st.com*)
- Pulse Width Modulation demonstration of the ST25DV-PWM-eSet board

Finally, a console displays all RF communication between the RF reader and the tags.

The ST25PC-NFC software is constantly evolving, check *www.st.com* regularly for updates.

2.1 Supported readers

The following NFC/RFID readers are supported:

- STMicroelectronics
  - ST25R95 (CR95HF)
  - ST25R3911B-DISCO
  - ST25R3916-DISCO
  - STEVAL-25R3916B
  - STEVAL-25R200
- FEIG ELECTRONIC
  - OBID MR102 (ISO 15693 only)
  - OBID LR1002 (ISO 15693 only)
  - OBID USB CPR30/30+/30pro

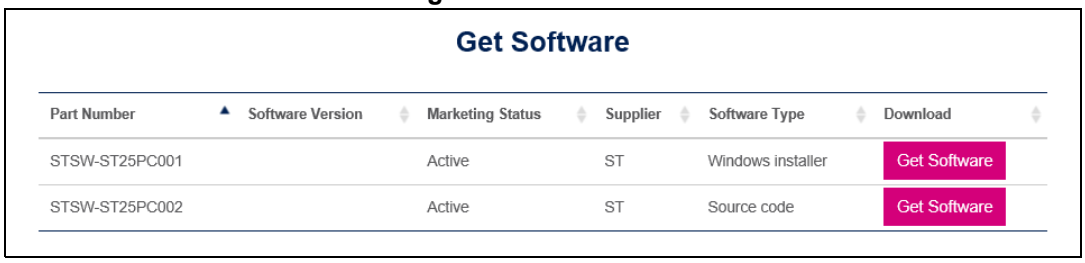
3 Installation

3.1 Download

The ST25PC-NFC.exe Windows installer file can be found on the ST website *www.st.com*.

Click on the *Get Software* button for the STSW-ST25PC001 (see *Figure 2*), then accept the license agreement.

Figure 2. Get software



3.2 Running the installer

Launch the installer program and follow the instructions. First, accept the agreement and click on the Next button, you will be asked for an installation folder, the default directory is *C:\Program Files\STMicroelectronics\ST25PC-NFC*. This directory can be changed by clicking on the Browse button. Once done, click on Next.

During the installation, you will be prompted to install MSVC++ 2017 redistributable (if not already on your PC), and also given the option to install FEIG reader USB drivers.

At the end of the process, the software can be launched (check the box to start)

Figure 3. License agreement

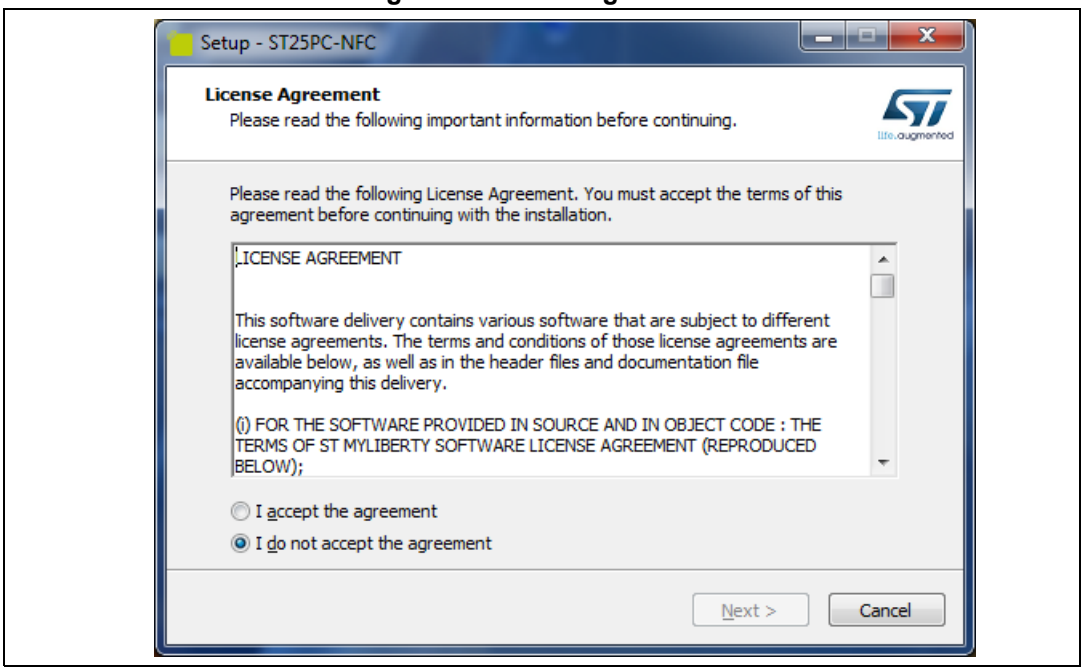


Figure 4. Install folder

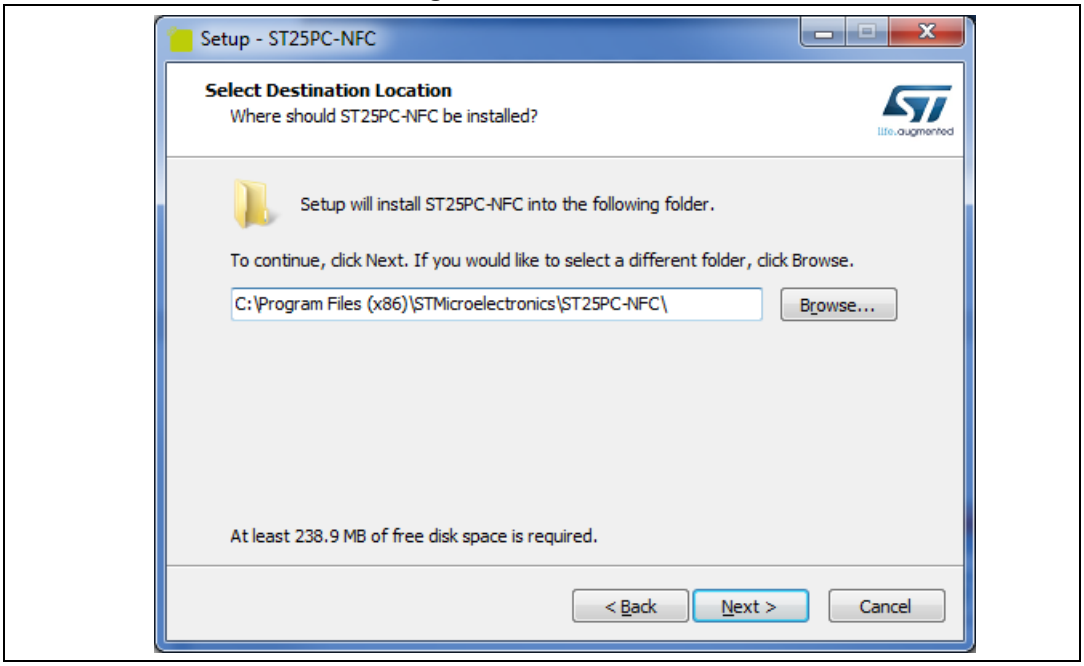
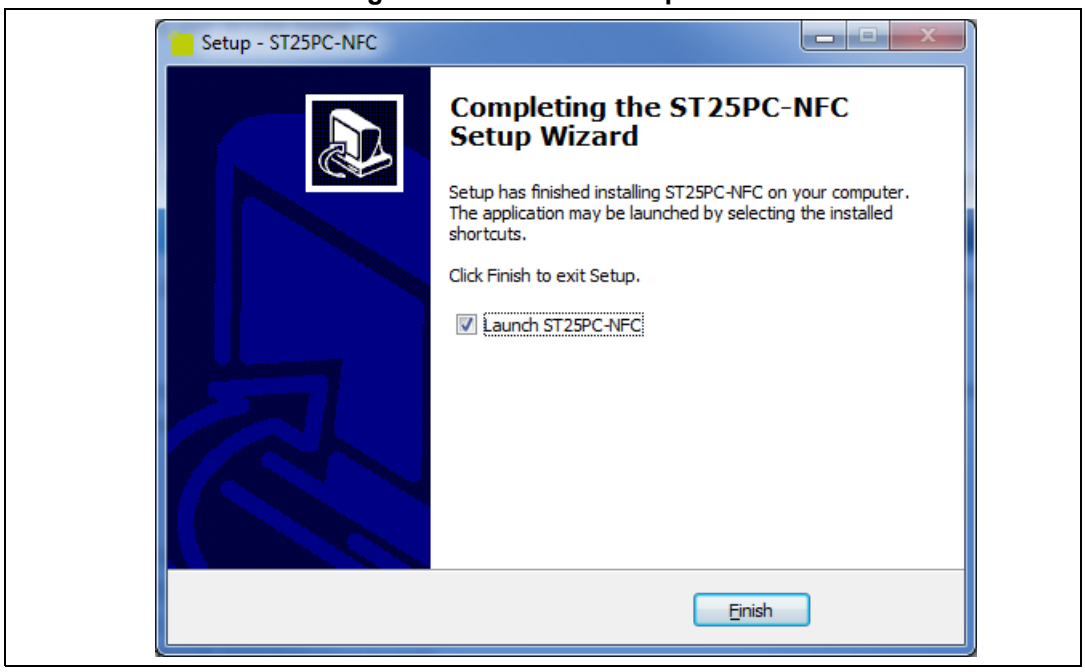


Figure 5. Installation completed

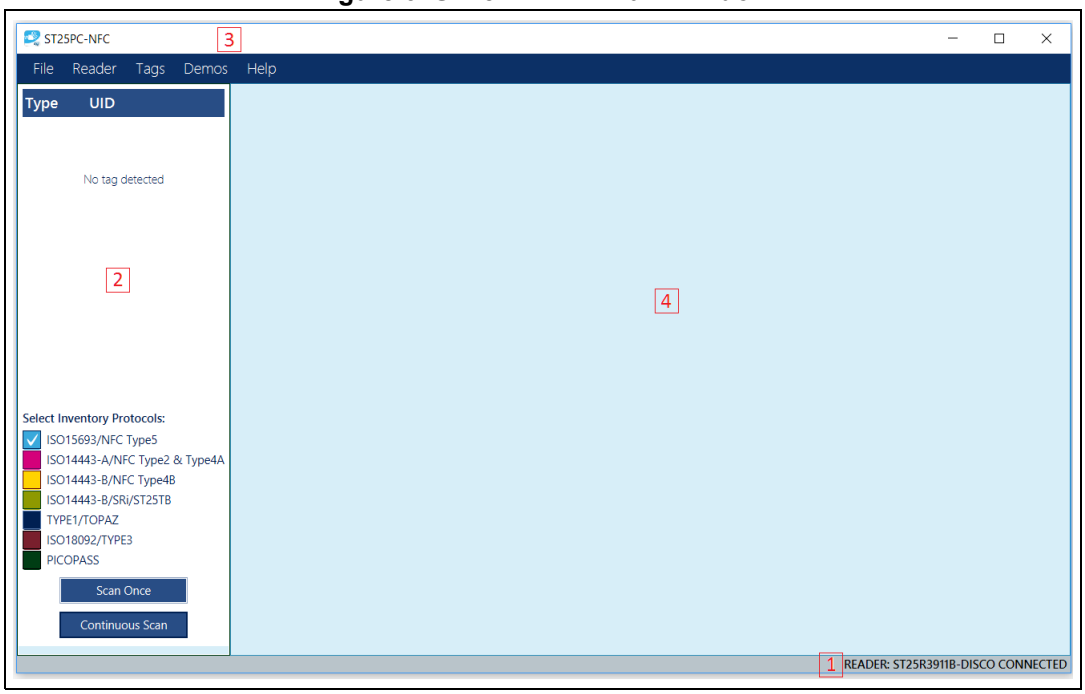


4 GUI overview

As shown in *Figure 6*, the ST25PC-NFC main window is divided in four parts:

1. Reader information area [1], indicating the RF reader being used
2. Inventory area [2], displaying tags present on the RF reader antenna
3. Top menu [3], used to select features and tools
4. Main area [4], displaying tabs from selected features and tools

Figure 6. ST25PC-NFC main window

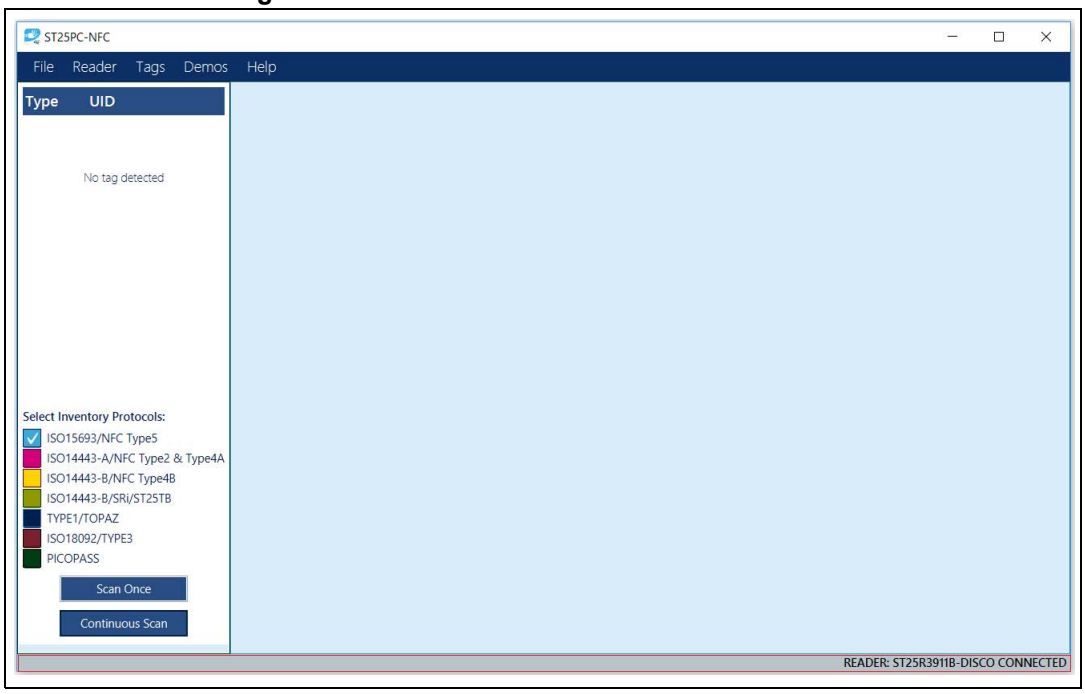


4.1 Application start

When starting the ST25PC-NFC software, the application automatically tries to detect an RF reader connected to your computer. This RF reader must be one supported by the software (see the list in *Section 2.1*).

The status bar at the bottom of the application (part [1] of *Figure 6*) indicates the name of the connected reader. *Figure 7* is an example, the ST25R3911B-DISCO board is detected.

Figure 7. ST25R3911B-DISCO RF reader detected



If no reader is connected, a warning appears (*Figure 8*), and the bottom connection status bar is shown in red, with the warning NOT CONNECTED (*Figure 9*).

Figure 8. No RF reader detected

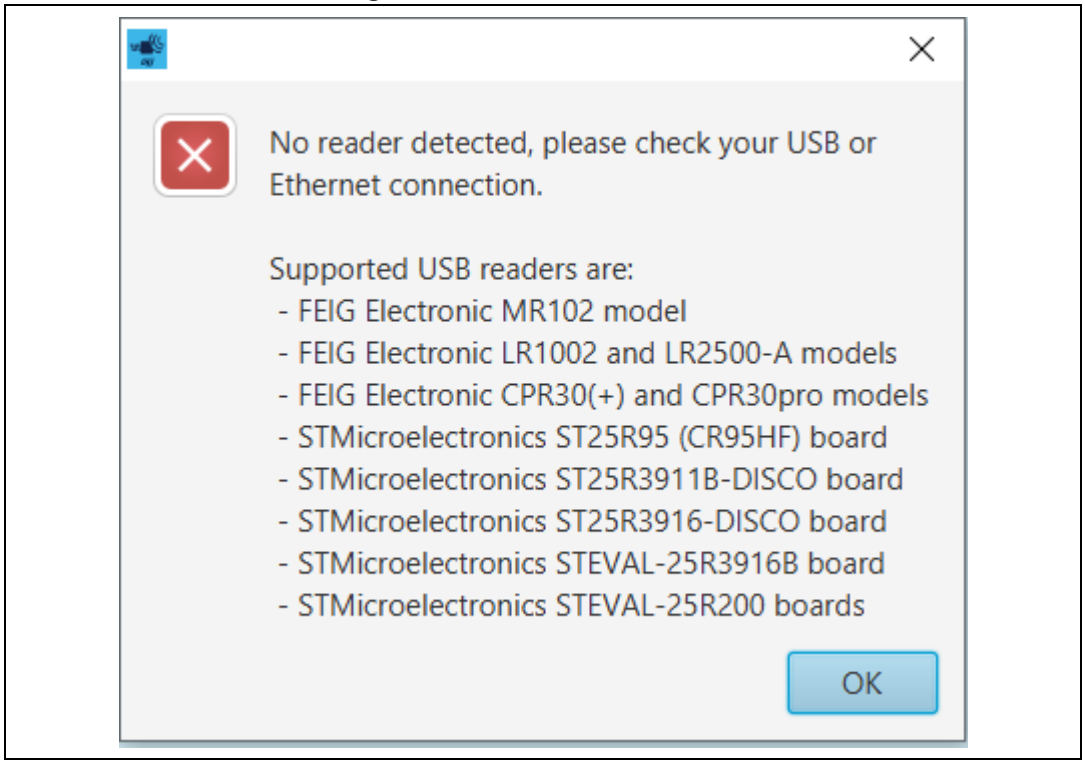
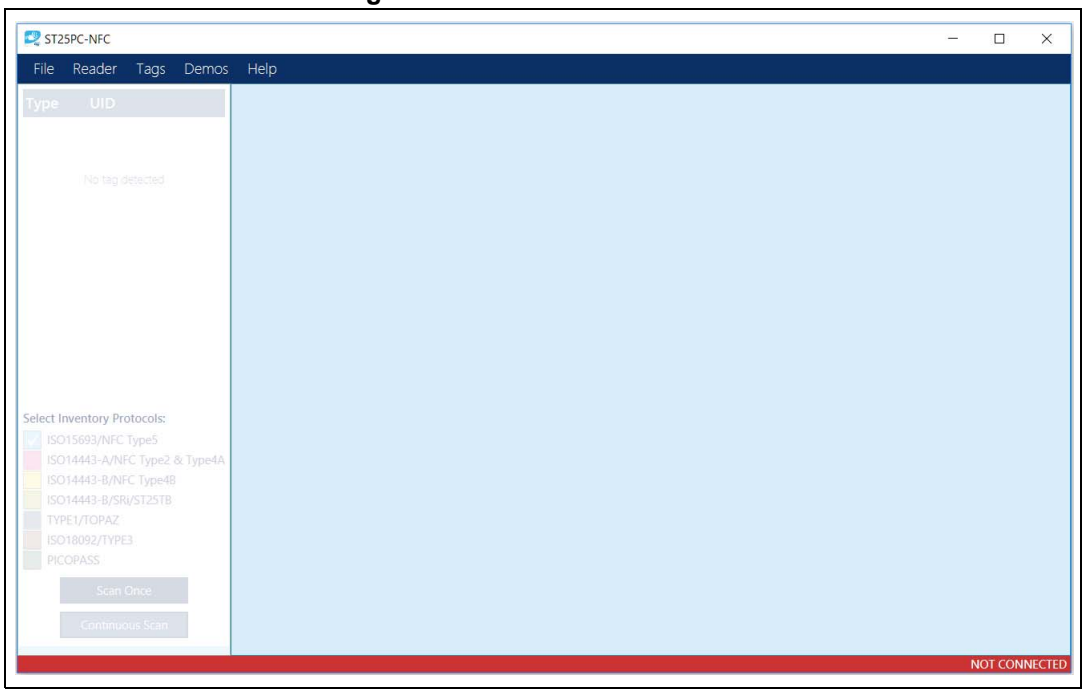


Figure 9. No RF reader detected



As soon as an RF reader is detected, the inventory process is launched and the detected tags are displayed on the left (part [3] of *Figure 6*).

4.2 Inventory panel

The Inventory panel (*Figure 10*) is located on the left side of the main screen. It displays tags detected by the anti-collision protocols implemented by the reader. By default, the ISO 15693 / NFC Forum Type 5 and ISO 14443-A / NFC Forum Type 2A and 4A protocols are selected. Default selected protocol can be changed using *Preference* panel available in *File* menu (see *Section 4.3.1*).

Figure 10. Inventory panel

Part [1] of *Figure 10* indicates the different RF protocols that can be included in the anti-collision process. Available RF protocols are:

- ISO15693 / NFC Forum Type5
- ISO14443-A / NFC Forum Type2 and Type4A
- ISO14443-B / NFC Forum Type4B
- ISO14443-B / SRi / ST25TB series
- NFC Forum Type1 / TOPAZ
- ISO18092 / NFC Forum Type3
- PICOPASS

Check-boxes allow the user to select the protocol to launch once the Inventory process starts.

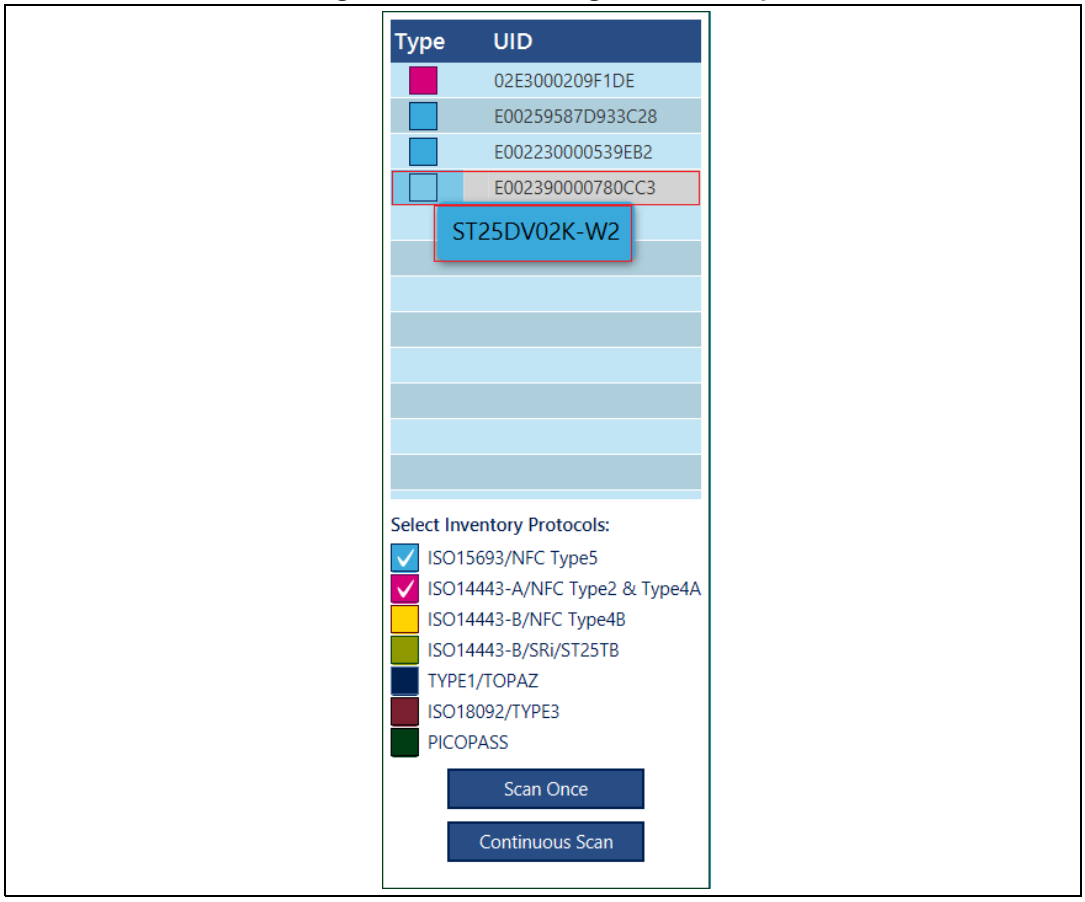
To detect tags, place them in the RF field of the reader and make sure the correct protocol is selected. The user can select one to four protocols (anti-collision sequences are executed sequentially) by clicking on the check-boxes.

The *Scan Once* button [2] executes the detection only once. Choose *Continuous Scan* [3] to cycle through the protocols indefinitely (or until you press the button again).

Once the anti-collision process is terminated, the UID of the detected tags are displayed in the table (Part [1] of *Figure 10*).

A tool-tip displays the tag name when hovering on the selected row (see *Figure 11*).

Figure 11. Detected tags with tool-tip



4.2.1 Tag info panel

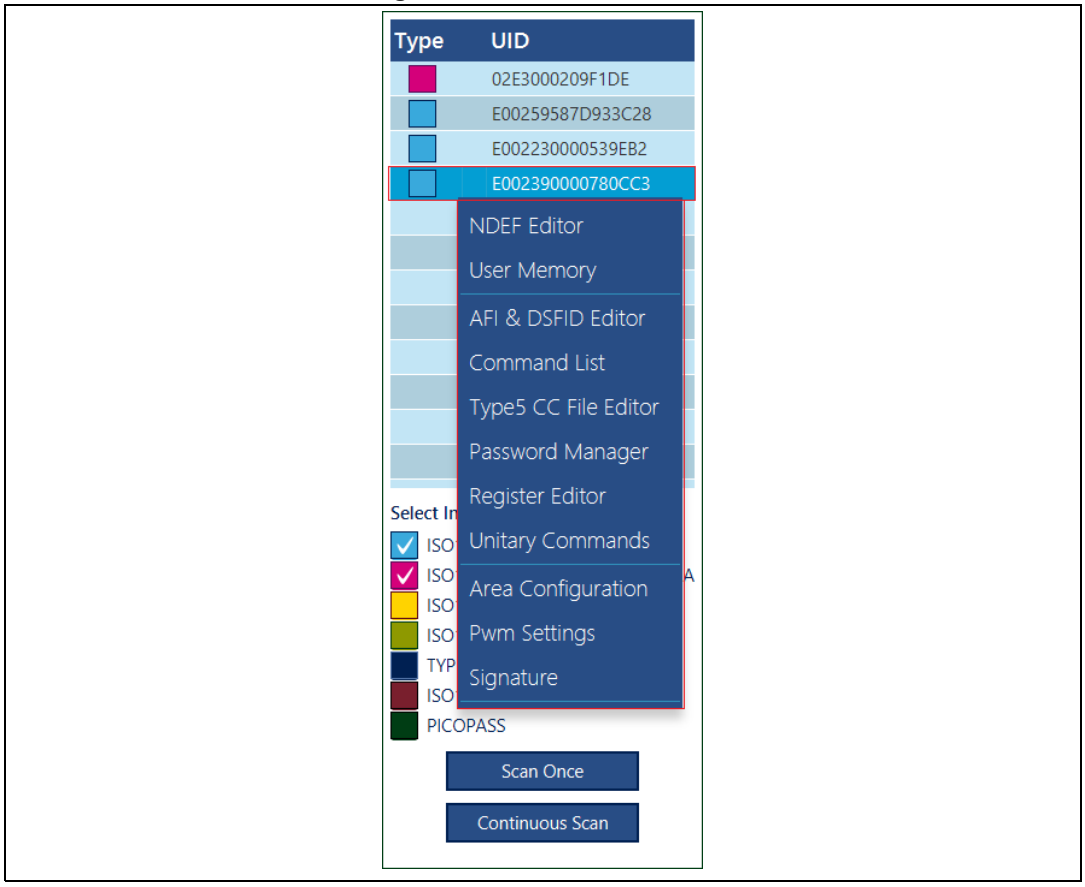
To get more information about a given tag in the table, left-click on the desired row. An information panel with more details about the tag appears (see *Figure 12*), where UID, product name and type (RF protocol family) are displayed. Depending on tag type, additional information is displayed.

Figure 12. Tag info panel

4.2.2 Tag contextual menu

This menu is accessed by right-clicking on the targeted row.

Figure 13. Contextual menu



From this menu it is possible to access all features available for the selected tag.

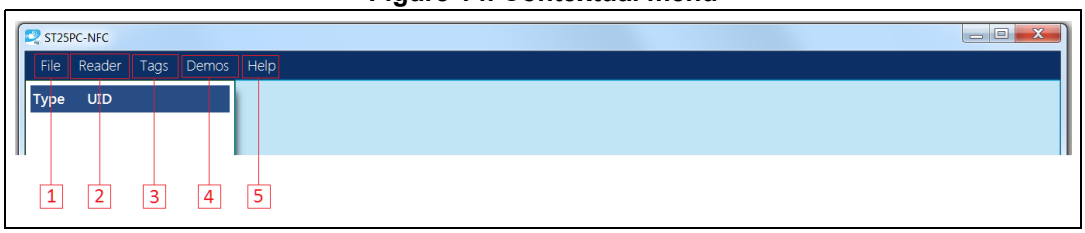
Clicking on a menu item opens the corresponding feature screen for the selected tag.

4.3 Main menu

The top *Menu* bar grants access to all RF protocol features and specific features of each product. The same menu items as the *Contextual menu* are available, but in case of the top bar menu, all tags detected during the Inventory stage are available for selection.

As indicated in *Figure 14*, the launch bar contains five main categories.

Figure 14. Contextual menu

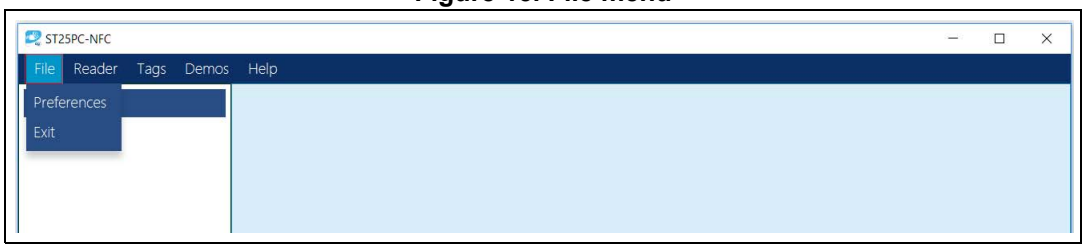


1. Part [1] contains *Preference* menu. Exit function is also available (clicking on the red cross at the top right of the main window does the same).
2. Part [2] contains a menu pertaining to the RF reader.
3. Part [3] gives access to all features and tools relative to RF protocols or tags.
4. Part [4] gathers demonstrations related to tag demonstrators.
5. Part [5] is the *Help* menu.

4.3.1 File menu

Uses *File* menu to set default preferences or to exit.

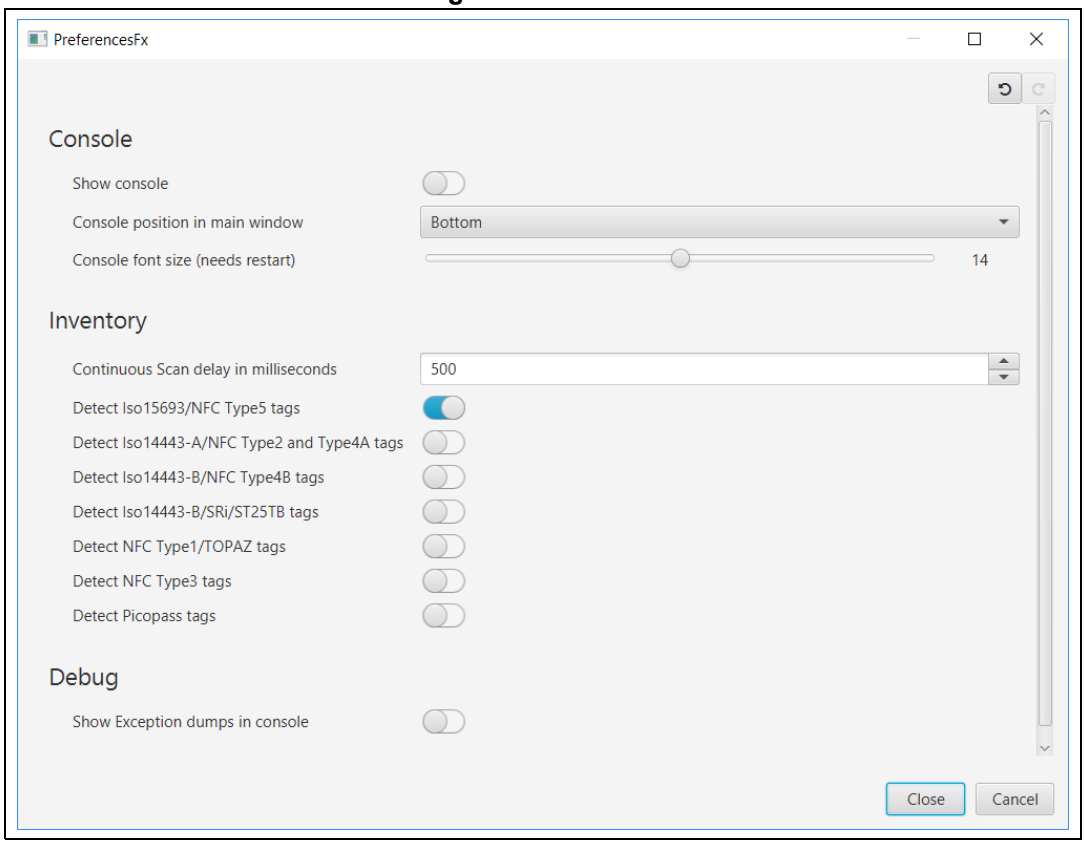
Figure 15. File menu



Preferences menu contains default settings.

Console part allows the user to display the console on the main window of the application, and to see all RF transactions. The user can change the size of the text and the position of the console (see *Figure 16*).

Figure 16. Console



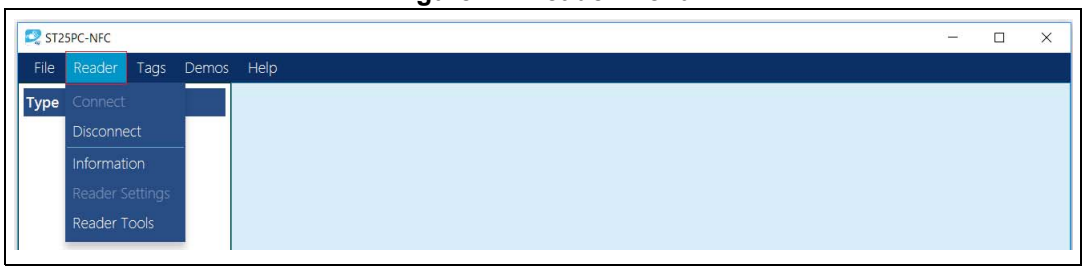
Inventory determines the RF protocols selected by default when the ST25PC-NFC application is launched. A delay parameter can be set to change the speed of the inventory loop.

Debug option can be set to display debug informations in the console.

4.3.2 Reader menu

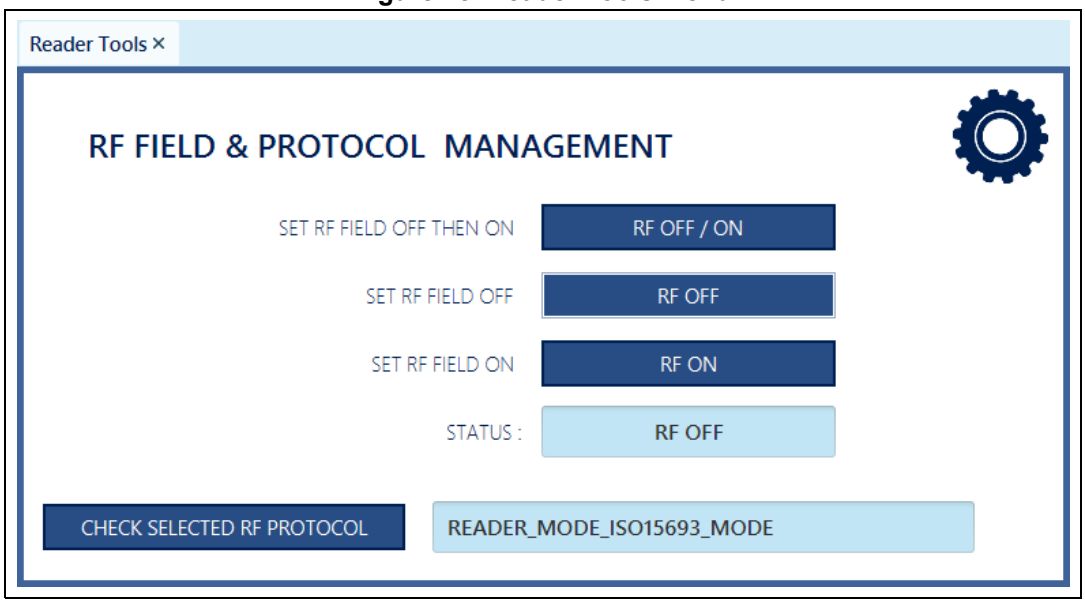
Use the *Reader* menu (*Figure 17*) to connect/disconnect RF readers.

Figure 17. Reader menu



- *Information* menu displays specific data on the RF reader connected to your computer and detected by the application.
- *Reader Settings* menu allows the user to change settings on specific readers.
- *Reader Tools* menu allow the user to set and reset RF field (see *Figure 18*).

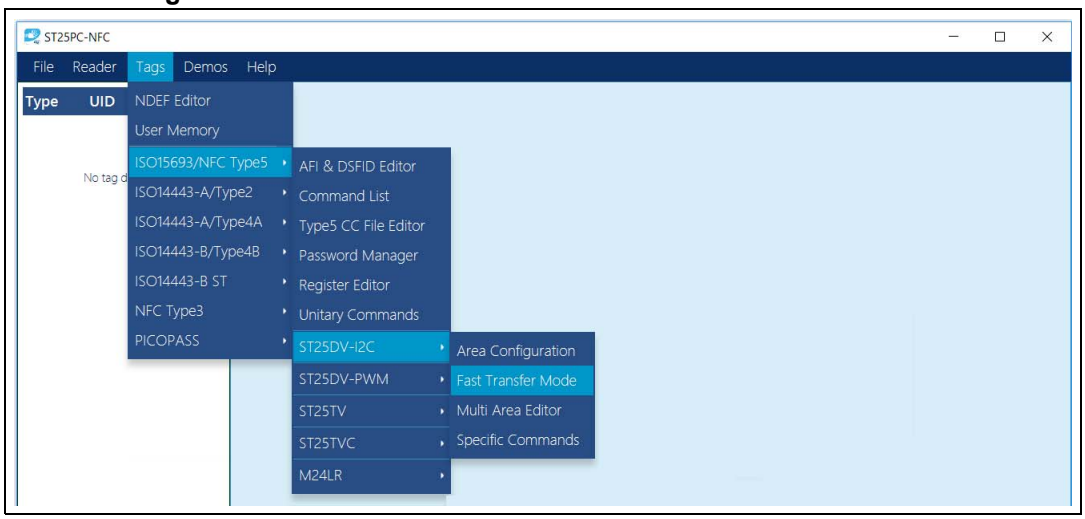
Figure 18. Reader Tools menu



4.3.3 Tags menu

From the *Tags* menu, user can access all features for the supported tags. Features appear on top of the *Tags* menu bar, followed by those for a given protocol (ISO 15693/NFC Type 5 in the example above) and finally sub-menus for each tag family (ST25DV-I2C series). See *Section 5* for more details.

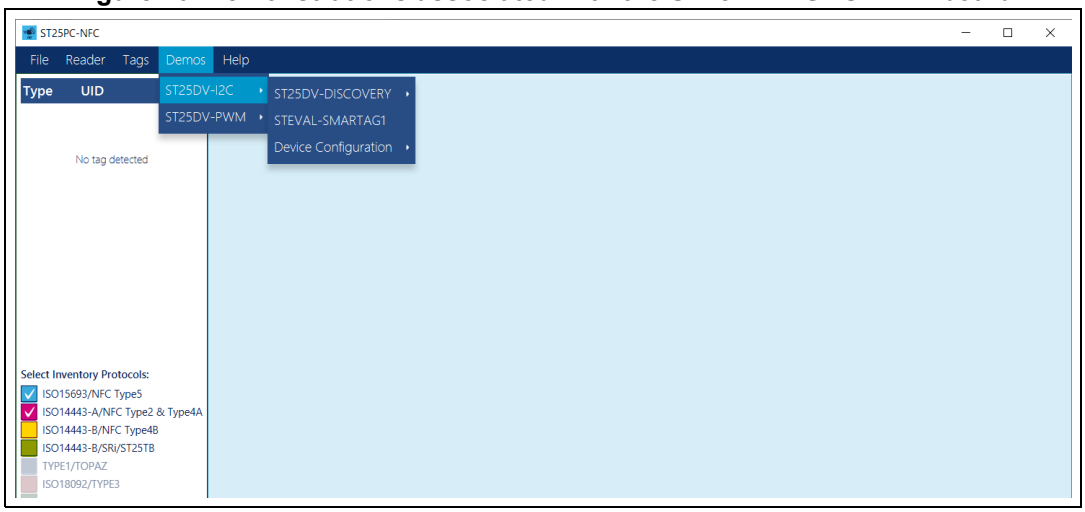
Figure 19. Access ST25DV-I2C features from the Main menu bar



4.3.4 Demos menu

In the *Demos* menu you can find software that interacts with ST25 demonstration boards.

Figure 20. Demonstrations associated with the ST25DV-DISCOVERY board

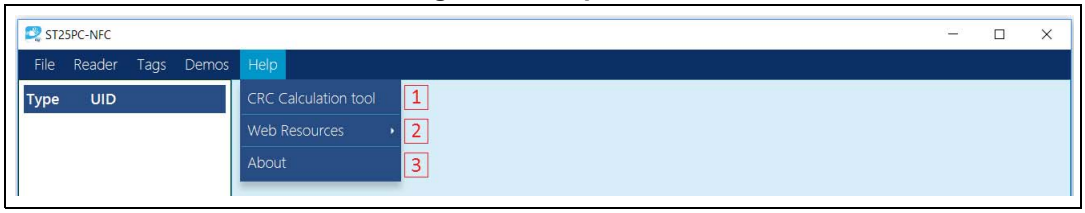


See *Section 6* for more details.

4.3.5 Help menu

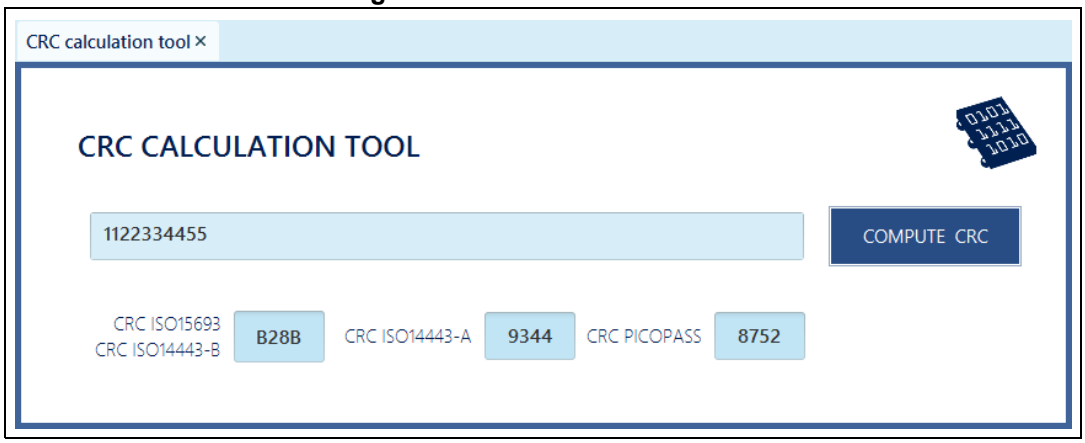
The *Help* menu (*Figure 21*) gives access to a CRC calculation tool (part [1]), provides relevant links to *www.st.com* (part [2]) and displays (part [3]) *About* informations.

Figure 21. Help menu



CRC Calculation tool allows the user to calculate the CRC16 value for specific RF protocols.

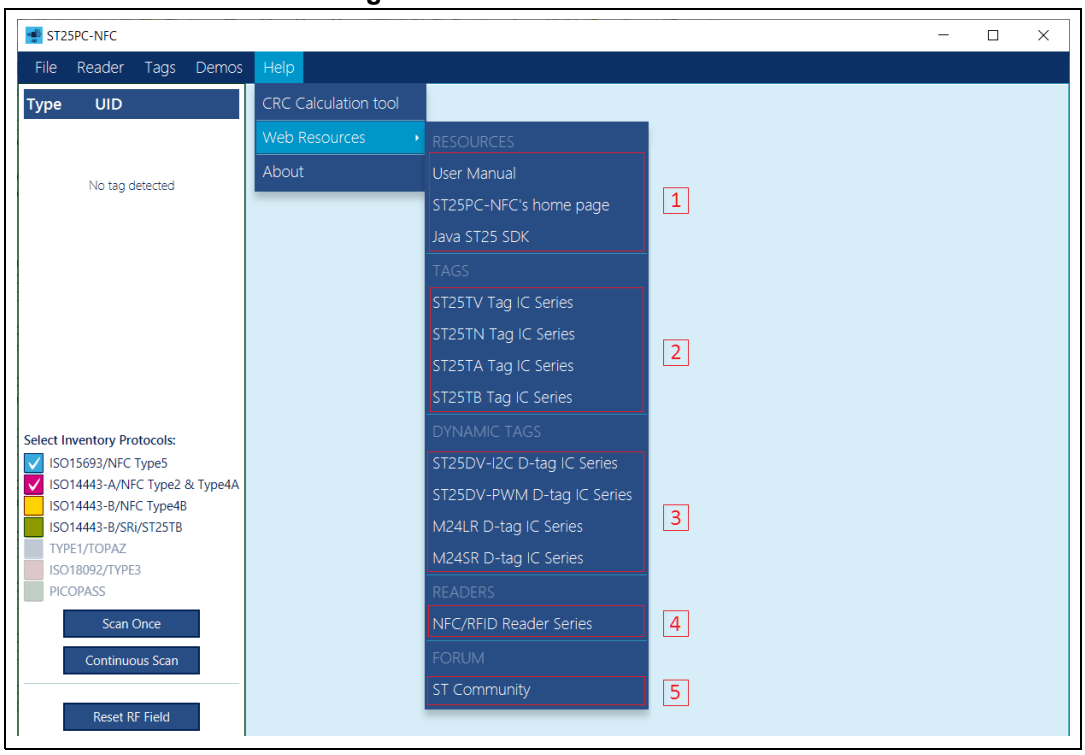
Figure 22. CRC calculation tool



Web Resources menu (*Figure 23*) contains links to the *www.st.com* website.

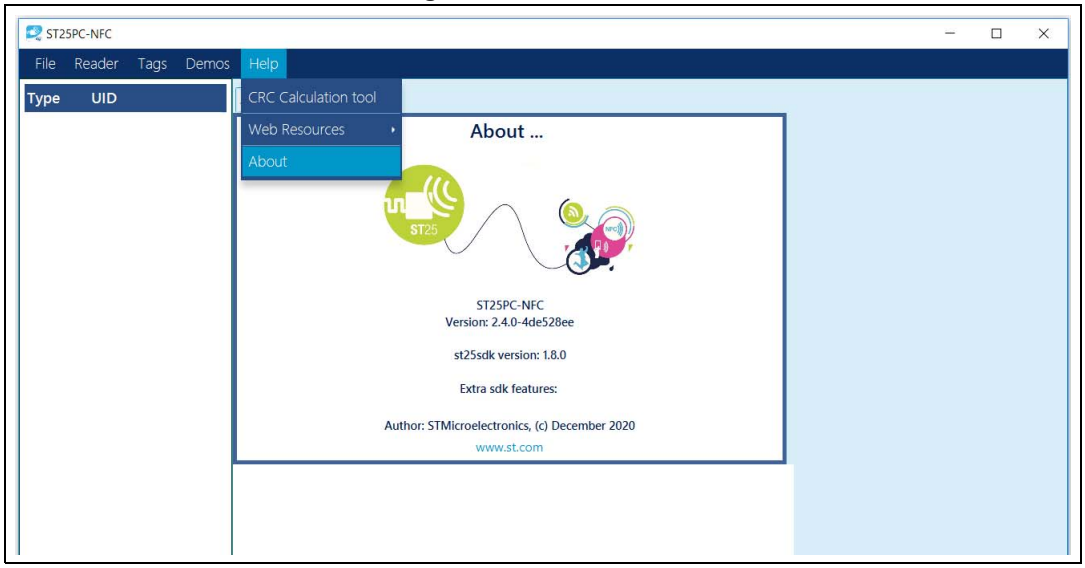
1. Part [1] is a link to theST25PC-NFC resources, such as user manual, web page for download and st25sdk library used by the ST25PC-NFC software.
2. Parts [2], [3] and [4] are a series of links to *www.st.com*, enabling fast access to data (e.g. datasheet, application notes, resources) about tags, dynamic tags and readers
3. Part [5] is the link to ST community forum. This web site is used by users to ask questions about STMicroelectronics products and firmwares. The user can read questions and answers about this application, or ask new questions.

Figure 23. Web resources menu



About menu (part [3] of *Figure 21*) displays ST25PC-NFC revision number and ST25DSK features.

Figure 24. About menu

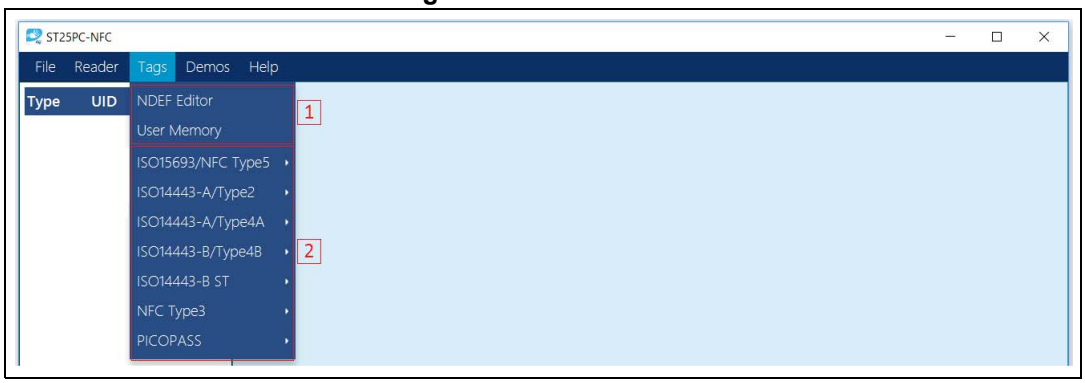


5 Tags menu

The *Tags* menu (see *Figure 25*) can be separated in two parts:

1. Part [1] contains generic tools such as NDEF editor and User Memory management. These tools can be used with any tag, independently of the RF protocol.
2. Part [2], dedicated to RF protocols

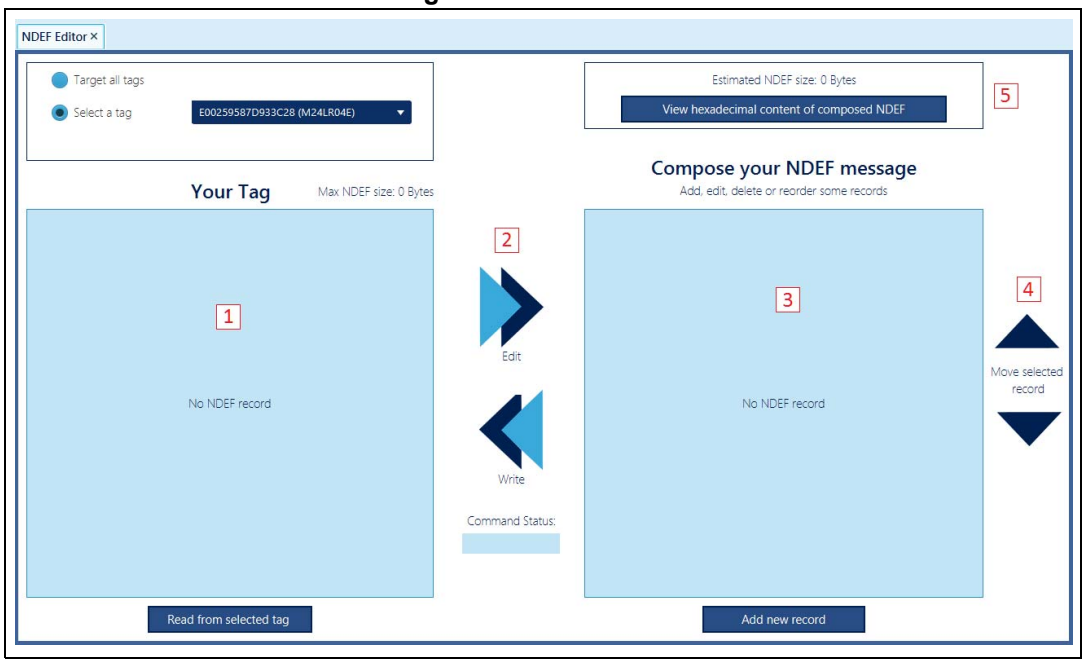
Figure 25. About menu



5.1 NDEF editor

The NDEF editor user interface (*Figure 26*) can read NDEF messages from any kind of tag. This user interface can also be used to create or modify a NDEF message.

Figure 26. NDEF editor



Read from selected tag button allows the user to read the NDEF message from the selected tag. If an NDEF message is detected, the NDEF message details are displayed in part[1] of *Figure 26*.

Thanks to *Edit* button (part[2]) it is possible to duplicate the detected NDEF message in the edition part of the user interface (part[3]).

The user can modify the NDEF message with following features:

- *Add new record* button allows the user to modify the NDEF message by adding one or more NDEF records. *Figure 27* displays the list of supported NDEF records available to populate the NDEF message, while *Figure 28* shows a new message built.
- *Move selected record* (part[4]) can be used to change the record list. When an NDEF message has been prepared, user can write it to selected tags with a click on the *Write* button (part [2]).

Figure 27. Supported NDEF records

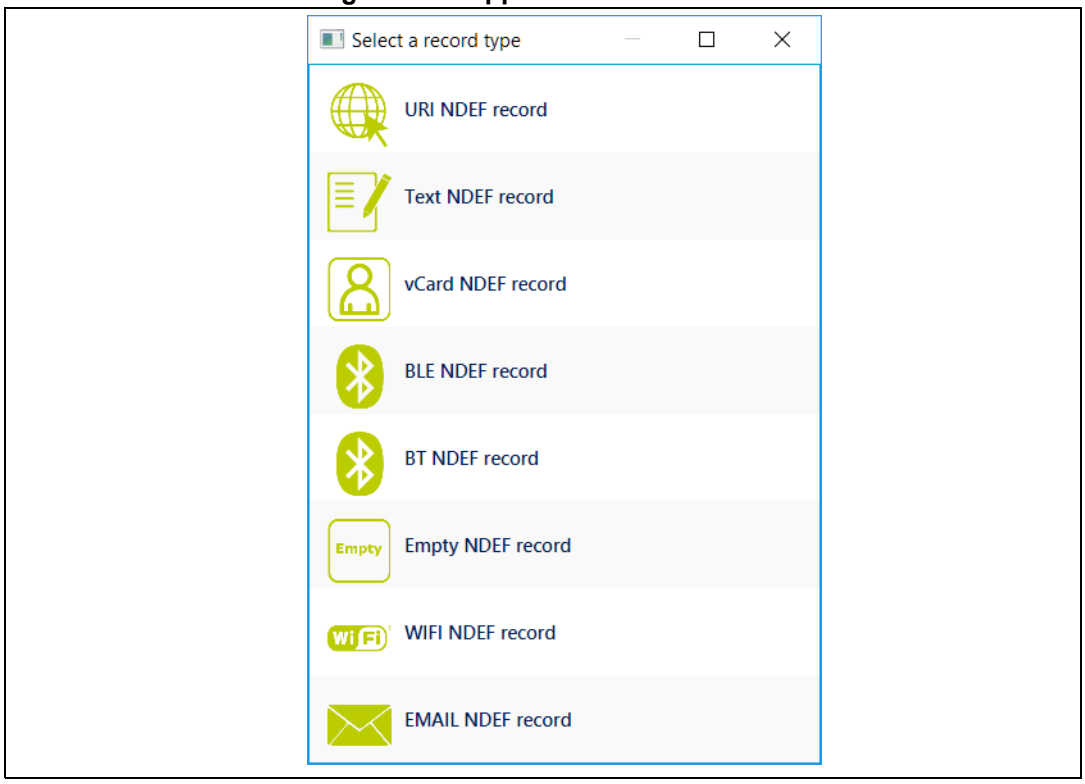
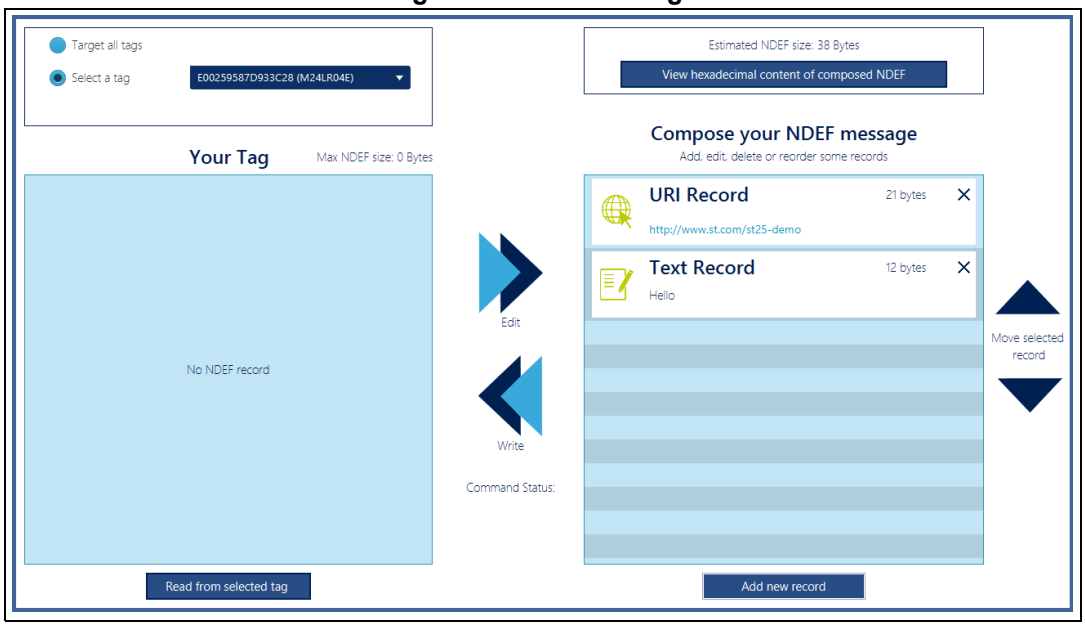
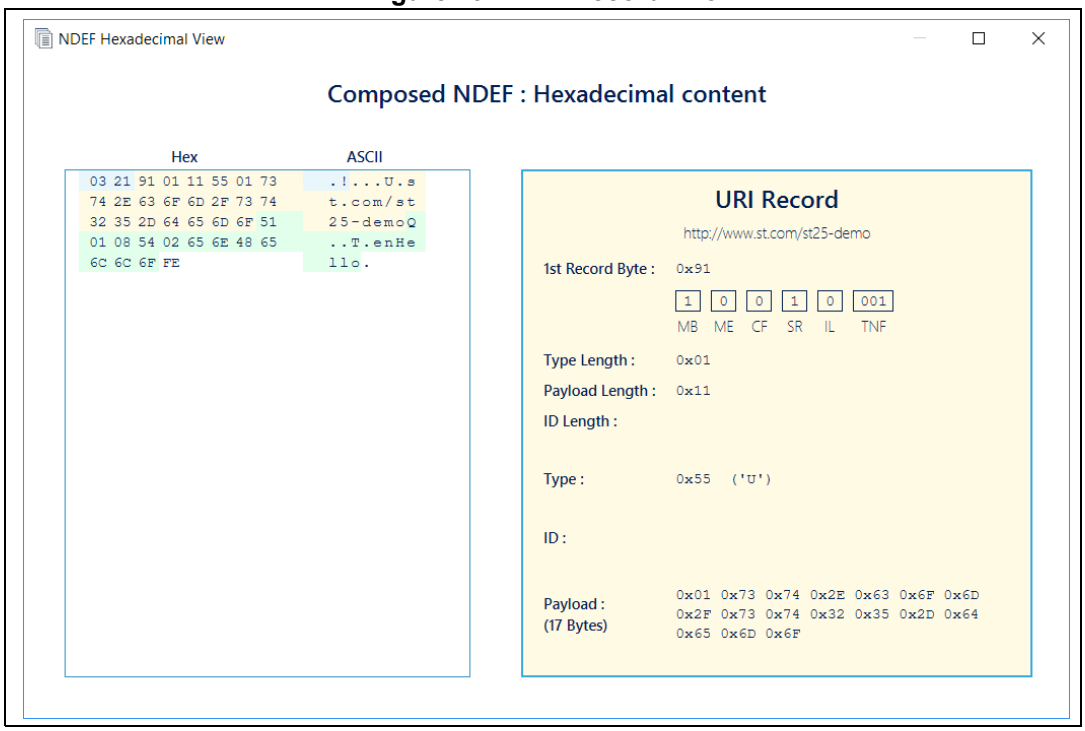


Figure 28. New message



Part[5] allows the user to decode the NDEF message and displays all the TLV information of each NDEF record (see *Figure 29*).

Figure 29. NDEF record info

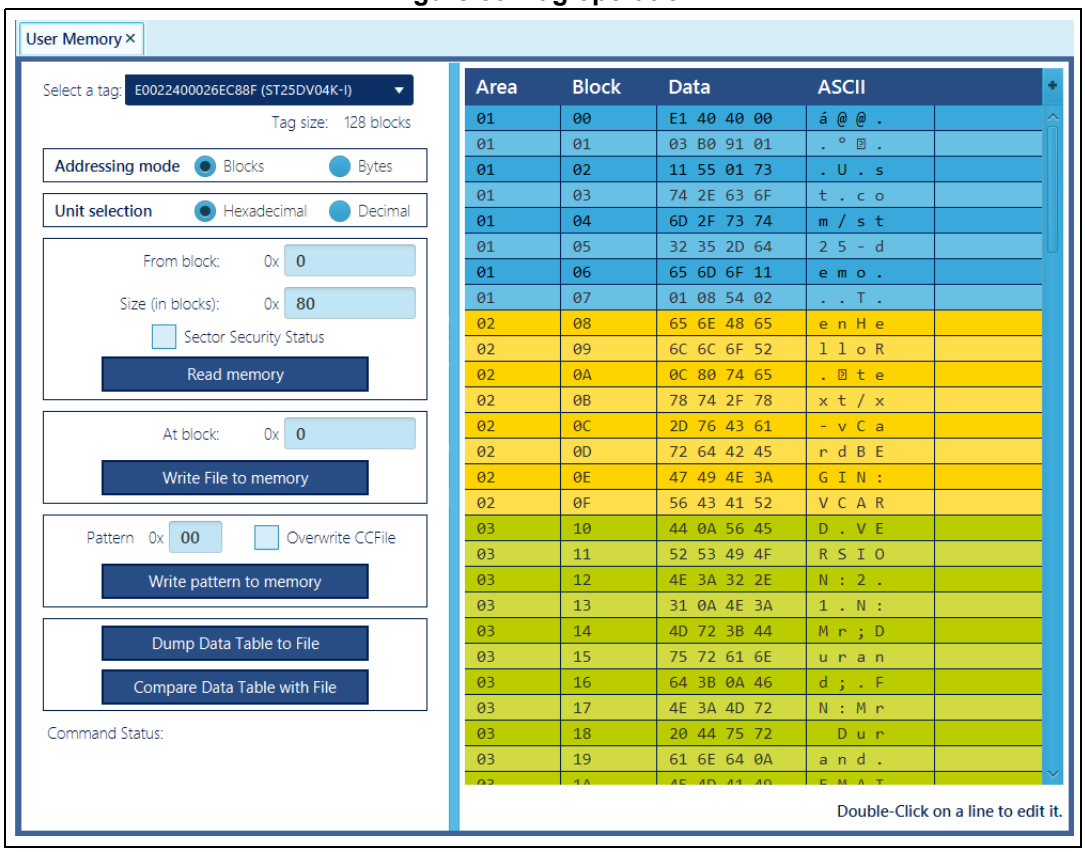


5.2 User memory

The *User Memory* interface is used to read, write or update the content of any tag.

Figure 30 shows the read and write user interface of the EEPROM of a tag.

Figure 30. Tag operation



The *Read data* button reads the content of the tag. The *From* field indicates the first address to be read, while *Size* field indicates the number of block or bytes to read.

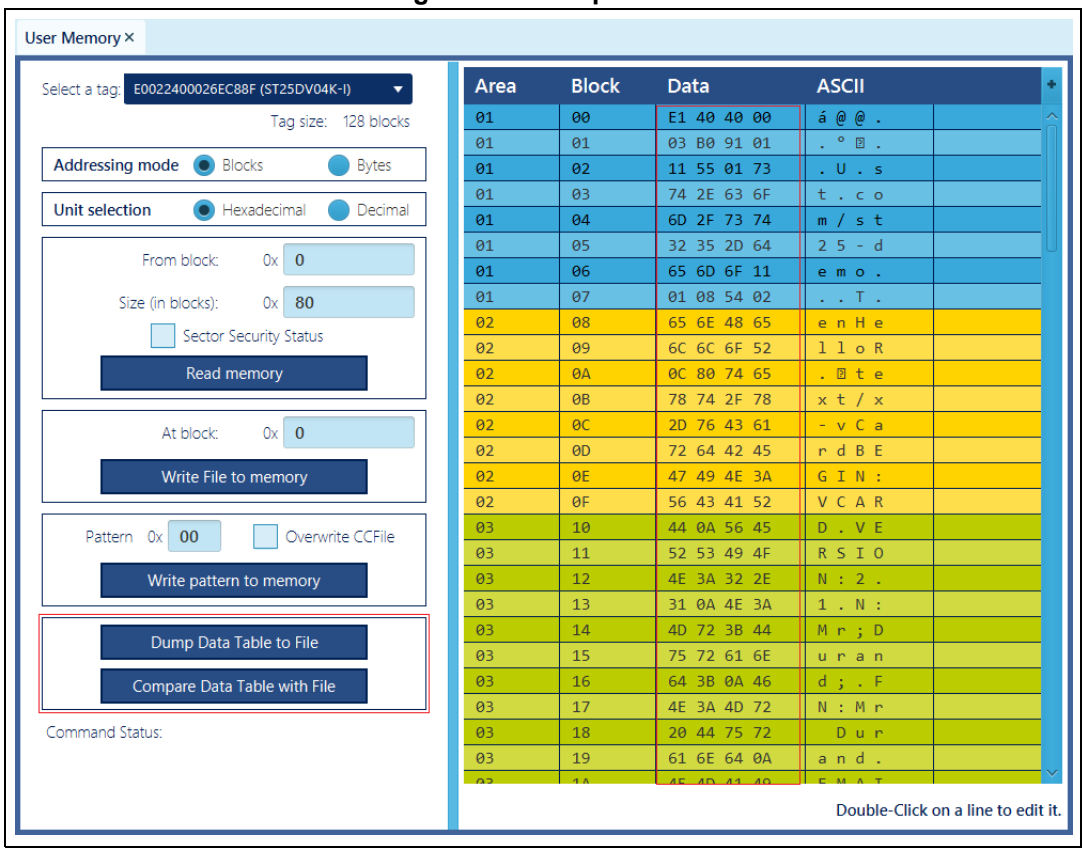
Write File to memory allows the user to copy the content of a binary file in the memory of the tag. the *At block* parameter defines the address where the first data is written.

Write pattern to memory feature allows the user to fill the memory with a single byte pattern (useful to erase the whole memory to 0x00 or 0xFF). Be careful not to delete CC file data.

To be able to modify the content of the memory double click on the block to be changed. A pop-up window appears to change data.

Figure 31 shows the *File operation* user interface for tag. This UI allows the user to transfer the content of a file in the tag memory. The tag memory can also be stored in a binary file.

Figure 31. File operation



Dump Data Table to File allows the user to store the content of data displayed in the user interface in a binary file.

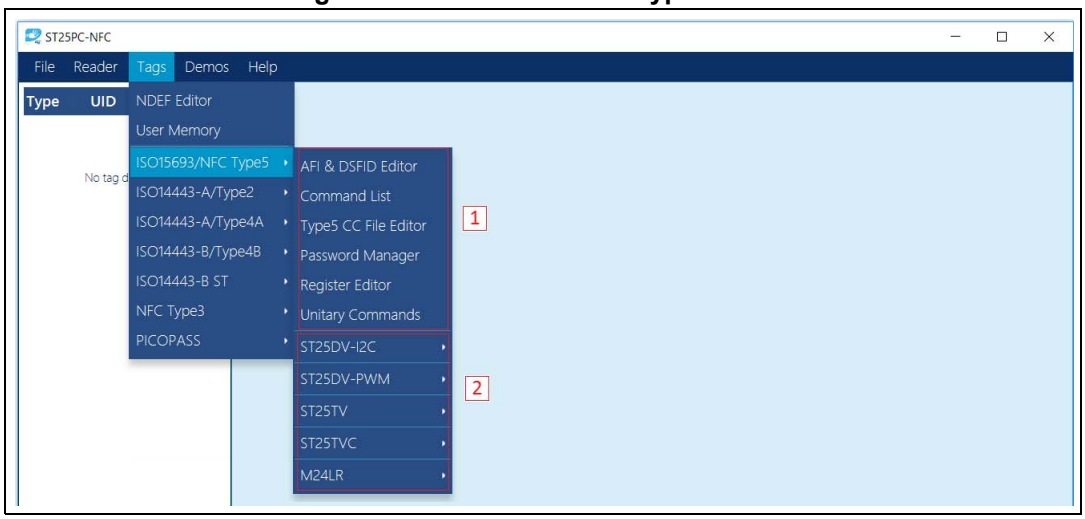
Compare Data Table with File allows the user to compare the data displayed in the user interface with a binary file.

5.3 ISO 15693 / NFC Type 5

ISO 15963 / NFC Forum Type 5 can be divided in two parts, as shown in *Figure 32*:

1. Part [1] describes the user interfaces available for all ISO 15693 products. This UI allows the user to manage features available in most of ISO 15693 products.
2. Part [2] lists the STMicroelectronics product series and contains specific features for each of them.

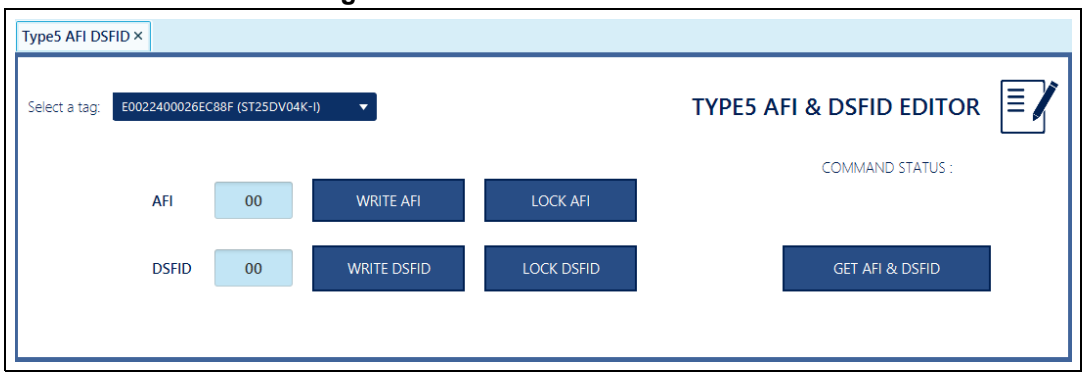
Figure 32. ISO 15693 / NFC Type 5 menu



5.3.1 Generic features

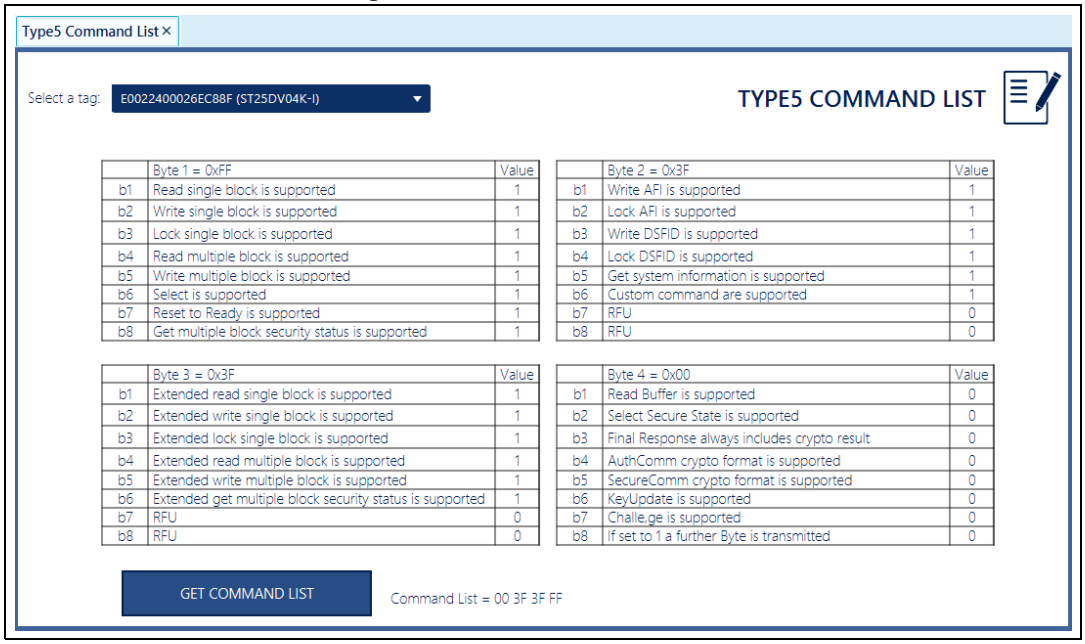
AFI & DSFID Editor menu allows the user to read, modify or lock the AFI and DSFID data (see *Figure 33*).

Figure 33. AFI & DSFID Editor menu



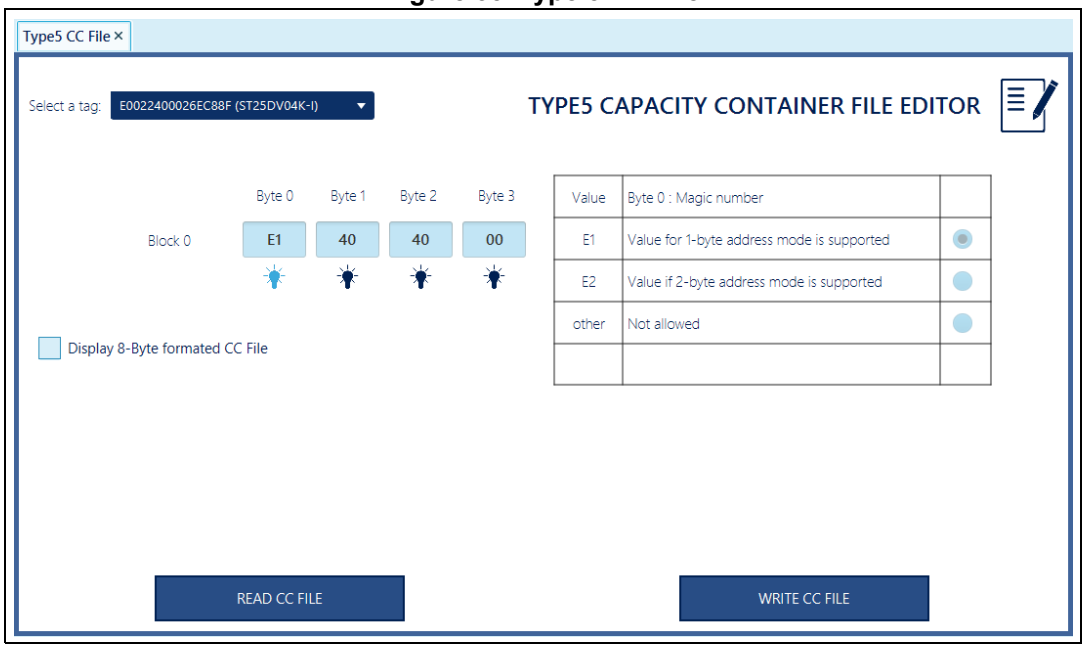
Commands List menu (see *Figure 34*) can be used to get the meaning of command list data available on latest Type 5 products.

Figure 34. Commands list menu



Type 5 CC File Editor menu displays a user interface useful to manage the CC file of any Type 5 tag (see *Figure 35*). Vicinity tags such as those of the M24LR series are also supported.

Figure 35. Type 5 CC File



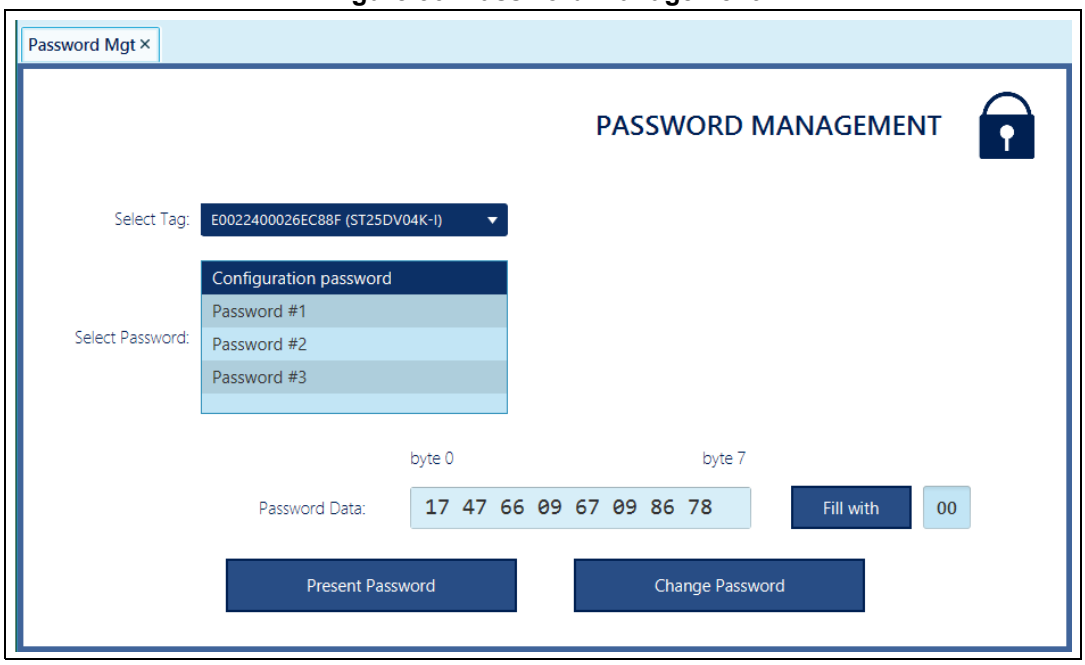
READ CC FILE button reads the CC file of the selected tag and displays it on the screen.

Clicking on each byte displays the information and the meaning of the byte, as described in the NFC Forum Type 5 specification.

WRITE CC FILE button writes the CC File as displayed on the screen in your selected tag. Extended CC file with an 8-byte formatted CC file is supported.

Password Manager menu (see *Figure 36*) displays a specific user interface to manage passwords. It is a generic tool that can be used on many STMicroelectronics products.

Figure 36. Password management



A *Select Tag* combo box contains all the tags identified by the Inventory process.

Depending on the tag, the *Select Password* field is updated with all supported passwords for the selected product.

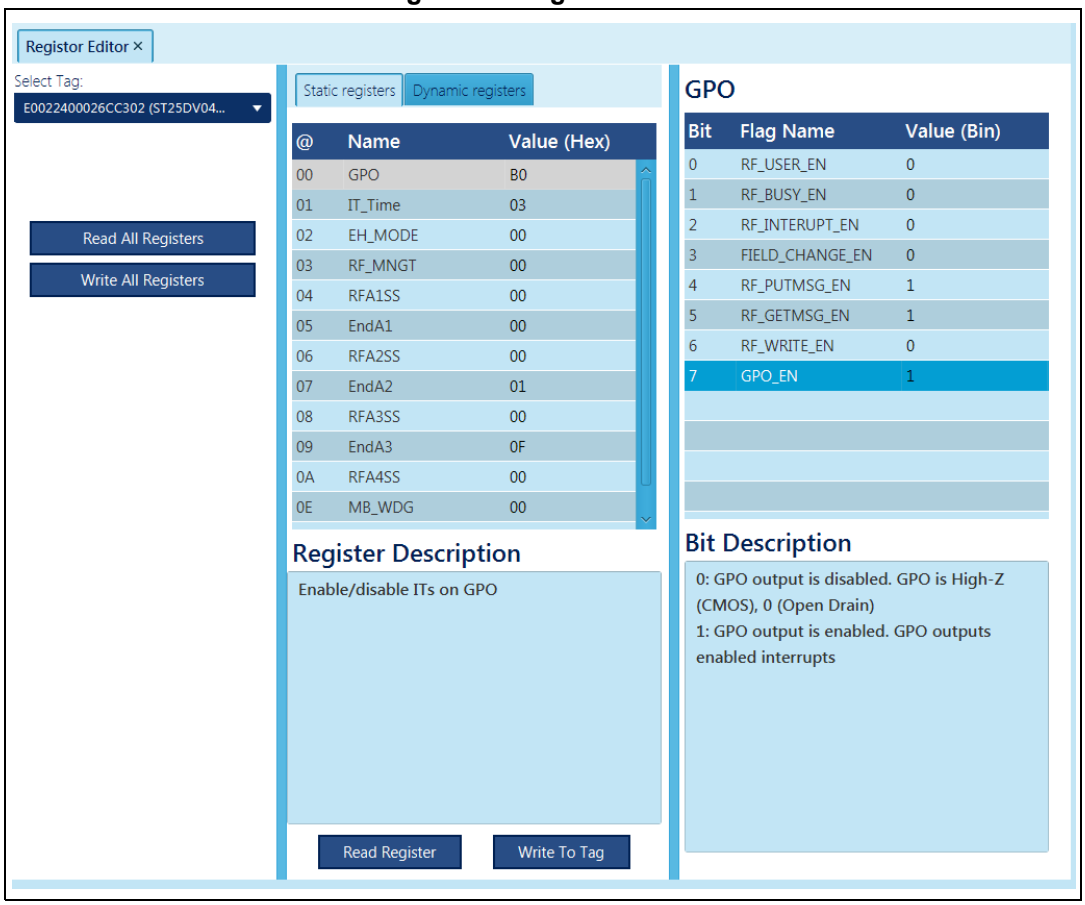
Password data field is used to set the value of the password to use.

Present Password button allows the user to present the selected password with *Password Data* field value to the selected tag.

Change Password button makes it possible to change the selected password.

Register Editor menu is used to manage specific registers of select tag. *Figure 37* is an example of the user interface for the ST25DV-I2C series. This interface is built according to the selected tag (static, dynamic registers).

Figure 37. Register editor



Read All Registers button is available to read all registers at once.

Write All Registers button can be used to write all registers with the Value indicated in the third column. You can change value for any register by double-clicking on any field.

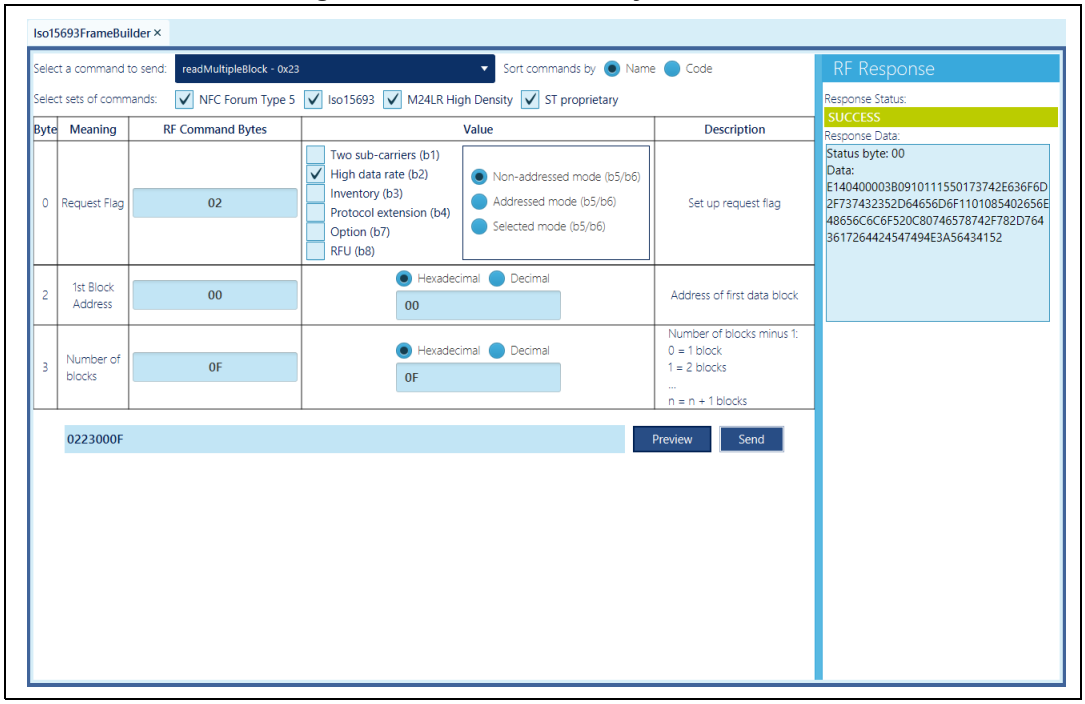
Read Register and *Write To Tag* button lets the user process a single register at a time, click on a specific register to select the one to be read or to be written.

Unitary Commands menu displays a user interface able to manage all ISO 15693 commands and proprietary commands. This tool is helpful to understand and control the ISO 15693 protocol or to test the behavior of a tag for any command.

Select a command to send box contains ISO 15693, Type 5 and STMicroelectronics proprietary commands. The user interface is automatically updated will all the field. The user can fill each field and send the command to the tag present within the reach of the reader RF antenna.

Unitary Commands menu is helpful to send any ISO15693 command or any proprietary command to the tags. *Figure 38* shows an example of the read multiple block command.

Figure 38. ISO 15693 unitary commands



All necessary fields are displayed following the format of each command. Each field can be modified.

Send button sends the RF frame with all field values.

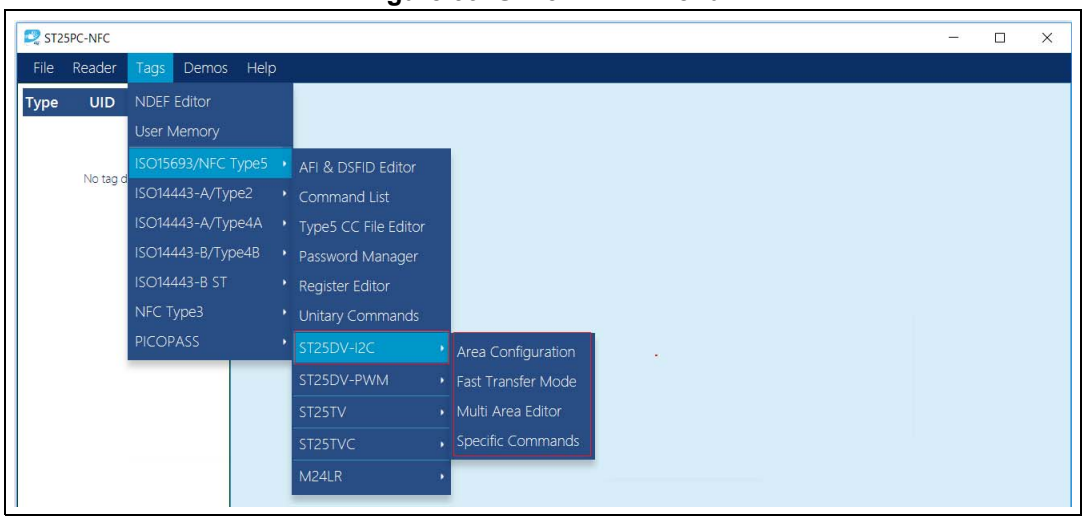
RF Response part of the user interface displays the answer of the tag, if any.

5.3.2 ST25DV-I2C menu

ST25DV-I2C menu displays a sub-menu containing all the specific features of this series:

- Area configuration
- Fast transfer mode
- Multi area editor
- Specific commands

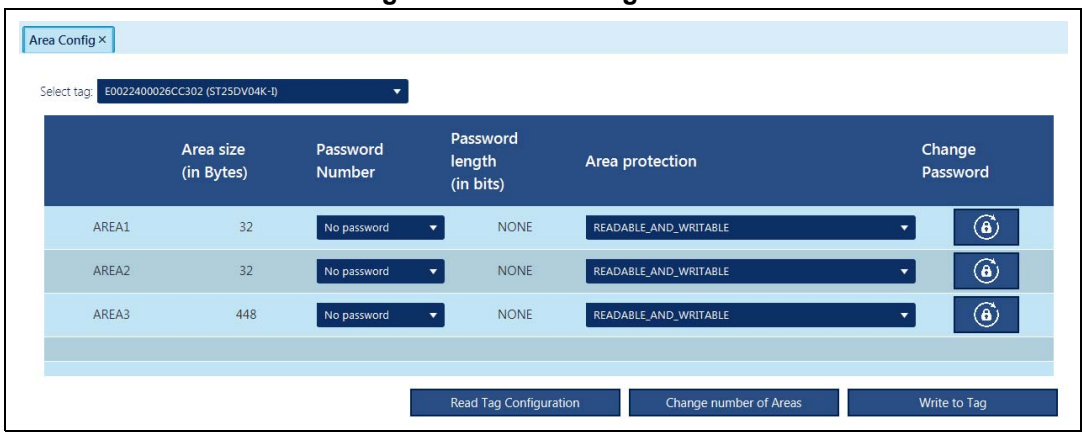
Figure 39. ST25DV-I2C menu



Area Configuration menu displays the user interface that can be used to read and write protection for each area of the selected tag. This user interface is automatically updated depending on the selected tag and its configuration (ST25DV-I2C series can be split in up to four areas, whereas products of the ST25TV series have only one or two areas).

Figure 40 shows an example of ST25DV04K configured with three areas, not protected by any password.

Figure 40. Area configuration

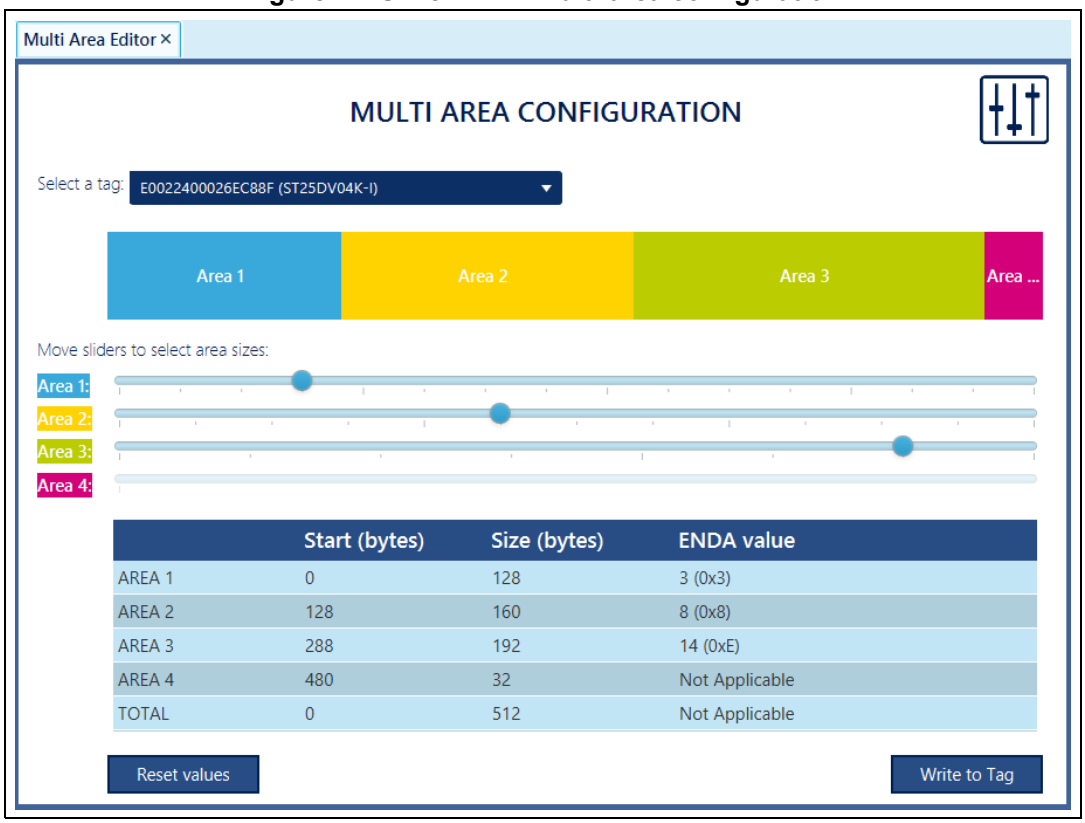


Area protection column can be used to change the protection of areas, while *Password Number* column can be used to select the password number. *Write to Tag* button applies the modifications done in the user interface to the tag.

The *Multi Area Editor* menu displays a user interface useful to configure the memory partition for ST25DV-I2C Dynamic tags.

Figure 41 is an example of a ST25DV04K tag configured with four areas. *Start and Size* fields describes the characteristics of each area. ENDA value field is the value of the register defining the areas.

Figure 41. ST25DV-I2C multi-area configuration



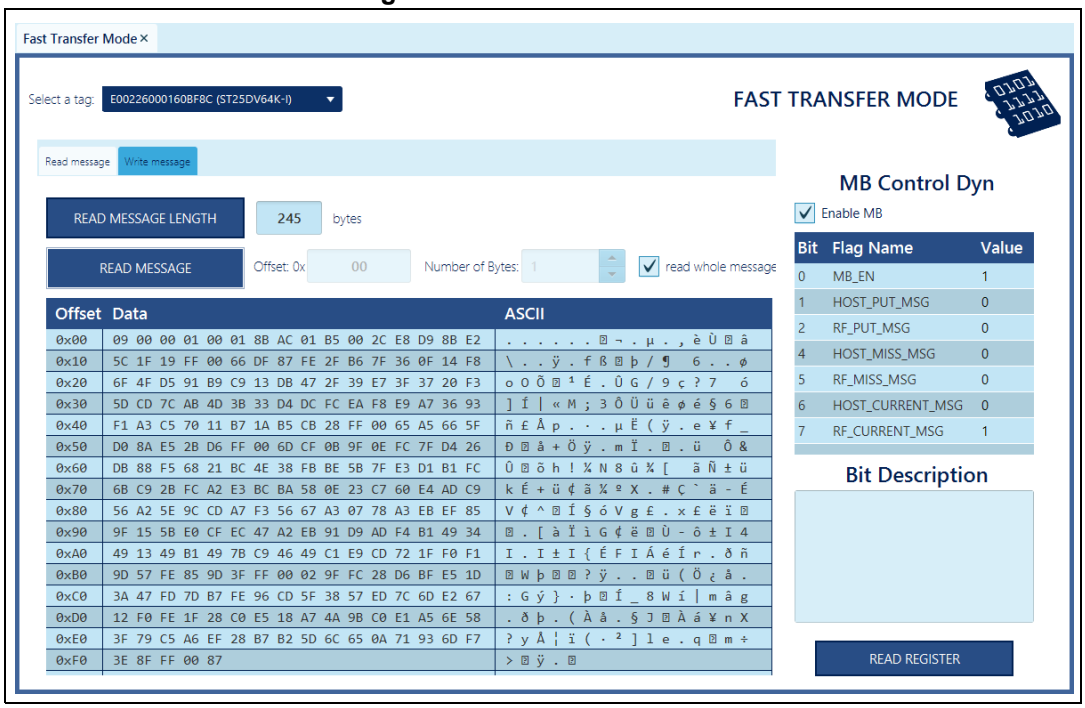
Use the scrollbars to change the size of each area or to reduce the number of areas. *Write to Tag* button will modify the registers of your selected tag to match the modifications.

Each area is represented by a color, the same used in the User Memory user interface.

Fast Transfer Mode menu displays a user interface able to manage the mailbox of the FTM (fast transfer mode) features. This is a specific feature of the ST25DV-I2C tags, useful to communicate between an RF reader and an MCU very quickly, without using the EEPROM.

Figure 42 shows the user interface that allows the user to read FTM length and data, and write FTM. It can be used to read FTM dynamic register values and check its behavior when using the FTM.

Figure 42. Fast transfer mode

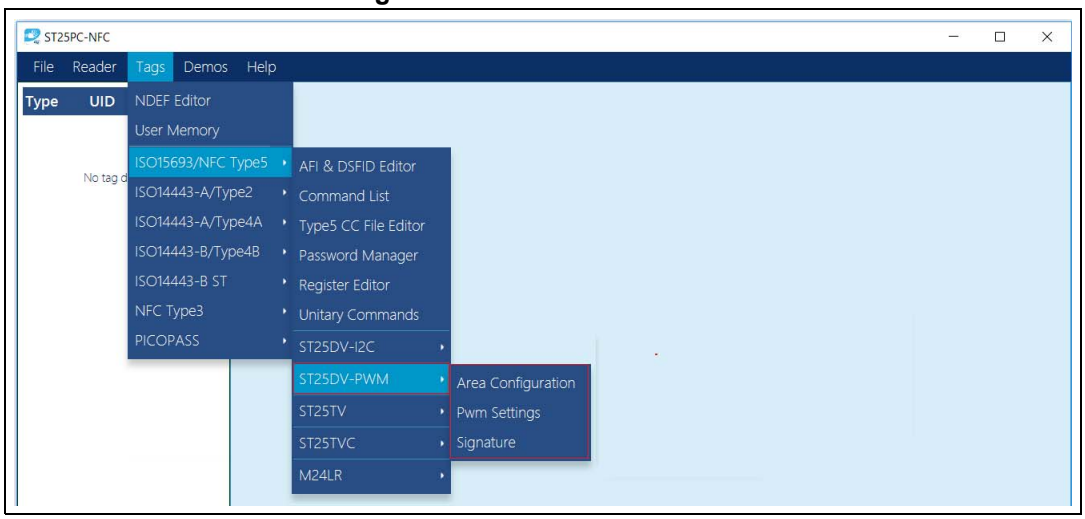


5.3.3 ST25DV-PWM menu

ST25DV-PWM menu displays a sub-menu containing all the specific features of the ST25DV-PWM series.

- *Area Configuration* menu (as described in *Section 5.3.2*). This interface allows the user to configure the ST25DV-PWM with one or two areas.
- *PWM Settings* menu displays a user interface that can be used to manage PWM (pulse width modulation) configuration.
- *Signature menu* allows the user to read and verify the TruST25 signature. To activate this feature contact your ST sales office.

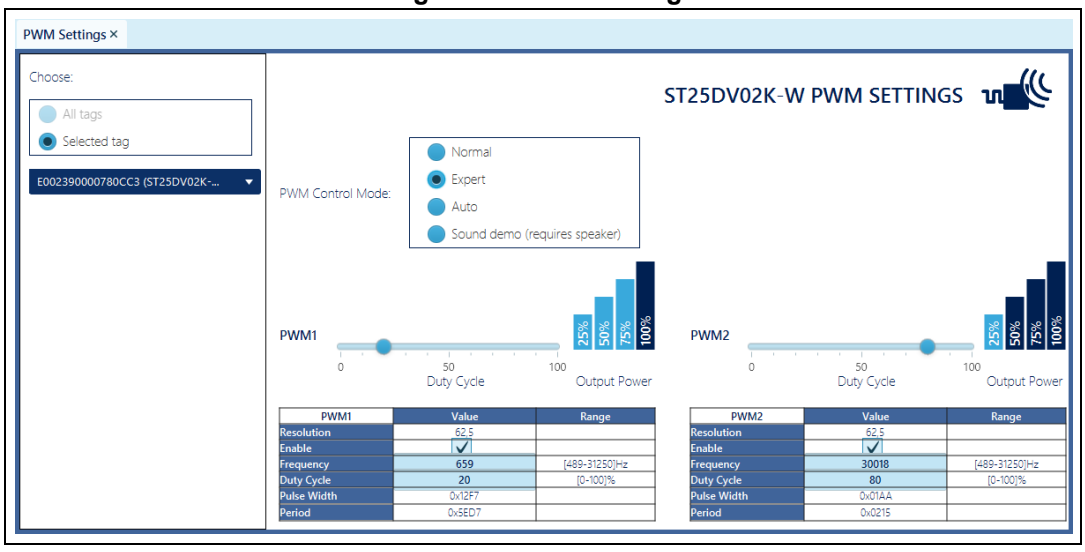
Figure 43. ST25DV-PWM menu



Use *PWM Setting* menu to configure the PWM feature of a selected ST25DV-PWM tag.

Figure 44 shows the PWM features of the ST25DV02K-W2. This product contains two PWMs, while the ST25DV02K-W1 contains only one.

Figure 44. PWM settings



PWM Control Mode selector selects different usages:

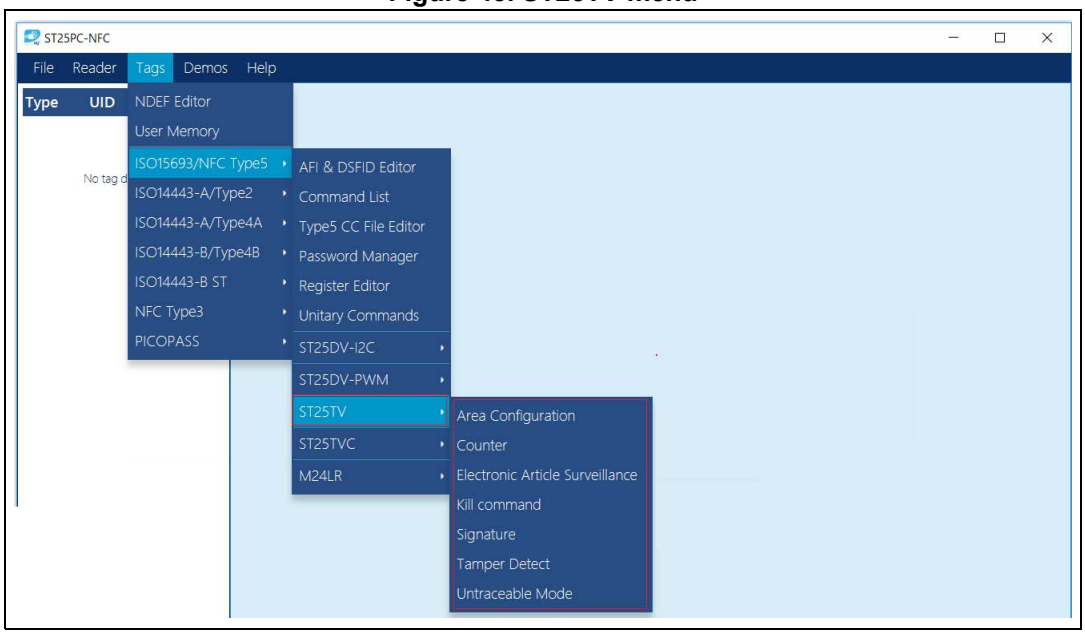
- *Normal* mode allows the user to change PWM setting by moving the slider, changing the duty cycle value. An RF command is automatically send to the ST25DV-PWM tag to apply new settings to the PWM register.
- *Expert* mode allows the user to modify each specific field, changing frequency or duty cycle. The PWM register is automatically updated following changes.
- *Auto* mode changes PWM settings automatically. This mode can be used with the ST25DV-PWM-eSET board.

5.3.4 ST25TV menu

ST25TV menu (*Figure 45*) displays a sub-menu containing all the specific features of the ST25TV series.

- *Area Configuration* menu (as described in *Section 5.3.2*)
- *Counter* menu
- *Electronic Article Surveillance* menu
- *Kill command* menu
- *Signature* menu, to read and verify the TruST25 signature. To activate this feature contact your ST sales office.
- *Tamper Detect* menu
- *Untraceable Mode* menu

Figure 45. ST25TV menu



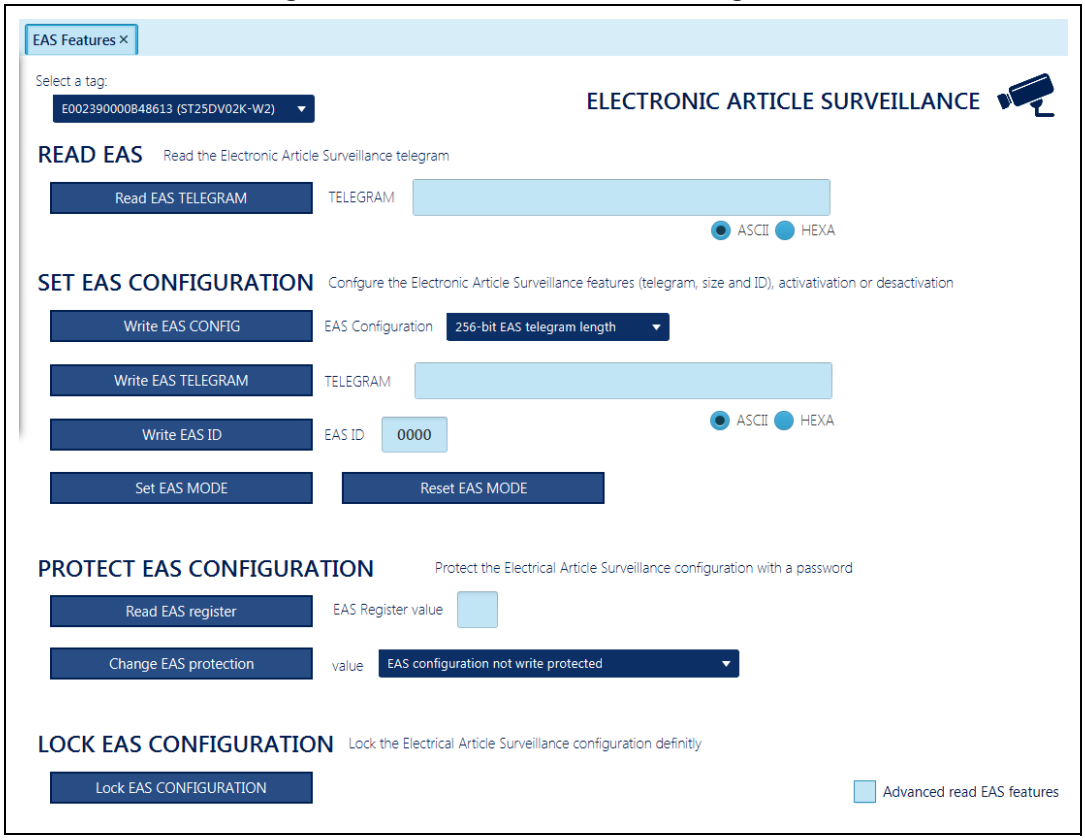
Counter menu user interface can be used to manage the counter of a ST25TV tag.

Figure 46. ST25TV counter

Read button can be used to read the value of the counter. Using *Clear* button, the user is able to clear the counter value. As defined by the datasheet, a password is required. The *Password Management* user interface appears to request the correct password.

Electronic Article Surveillance menu displays the user interface, as shown in *Figure 47*. This UI allows the user to read the EAS telegram, to configure it, and to set specific protections.

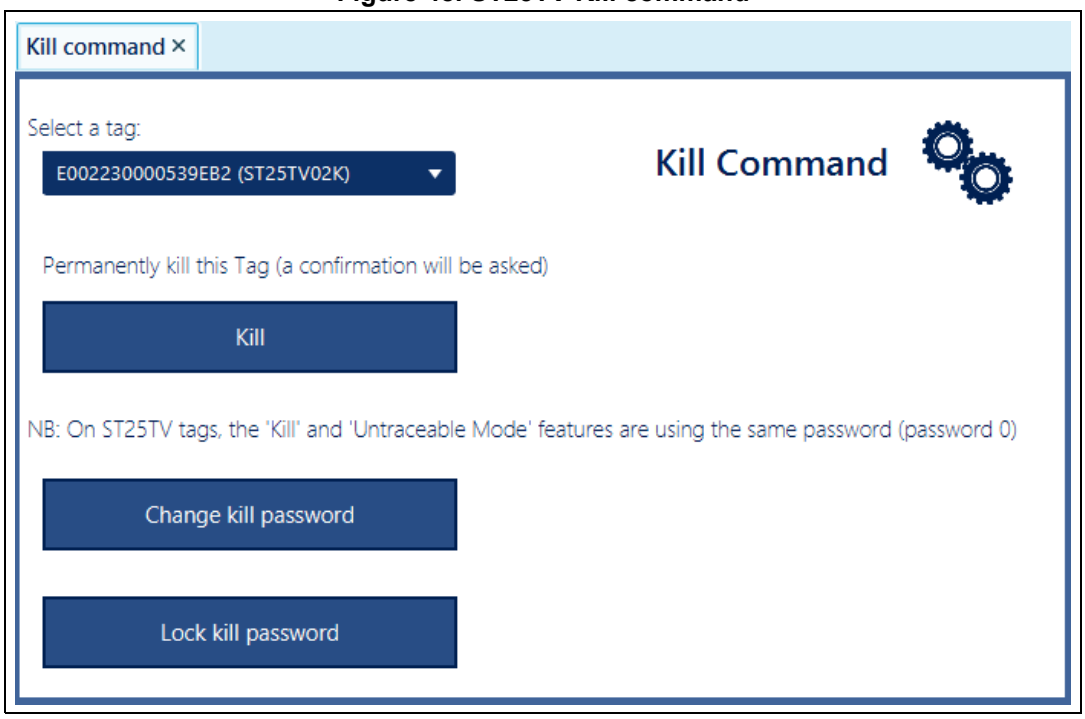
Figure 47. ST25TV electrical article signature



Advance read EAS features selector displays additional commands according to ST25TV series datasheets.

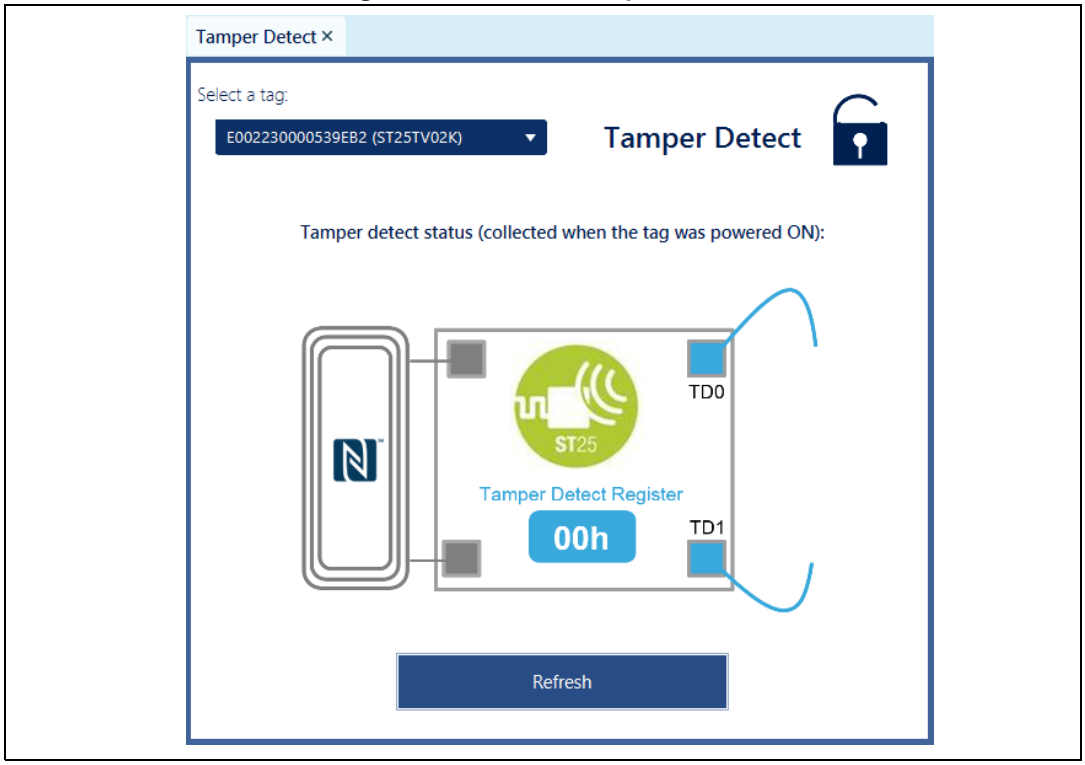
Kill commands menu displays a user interface to manage Kill feature. This user interface has to be used with care, as it is a non-reversible feature.

Figure 48. ST25TV Kill command



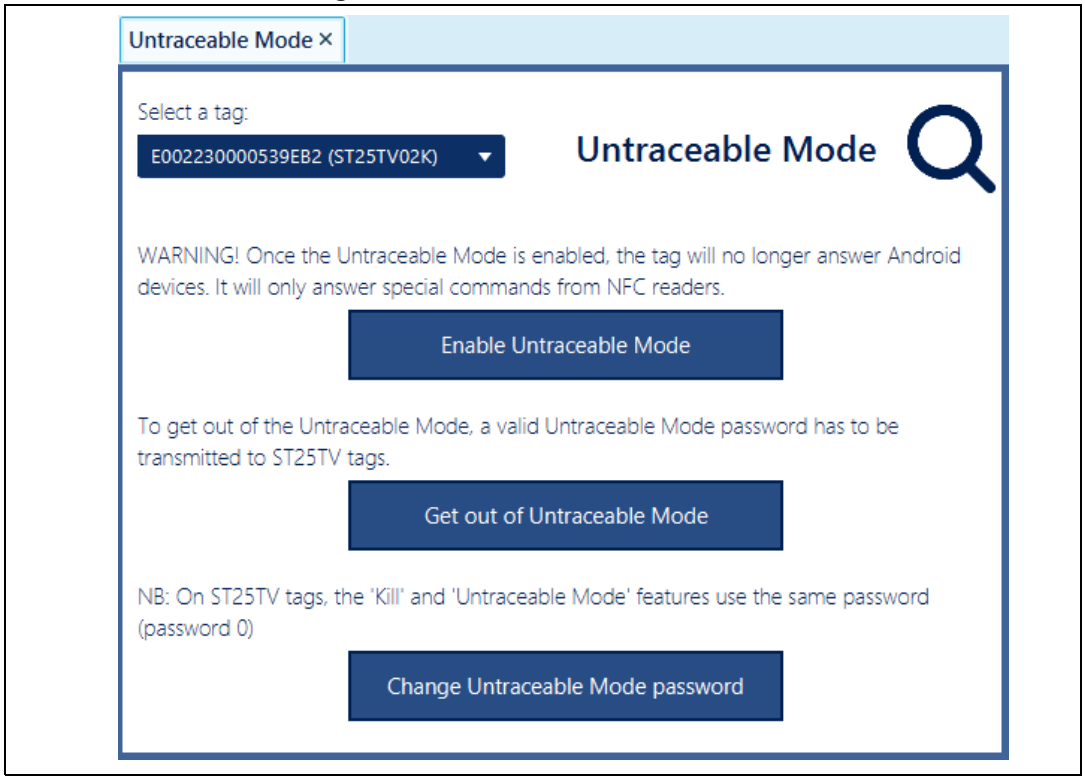
Tamper Detect menu demonstrates the behavior of the tamper detect feature. If an ST25TV tag is present on the RF antenna of the reader, as soon as a Tamper detect screen is opened, some commands are sent to the ST25TV tag to read the status of the detector. Depending on this status, the TDO/TD1 wire is shown as open or shorted. *Figure 49* shows an example of ST25TV tag with the Tamper detect opened. Click on *Refresh* button to read again the Tamper detect register and display its new status.

Figure 49. ST25TV Tamper detect



Untraceable Mode menu displays a user interface to manage Untraceable Mode feature. *Figure 50* shows this user interface.

Figure 50. ST25TV Untraceable Mode



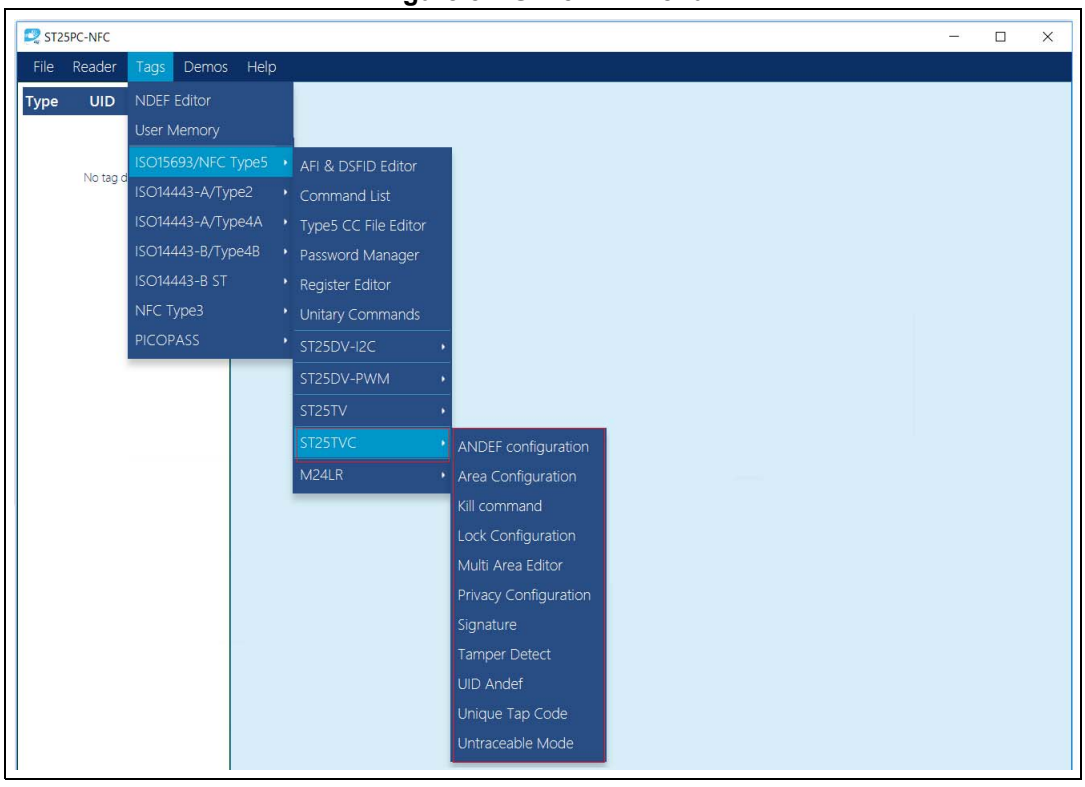
Enable Untraceable Mode, *Get out of Untraceable Mode* and *Change Untraceable Mode password* buttons can be used to manage this specific feature.

5.3.5 ST25TVC menu

ST25TVC menu (*Figure 51*) displays a sub-menu containing all the specific features of the ST25TVC series:

- *ANDEF Configuration* menu
- *Area Configuration* menu (described in *Section 5.3.2*)
- *Kill command* menu (described in *Section 5.3.4*)
- *Multi Area Editor* menu (described in *Section 5.3.2*)
- *Lock Configuration* menu
- *Privacy Configuration* menu
- *Signature* menu, to read and verify the TruST25 signature. To activate this feature contact your ST sales office.
- *Tamper Detect* menu
- *UID ANDEF* menu
- *Unique Tap Code* menu
- *Untraceable Mode* menu (described in *Section 5.3.4*)

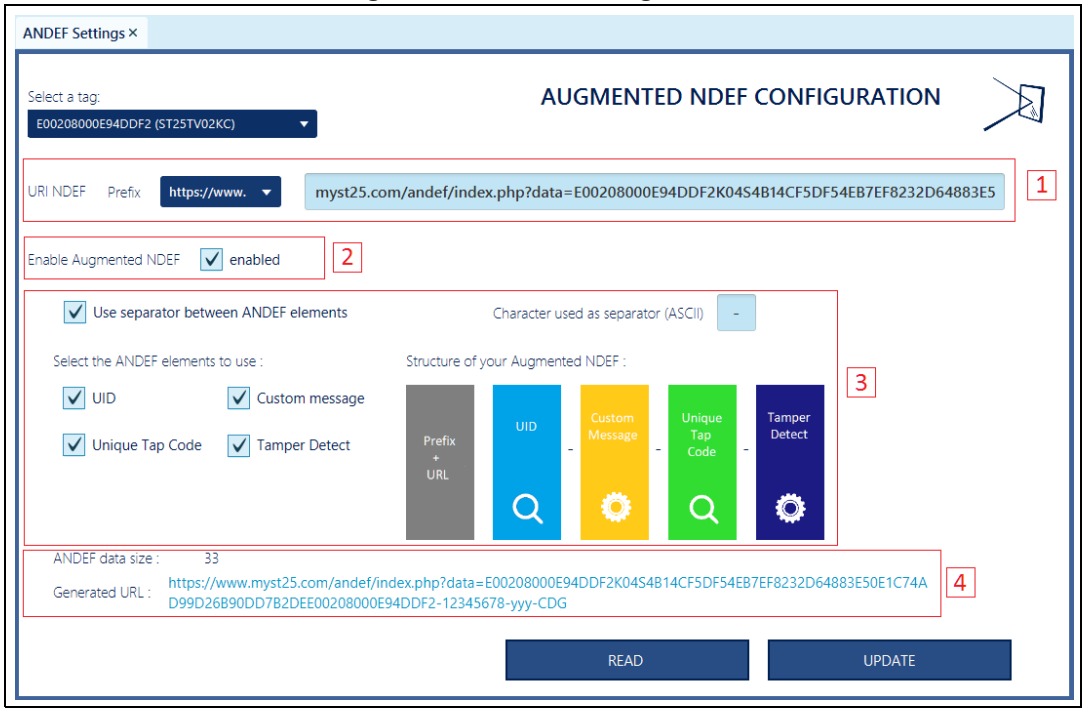
Figure 51. ST25TVC menu



ANDEF Configuration user interface allows the user to configure the Augmented NDEF features of the ST25TVC tag. With reference to *Figure 52*:

- Part [1]: configures the NDEF prefix and the NDEF URI content. This is the static part of the NDEF message containing an URI record.
- Part [2]: activates (or disactivates) the Augmented NDEF feature.
- Part [3]: configures the dynamic part of the NDEF message that completes (augments) the URI record.
- Part [4]: contains the size of the ANDEF part of the URI. The generated URL describes the final URL record that the tag displays with the activation of the ANDEF feature.

Figure 52. ANDEF configuration



Read button can be used to read the ANDEF configuration of the selected tag. The ANDEF configuration user interface changes according to the tag content.

Update button applies to the tag the change(s) done on the user interface.

Several items can be added or removed on ANDEF message, such as the tag UID, an 8-character custom message, the unique tap code value and the tamper detect characteristics:

- click on *Tamper Detect* picture to display Tamper Detect configuration user interface
- click on *Unique Tap Code* picture to display Unique Tap Code user interface
- click on *UID* picture to read the tag UID (*Figure 53*)
- click on *Custom Message* picture to edit Custom Message (*Figure 54*), and then click on *Read* / *Update* button, to, respectively, read / modify Custom Message value.

Figure 53. UID

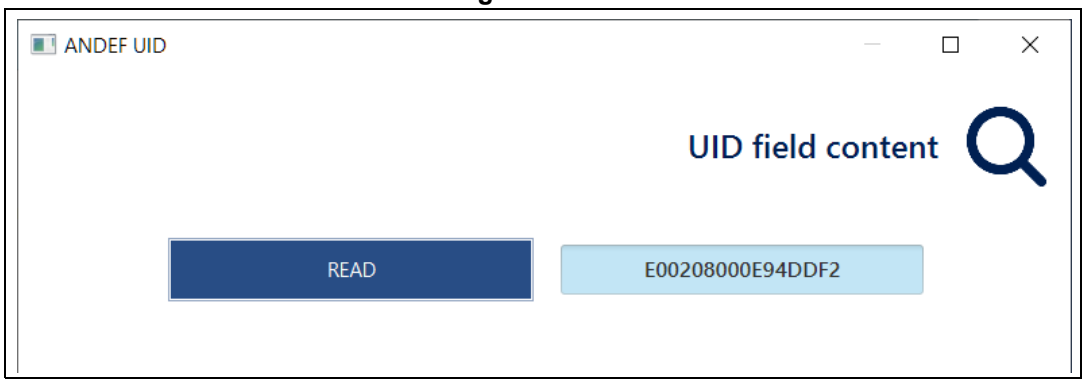
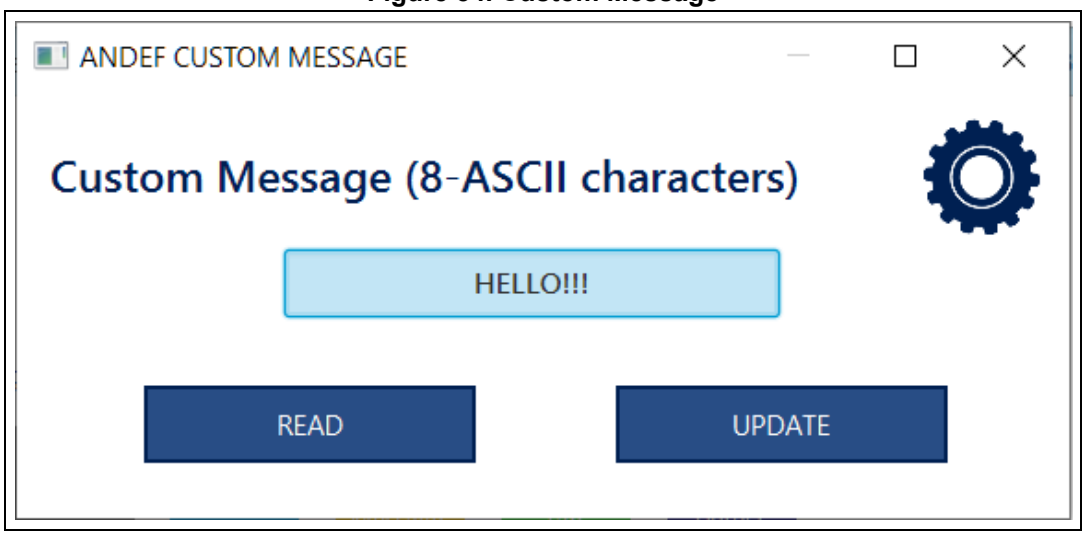
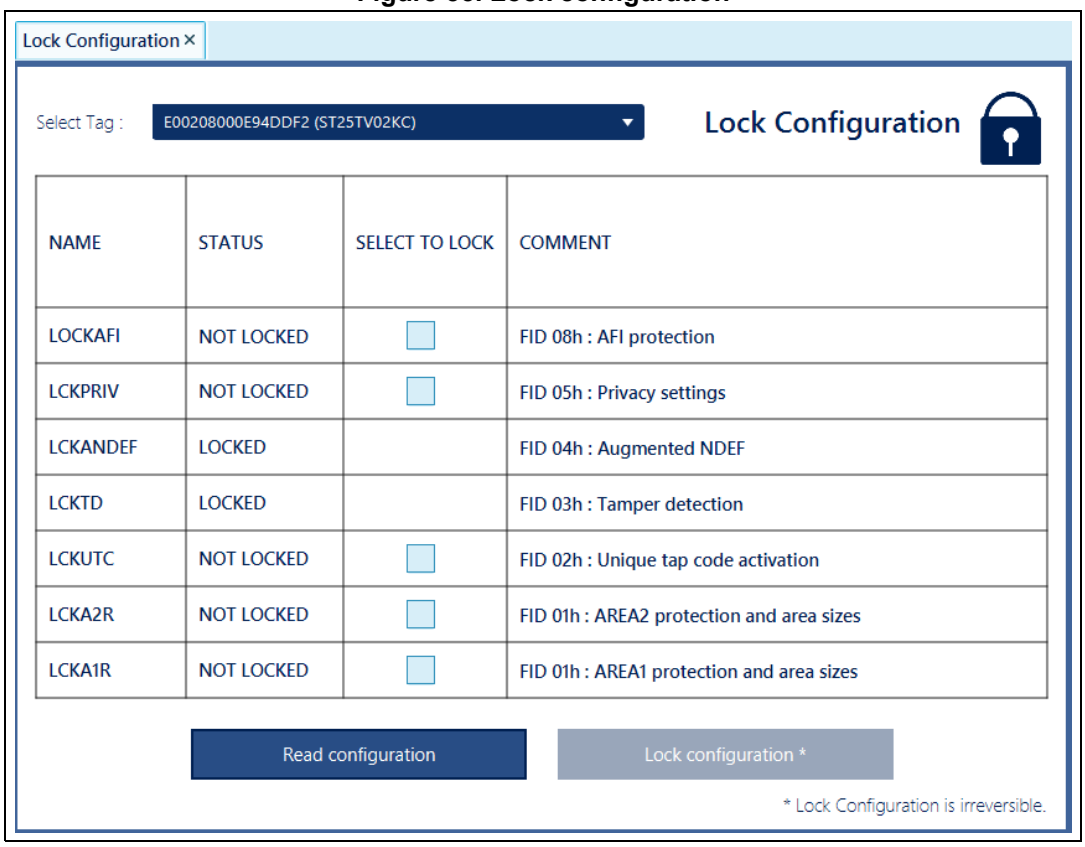


Figure 54. Custom Message



Lock Configuration user interface can be used to prevent modifications. This action is non-reversible.

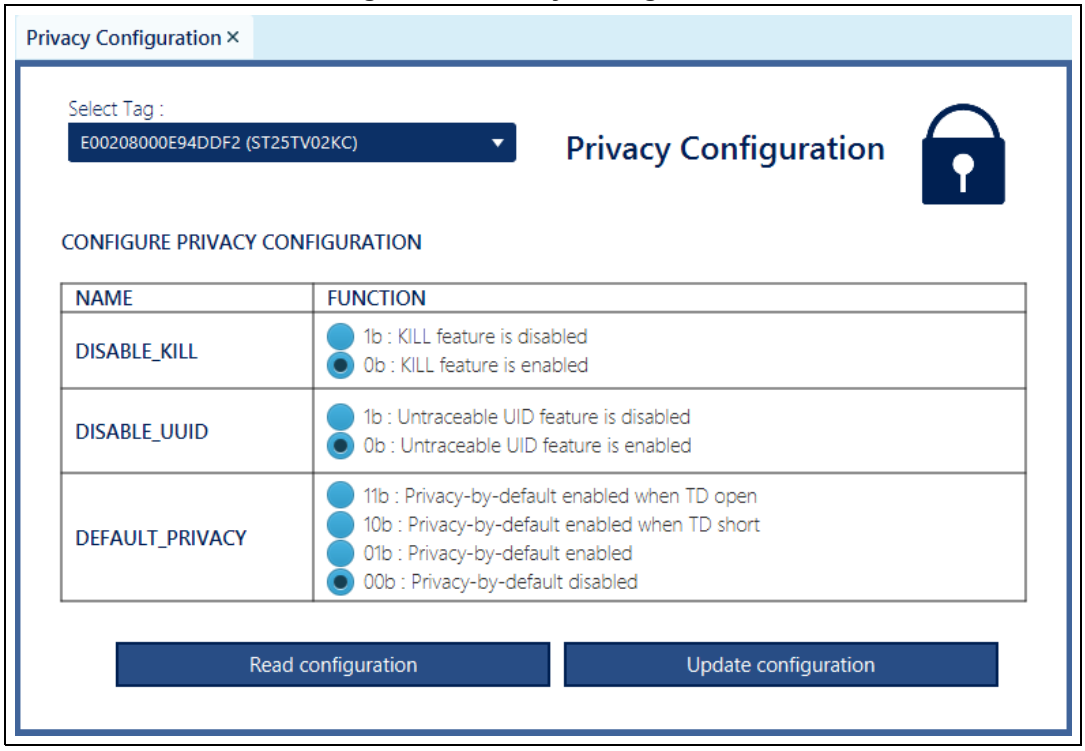
Figure 55. Lock configuration



Read Configuration button can be used to read the lock configuration of the selected tag. After selecting features to be locked, click on *Lock configuration* button to lock it.

Privacy Configuration user interface (*Figure 56*) can be used to configure the privacy settings of ST25TVC tags.

Figure 56. Privacy Configuration

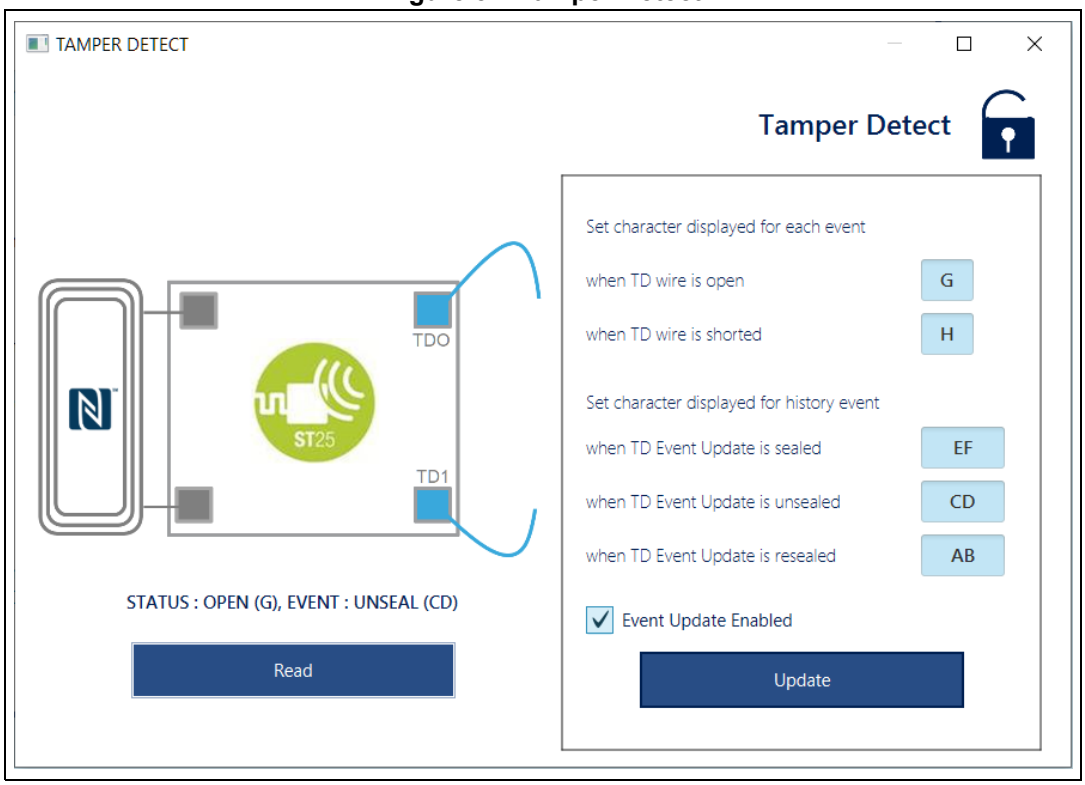


Read configuration button can be used to read the configuration of the selected tag.

After having modified the privacy parameters, click on *Update configuration* button to change the settings.

Tamper Detect menu demonstrates the behavior of the tamper detect feature. If an ST25TVC tag is present on the RF antenna of the reader, as soon as a *Tamper Detect* screen is opened, some commands are sent to the ST25TVC tag to read the status of the detector. Depending on this status, the TDO/TD1 wire is shown as open or shorted. *Figure 57* shows an example of an ST25TVC tag with the *Tamper Detect* opened.

Figure 57. Tamper Detect



Click on *Read* button to read again the tamper detect register and display its new status.

Update button can be used to personalize parameters such as the values for its state. *Tamper Detect* status and event are part of Augmented NDEF features and can be added as well.

Unique Tap Code (*Figure 58*) user interface can be used to read the value of the UTC or to enable/disable it.

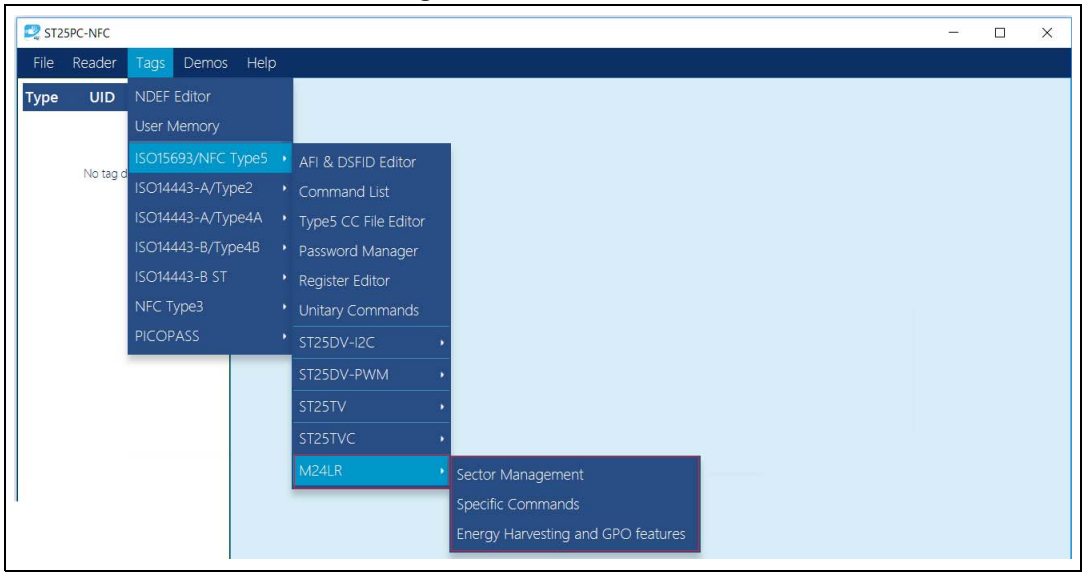
Figure 58. Unique tap code

Read button can be used to read the Unique Tap Code value, click on check-box to enable or disable it.

5.3.6 M24LR menu

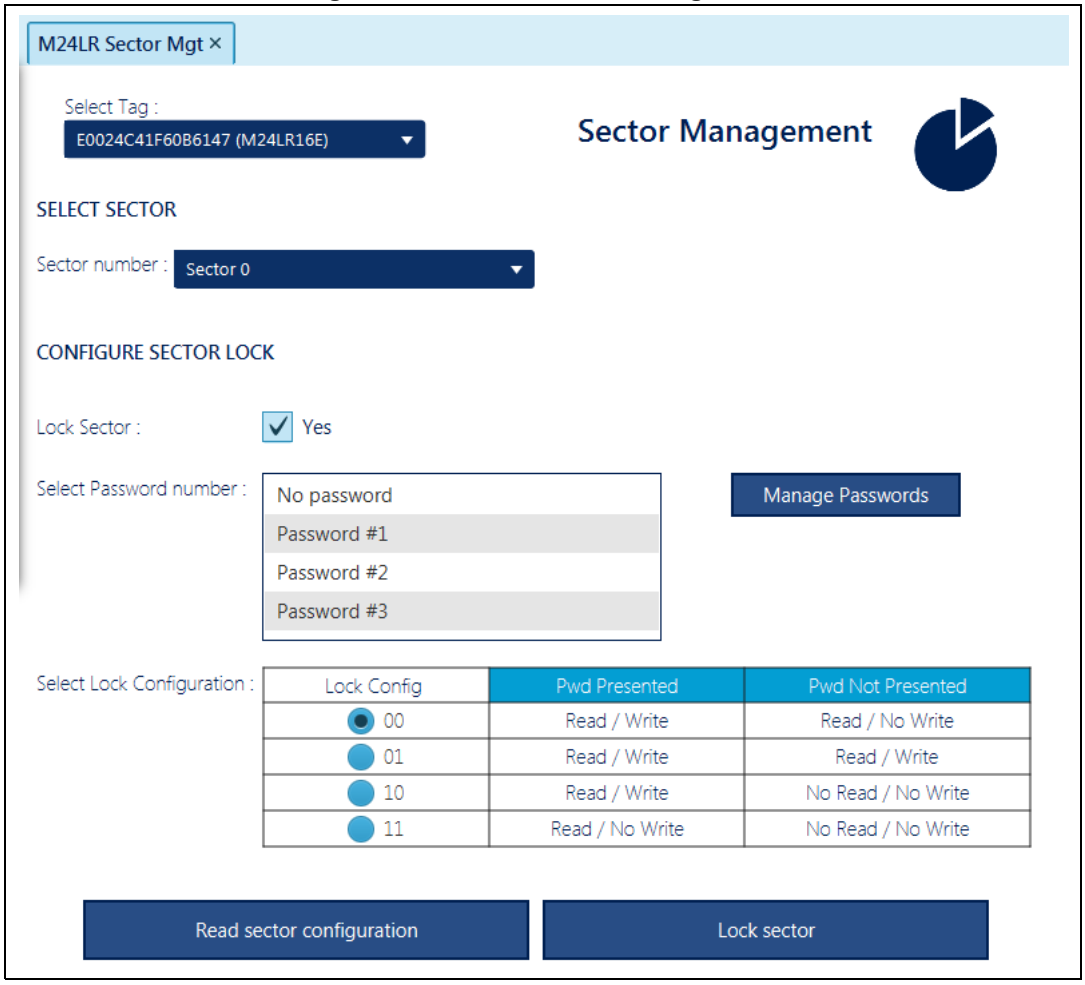
M24LR menu (*Figure 59*) allows the user to play with specific commands of the M24LR series or to manage sector passwords.

Figure 59. M24LR menu



Sector Management menu (*Figure 60*) displays a user interface to manage the sectors of any M24LR tag.

Figure 60. M24LR sector management



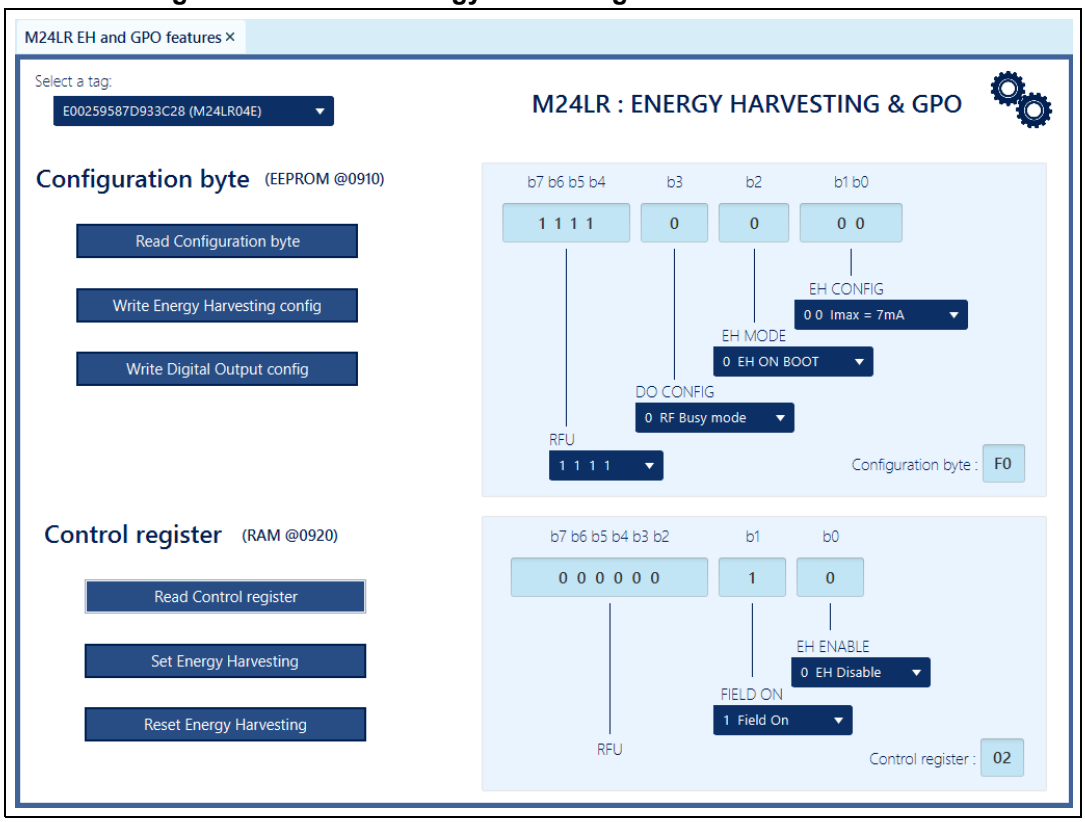
Read sector configuration button reads the configuration of the selected tag. As soon as the configuration is read, the user can select a Sector number and the configuration of the selected sector is displayed on the screen:

- Lock sector status
- Password number that lock this sector
- Lock configuration value

Lock sector button can be used to lock any sector with a specific configuration. Select the sector number, choose the password number (if needed) and select the lock configuration. *Lock sector* button will apply the selected configuration to the selected tag.

Energy Harvesting and GPO features menu (*Figure 61*) displays a user interface useful to manage GPO Mode and Energy Harvesting configuration.

Figure 61. M24LR - Energy Harvesting and GPO features menu

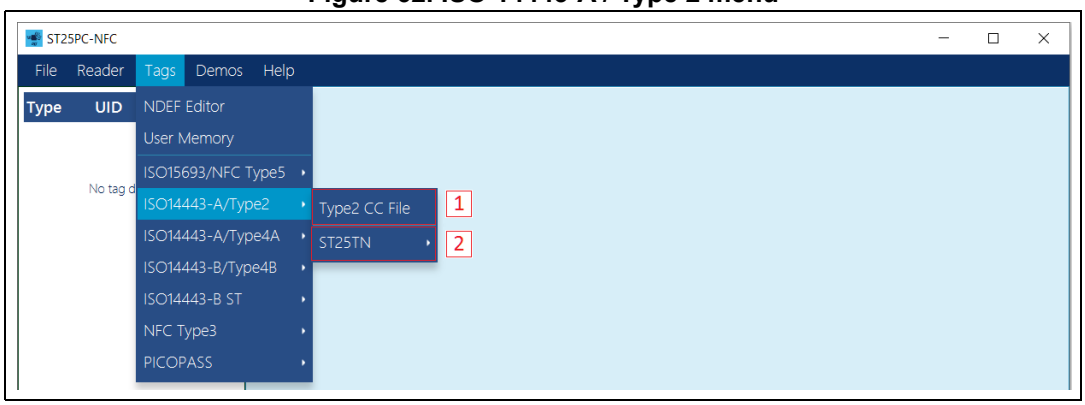


5.4 ISO14443-A / Type 2 menu

ISO14443-A / Type 2 can be divided in two parts, as shown in *Figure 62*:

1. Part [1] describes the user interfaces (described in detail in *Section 5.4.1: Generic features*) available for Type 2 products.
2. Part [2] lists the STMicroelectronics product series and contains specific features for each of them.

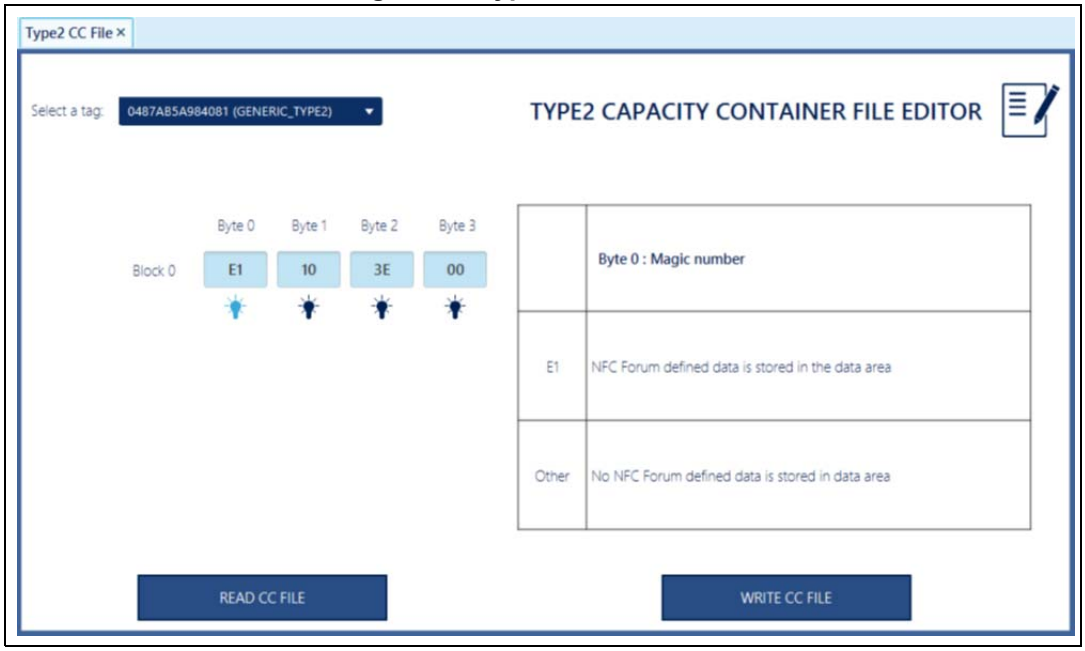
Figure 62. ISO 14443-A / Type 2 menu



5.4.1 Generic features

Type2 CC File menu (see *Figure 63*) displays a user interface useful to read and decode the capacity container file of a Type 2 tag.

Figure 63. Type 2 CC File menu

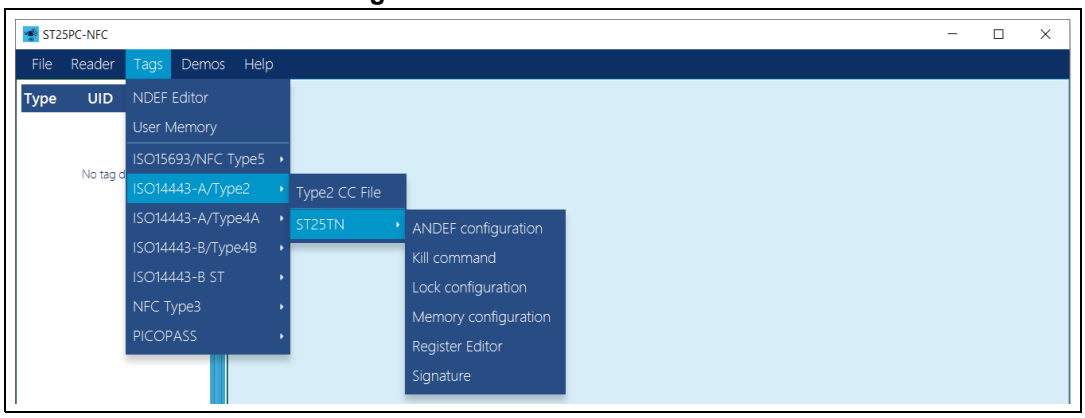


5.4.2 ST25TN menu

ST25TN menu (see *Figure 64*) displays a sub-menu containing all the specific features of the ST25TN series.

- *ANDEF Configuration*
- *Kill Command* (described in *Section 5.3.4: ST25TV menu*)
- *Lock Configuration*
- *Memory Configuration*
- *Register Editor* (described in *Section 5.3.1: Generic features*)
- *Signature*, to read and verify the TruST25 signature. To activate this feature contact your ST sales office.

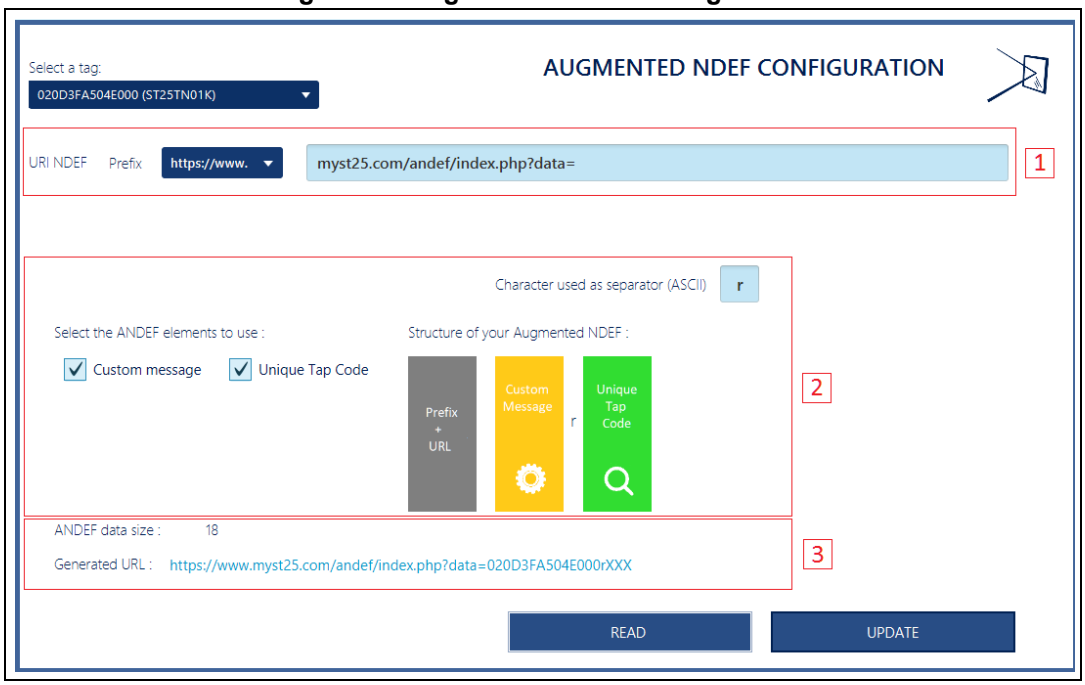
Figure 64. ST25TN series menu



ANDEF Configuration user interface allows the user to configure the Augmented NDEF features of the ST25TN tag. With reference to *Figure 65*:

1. Part [1]: configures the NDEF prefix and the NDEF URI content. This is the static part of the NDEF message containing an URI record.
2. Part [2]: configures the dynamic part of the NDEF message that completes (augments) the URI record.
3. Part [3]: contains the size of the ANDEF part of the URI. The generated URL describes the final URL record that the tag displays with the activation of the ANDEF feature.

Figure 65. Augmented NDEF configuration



Read button can be used to read the ANDEF configuration of the selected tag. The user interface changes according to the tag content.

Update button applies to the tag the change(s) done on the user interface.

Several items can be added or removed on ANDEF message, namely an 8-character custom message (*Figure 66*) and the unique tap code value (*Figure 67*).

Click on *Custom Message* picture to edit it, and then click on Read / Update button, to, respectively, read / modify its value.

A unique tap code can be enabled or disabled using check box. The configuration (Enable / Disable) can be read, but the UTC value cannot be read directly (it is displayed in ANDEF message).

Figure 66. Custom message

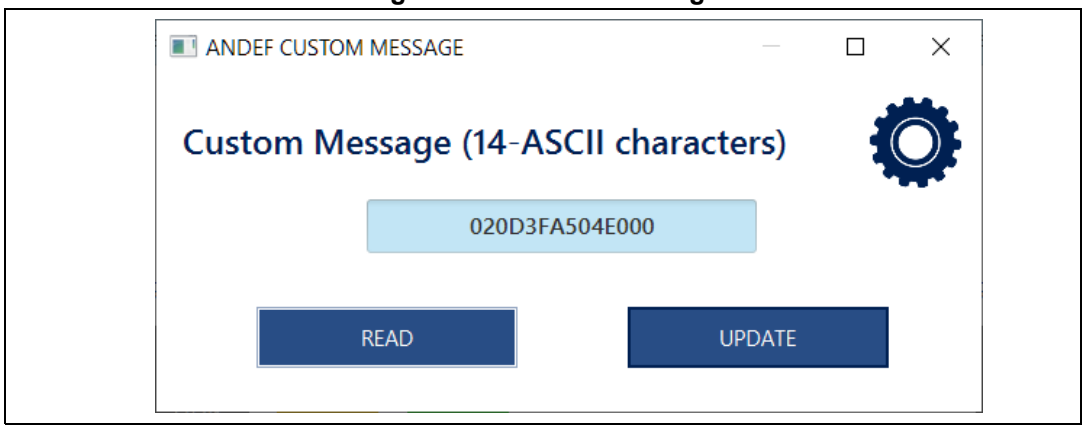


Figure 67. Unique tap code

Lock Configuration user interface can be used to lock blocks of the ST25TN memory. Some lock bits can be set to lock some blocks. Others lock bits can be used to lock the lock bits. This action is non-reversible.

Figure 68. Lock configuration (first panel)

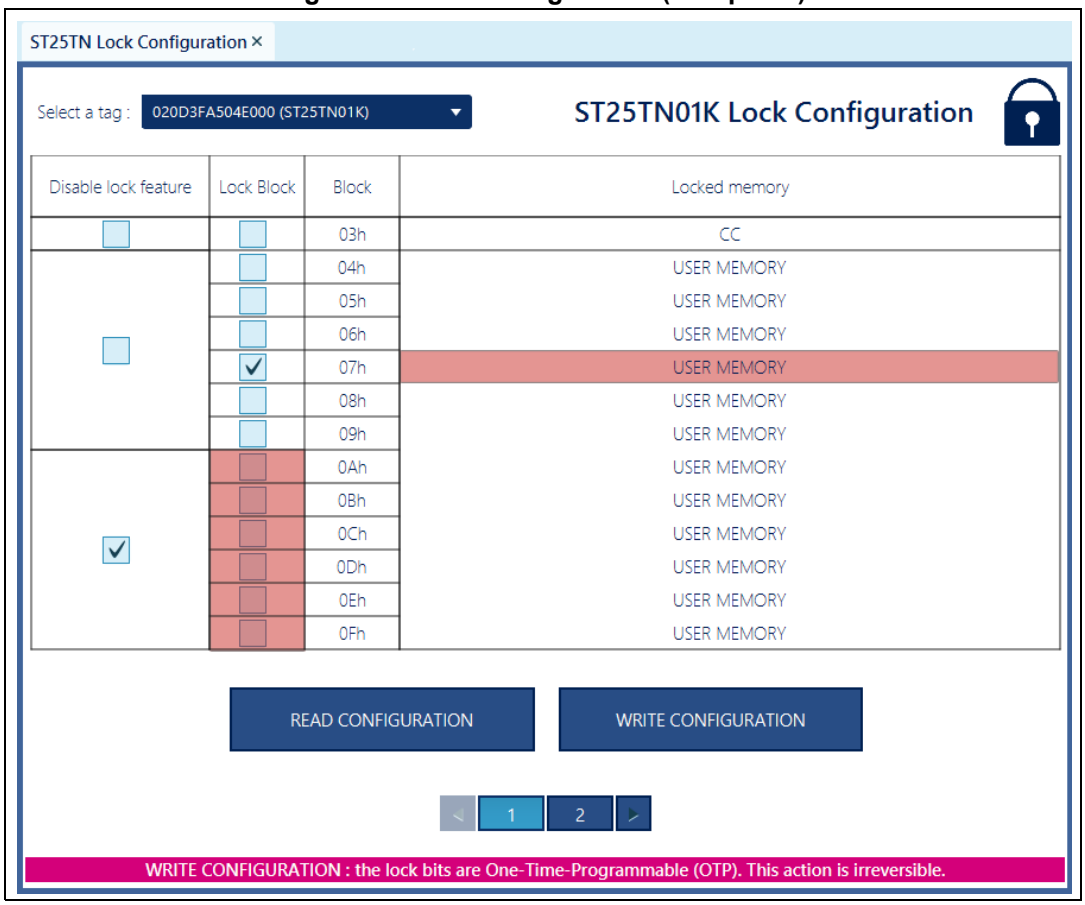
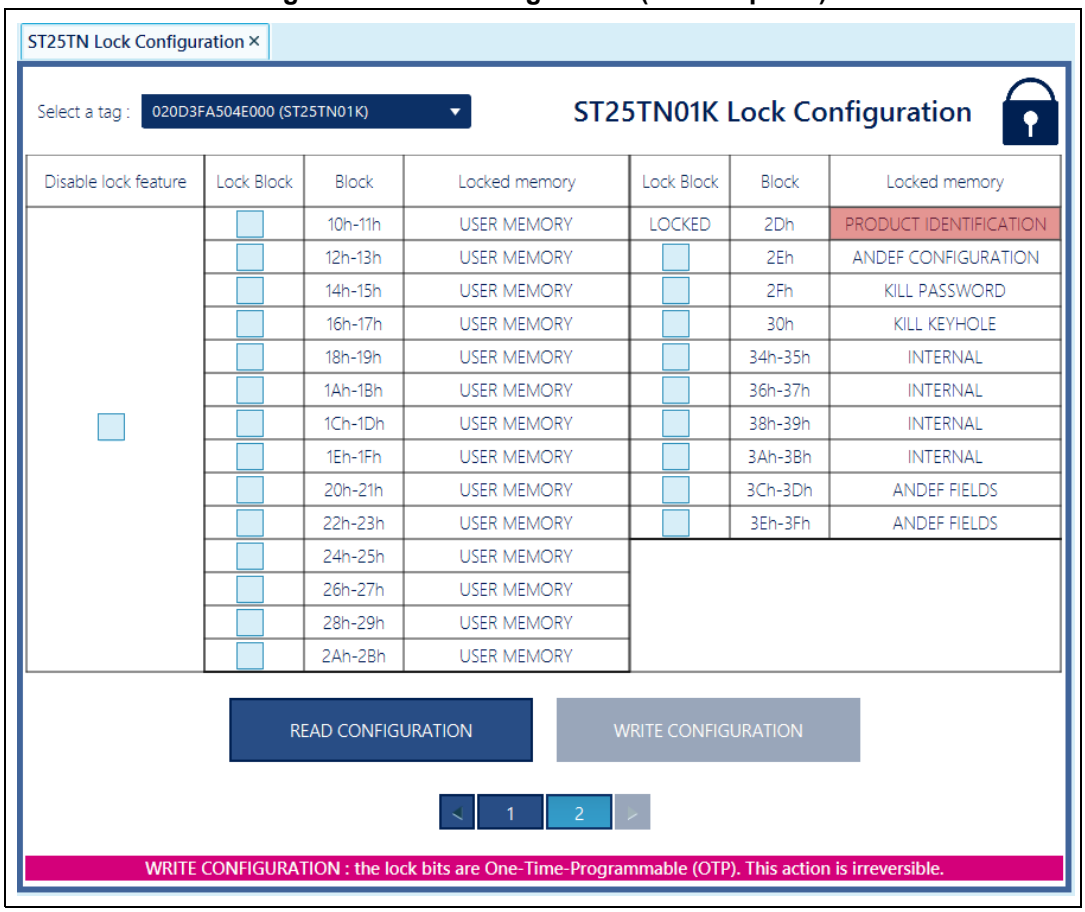


Figure 69. Lock configuration (second panel)



Read Configuration button can be used to read the lock configuration of the selected tag. After selecting features to be locked, click on *Write configuration* button to lock it.

Memory Configuration user interface can change the configuration of the memory. This action is non-reversible and can damage the tag.

Figures *70*, *71* and *72* display, respectively, the Default, the Extended mode 1 and the Extended mode 2 configurations of the ST25TN.

Figure 70. ST25TN - Default mode configuration

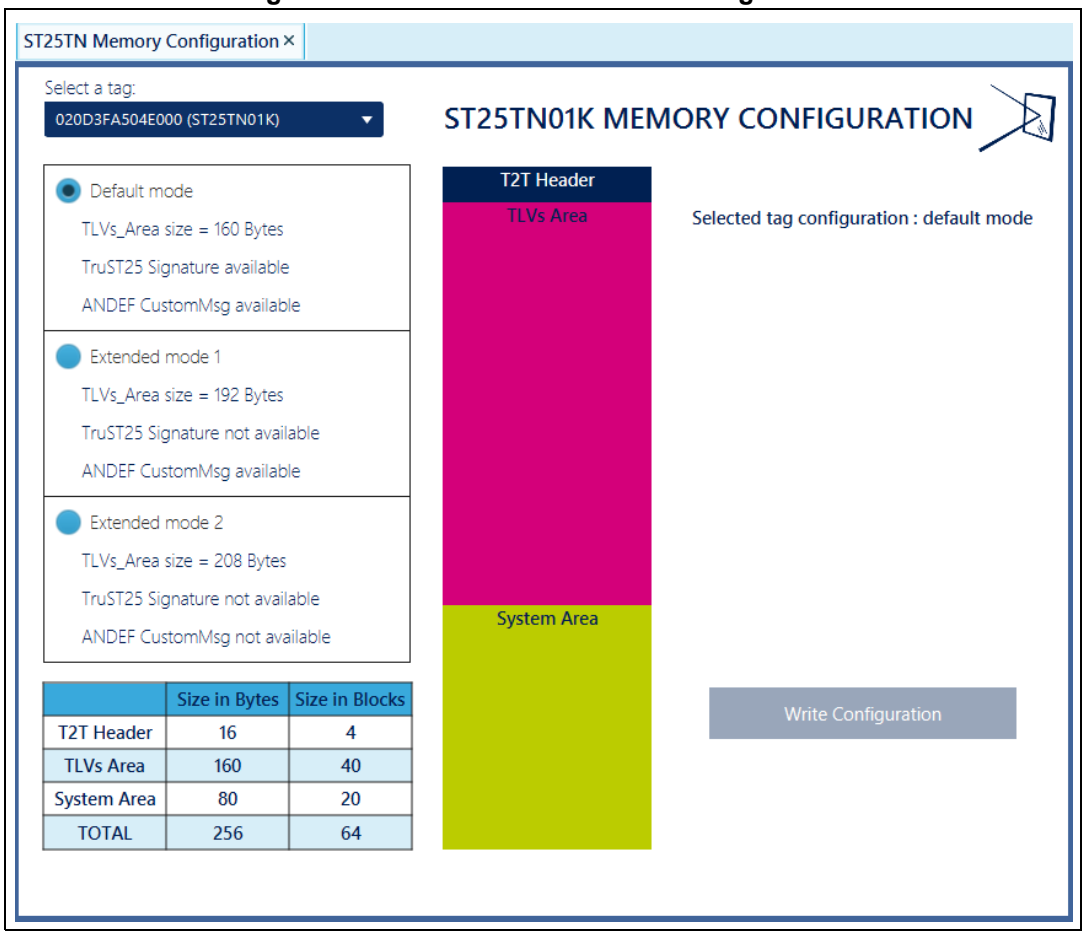
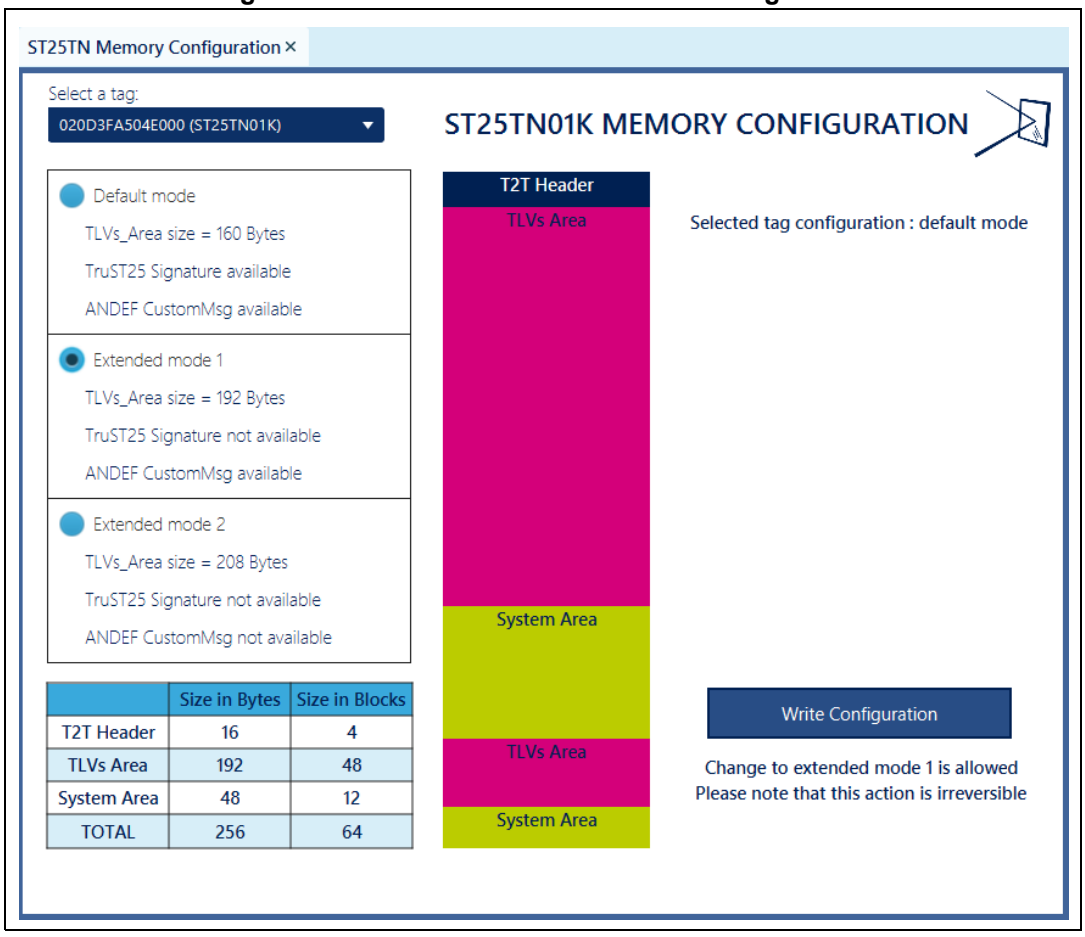
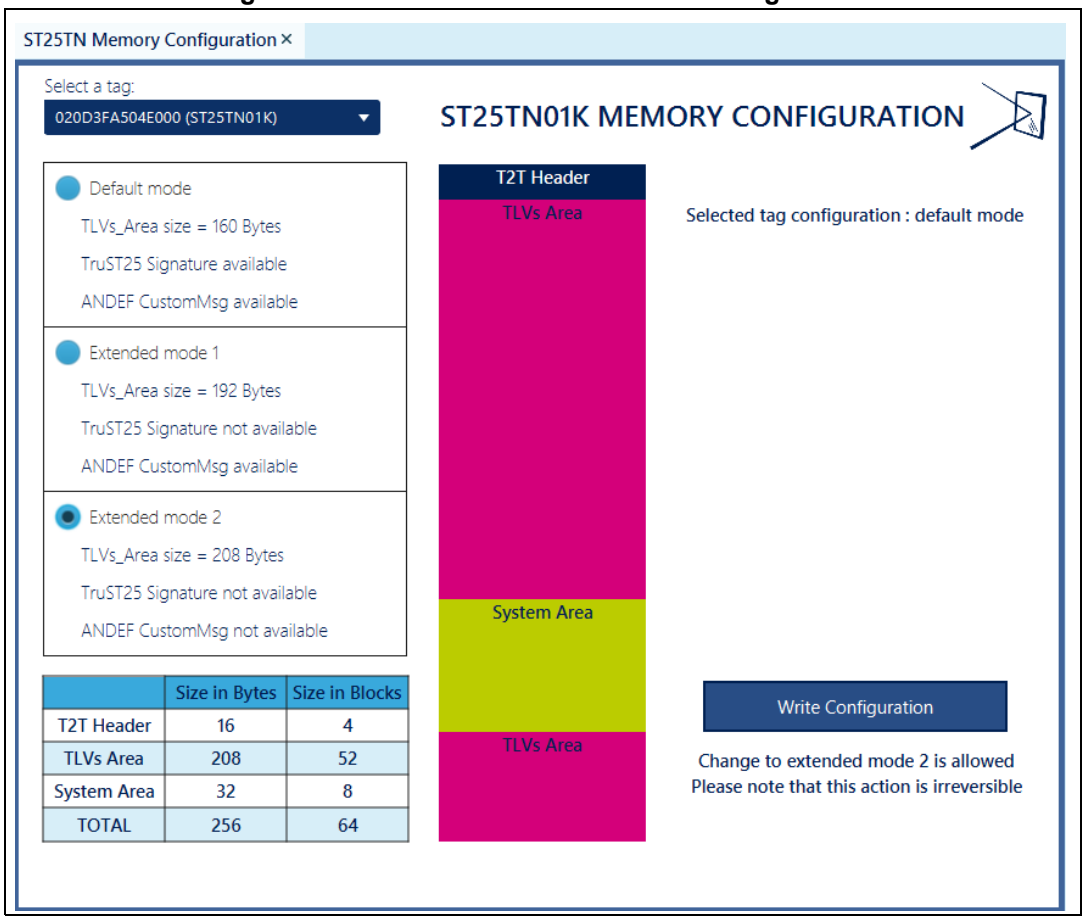


Figure 71. ST25TN - Extended mode 1 configuration



	Size in Bytes	Size in Blocks
T2T Header	16	4
TLVs Area	192	48
System Area	48	12
TOTAL	256	64

Figure 72. ST25TN - Extended mode 2 configuration



	Size in Bytes	Size in Blocks
T2T Header	16	4
TLVs Area	208	52
System Area	32	8
TOTAL	256	64

Write configuration button allows the user to switch the tag from Default to Extended mode 1 or 2 versions, or from Extended mode 1 to extended mode 2 version. No revert action is possible.

5.5 ISO 14443-A / Type 4A menu

ISO 14443-A / Type 4A menu can be divided in two parts, as shown in *Figure 73*:

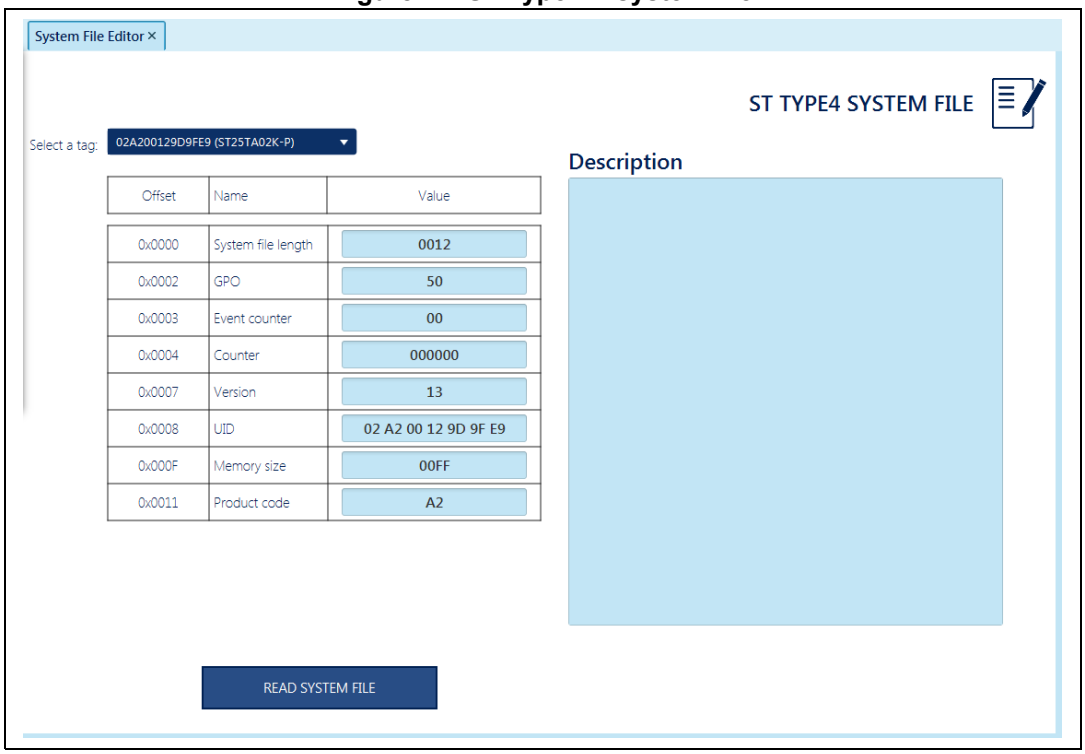
1. Part [1] describes the user interfaces available for all Type 4A products.
2. Part [2] lists the STMicroelectronics product series and contains specific features for each of them.

Figure 73. ISO 14443-A / Type 4A menu

5.5.1 Generic features

System File Editor menu displays a user interface useful to manage the system file of Type 4A STMicroelectronics tags (see *Figure 74*).

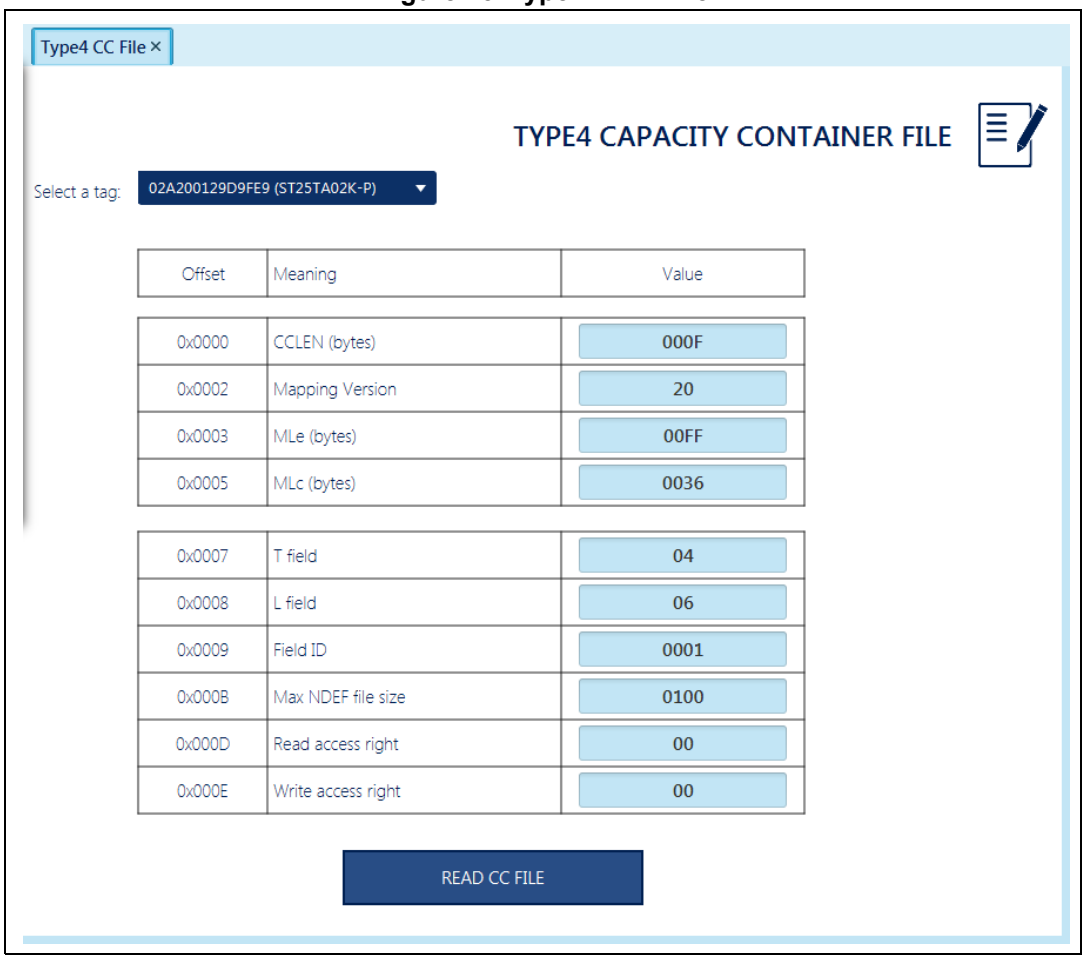
Figure 74. ST Type 4A system file



READ SYSTEM FILE button displays the content of the system file of the selected tag. Clicking on any field displays the description of this field.

Type 4A CC File Editor menu displays a user interface useful to manage the Capacity Container File of any Type 4A tag (see *Figure 75*).

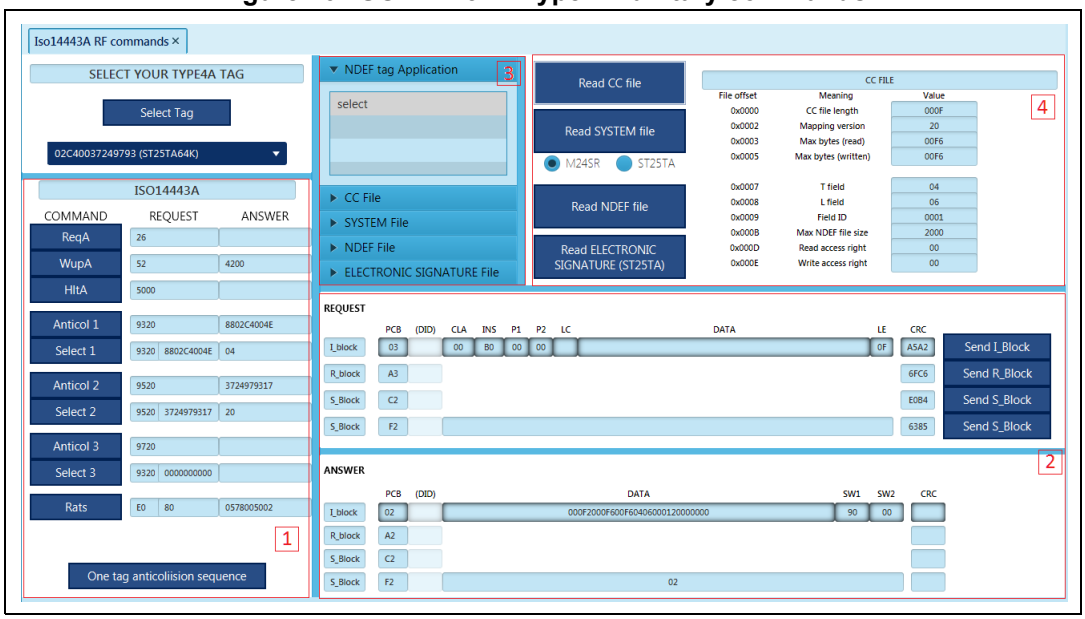
Figure 75. Type 4A CC File



READ CC FILE button reads the CC file of the selected tag and displays it on the screen. Putting the mouse over any field displays a tooltip with the description of the field.

Unitary Commands menu (*Figure 76*) displays a user interface able to manage all ISO 14443-A commands and Type 4A APDU commands. This tool is helpful to understand and control the ISO 14443-A anticollision process and to manage Type 4A APDU frame format.

Figure 76. ISO 14443-A/ Type 4A unitary commands



Part [1] concerns the ISO 14443-A commands. Each command can be sent by clicking on any button. Some fields (such as Select 1, Select 2, Select 3, REQUEST) can be modified with expected data to ensure anti-collision process. Answer column contains the tag answer, if any.

One tag anti-collision sequence button chains all ISO 14443-A commands to follow anti-collision process and to be able to select a tag (be sure that only one tag is on the RF reader).

Parts [2], [3] and [4] concern Type 4A commands. Note that a tag has to be selected with ISO 14443-A anti-collision process to be able to answer Type 4A requests.

Part [2] contains Type 4 APDU frames for request and answer.

- *REQUEST* part contains the request to be sent to the tag. *Send I_Block* button allows the user to send the APDU frame to the tag.
- *ANSWER* part is filled in case of tag answer.

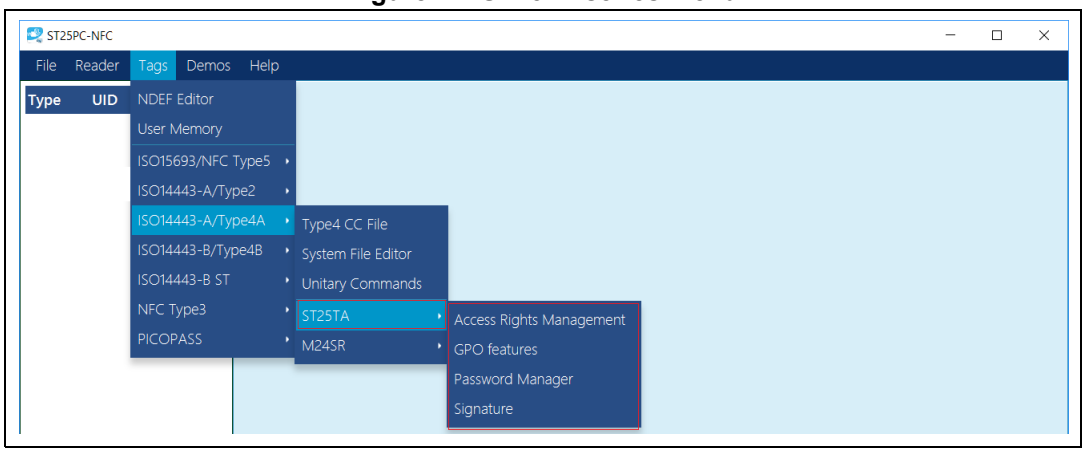
Part [3] is a menu containing all Type 4A requests. Selecting any of this request by clicking on it will fill the part[2] *REQUEST APDU* command. Click on *Send I_Block* button to send it.

Part [4] contains some buttons to launch the complete read process (*Select file*, *Read file*). Clicking on *Read CC file*, *Read SYSTEM file*, *Read NDEF file* and *Read ELECTRONIC SIGNATURE* buttons displays the data in Part [4] of the user interface.

5.5.2 ST25TA menu

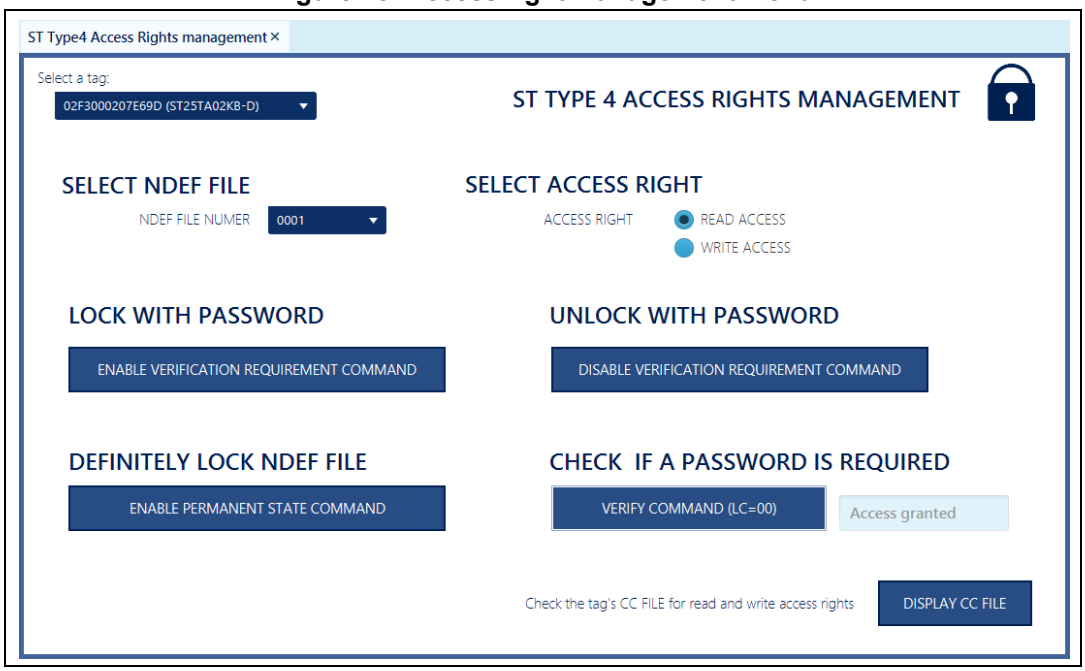
ST25TA menu (see *Figure 77*) displays a sub-menu containing all the specific features of the ST25TA series.

Figure 77. ST25TA series menu



Access right Management menu displays a user interface useful to manage access right of Type 4A STMicroelectronics tags (see *Figure 78*).

Figure 78. Access right Management menu



Lock With Password button can be used to lock the NDEF file of the ST Type4 tag on a read or write features.

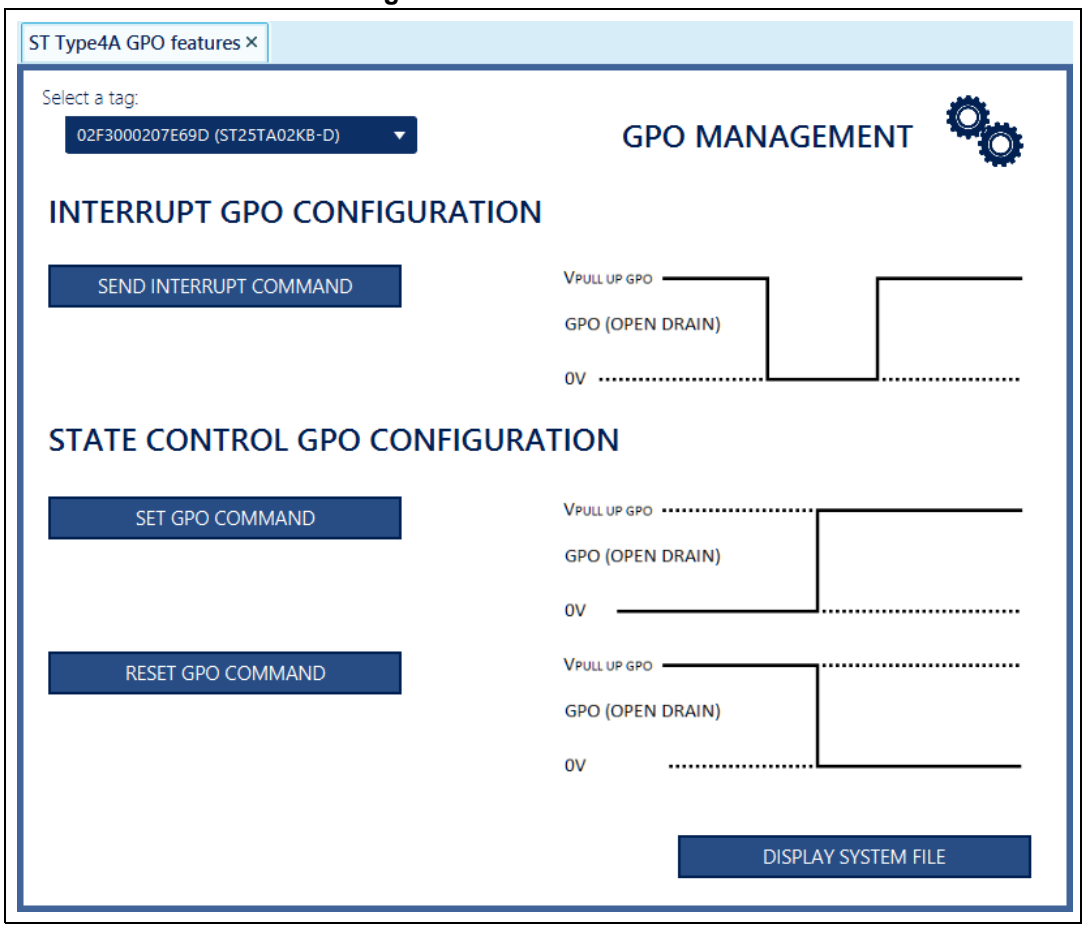
Unlock With Password button can be used to remove lock access rights to the NDEF file of the ST Type4 tag on read or write features

Definitely Lock NDEF File button can be used to definitely lock the NDEF file of the ST Type4 tag on a read or write features. Be aware that it is a non-reversible action.

Check if Passwords is required button can be used to verify if the NDEF file is locked or available for a read or a write operation.

GPO feature menu displays a user interface useful to manage GPO of Type 4A STMicroelectronics tags (see *Figure 79*).

Figure 79. GPO feature menu



Send Interrupt command, *Set GPO command* and *Reset Interrupt commands* button can be used to manage interruptions on GPO pin. GPO must be configured properly to be able to perform this actions. *Display System file* button is a direct access to System File user interface useful to check the configuration of the GPO and change it if needed.

Password Management menu (as described in *Figure 5.3.1*).

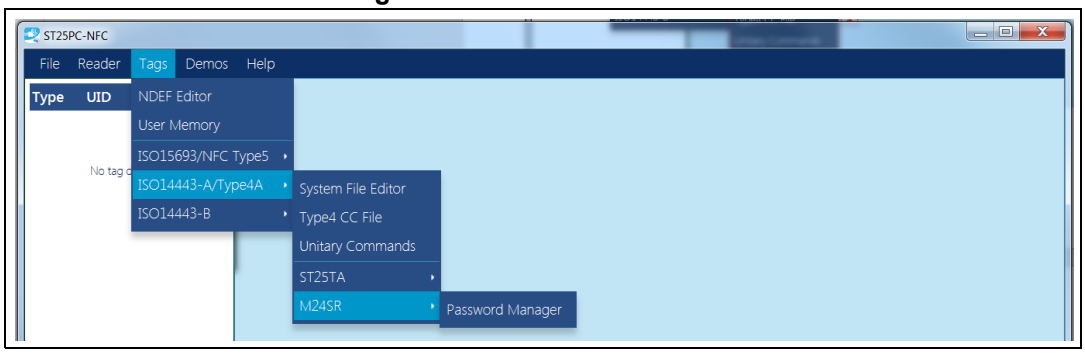
Signature menu allows the user to read and verify the TruST25 signature. To activate this feature contact your ST sales office.

5.5.3 M24SR menu

M24SR menu displays a sub-menu containing all the specific features of the M24SR series.

- *Access rights Management* menu (as described in *Section 5.5.2*)
- *GPO Features menu* (as described in *Section 5.5.2*)
- *Password Management* menu (as described in *Section 5.3.1*)

Figure 80. M24SR series menu

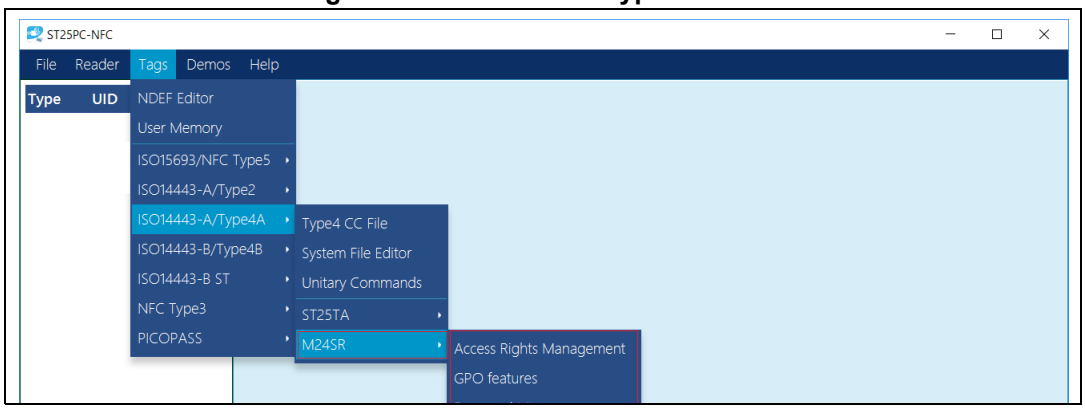


5.6 ISO14443-B / Type 4B menu

This menu can be used to display Type 4B CC File user interface, as shown in *Figure 81*.

- Type4 CC File menu (as described in *Section 5.3.1*)

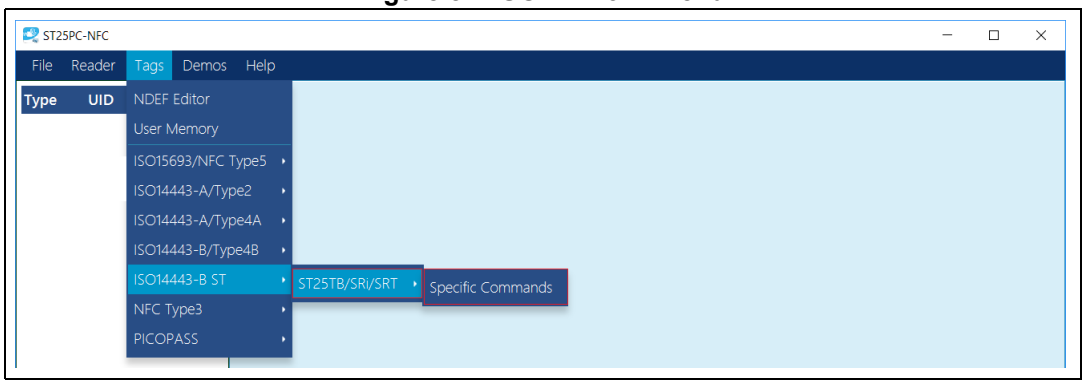
Figure 81. ISO14443-B / Type 4B menu



5.7 ISO 14443-B menu

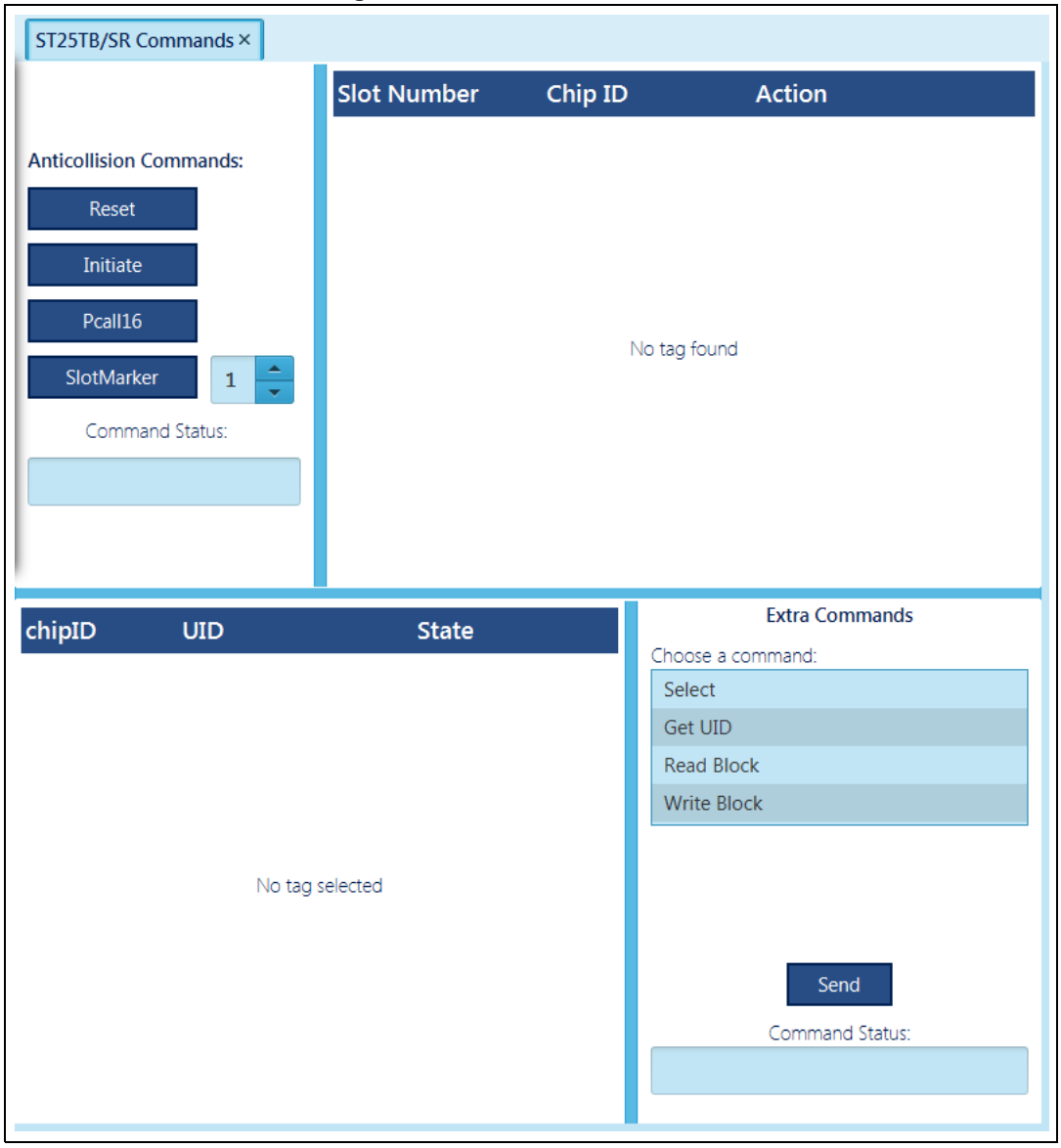
ISO 14443-B menu (*Figure 82*) displays a sub-menu containing the specific features of the STMicroelectronics SRi, SRT and ST25TB series.

Figure 82. ISO 14443-B menu



Specific Commands menu (*Figure 83*) displays a user interface to manage ISO 14443-B. This tool is helpful to understand and control the ISO 14443-B STMicroelectronics products.

Figure 83. ST25TB user interface



5.8 NFC Type 3 menu

NFC Type 3 menu can be used to display Type 3 attribute informations interface, see *Figure 84*.

Type3 Attribute Information menu displays a user interface useful to read and modify the attribute informations of a Type3 tag (see *Figure 85*).

Figure 84. NFC Type 3 menu

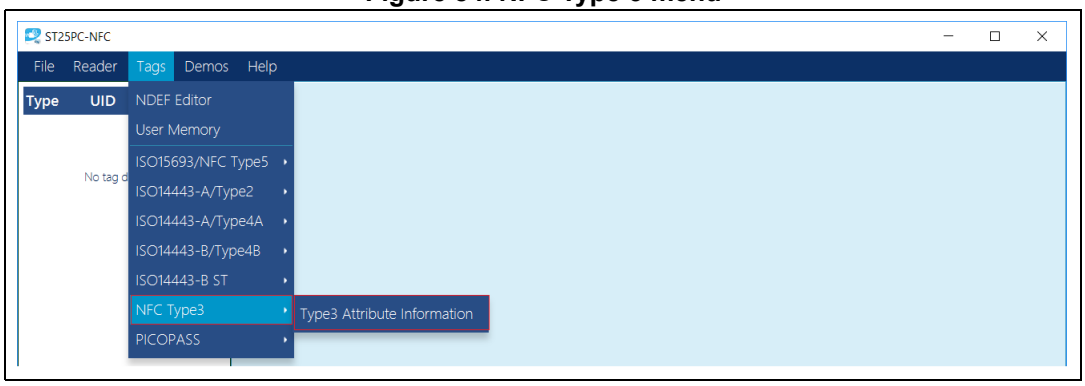
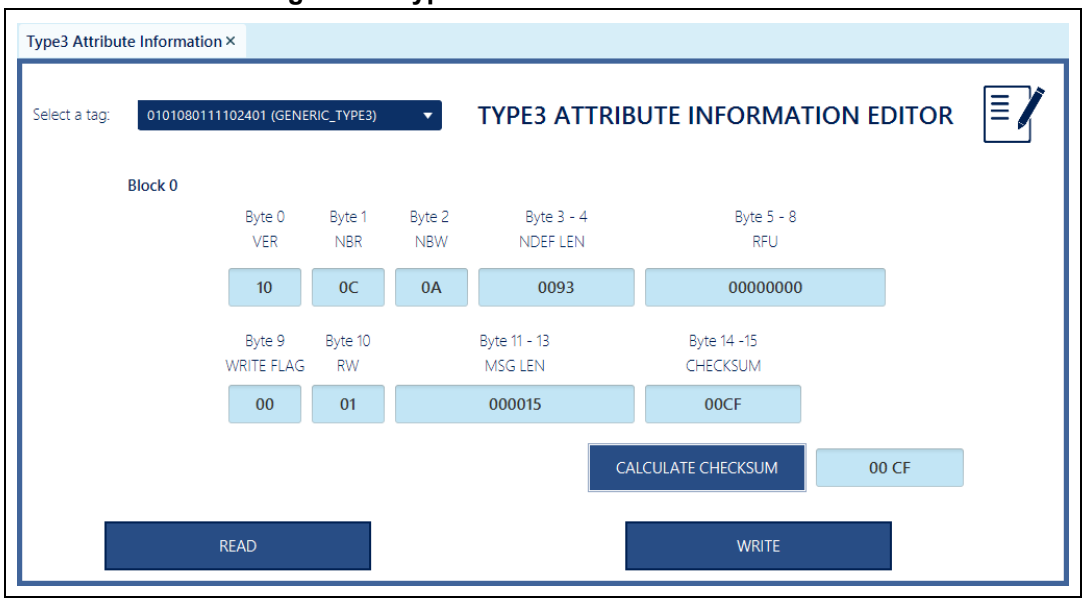


Figure 85. Type3 Attribute Information menu

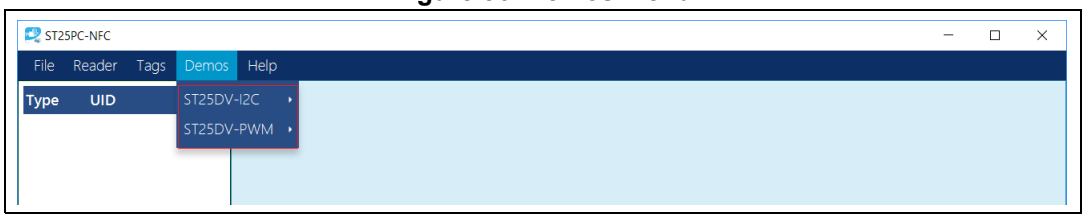


6 Demos menu

Demos menu displays a sub-menu containing the name of generic products. User interfaces have been developed to play with demonstration boards and are available in each sub-menu.

- *ST25DV-I2C* menu
- *ST25DV-PWM* menu

Figure 86. Demos menu

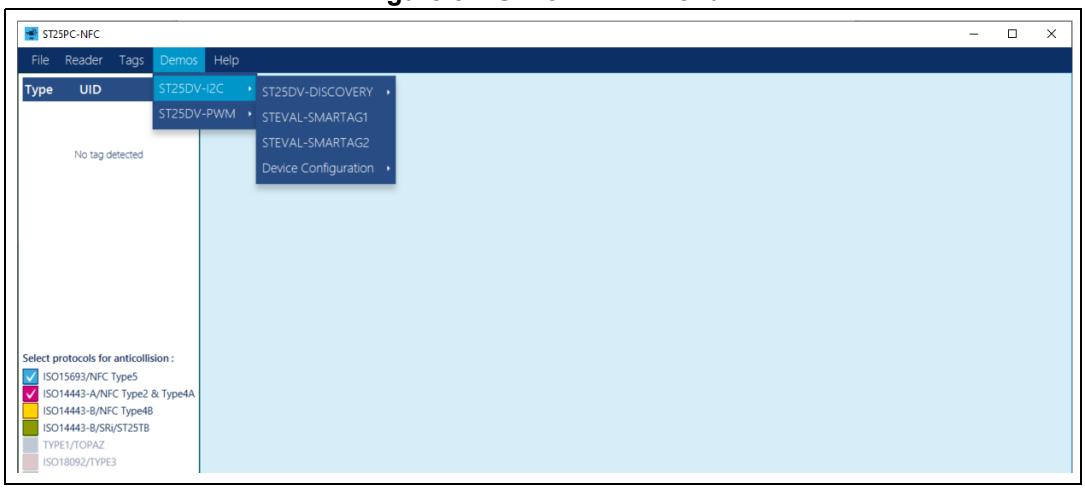


6.1 ST25DV-I2C menu

ST25DV-I2C menu displays a sub-menu containing the name of some demonstration boards. Some interfaces have been developed to use these boards and are available in each sub-menu.

- *ST25DV-DISCOVERY*
- *STEVAL-SMARTAG1*
- *STEVAL-SMARTAG2*
- *Device configuration*

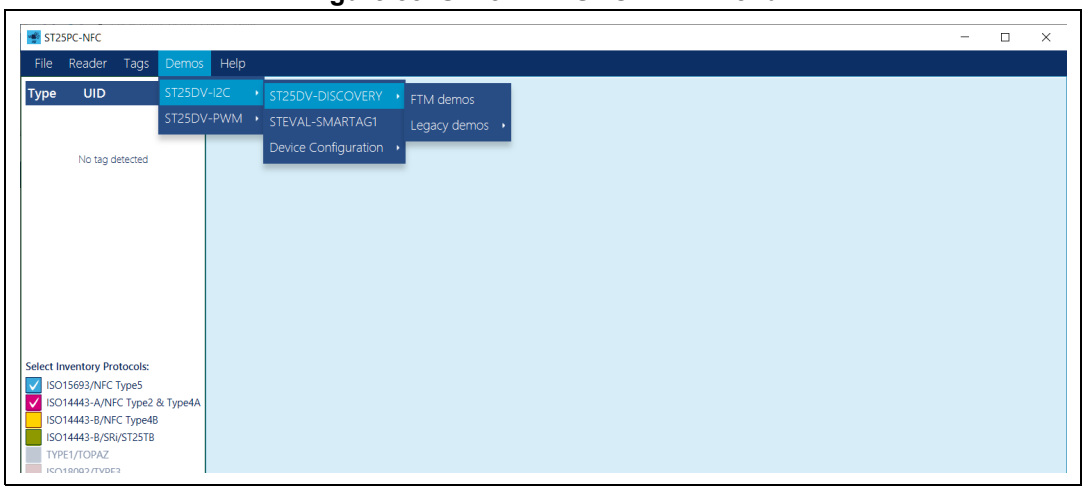
Figure 87. ST25DV-I2C menu



6.1.1 ST25DV-DISCOVERY menu

As illustrated by *Figure 88*, two menus are available for ST25DV-DISCOVERY. There are no differences in terms of activities, but the firmware and the FTM protocol are different.

Figure 88. ST25DV-DISCOVERY menu



The user interface contains all FTM demonstrations (*Firmware Upgrade*, *Send picture*, *Receive picture*, *Send random data*, *Send file*, *Receive data*, *Stop watch*) in the single user interface.

FTM demos implements an integrated, optimized and easy-to-use FTM protocol. All tasks parameters are managed by the SDK.

The demonstrations must be run with the new generation of ST25DV-DISCOVERY based on MB1396 board and firmware version equal or upper than 2.1.0), or the last generation of ST25DV-DISCOVERY based on MB1283 board with firmware version equal or upper than 1.2.0.

Legacy demonstrations user interface contains the same demonstrations as FTM, based on simple SDK commands. Global management of the task is carried out by the PC software and is not optimized. This demonstrations have to be used with the old generation of ST25DV-DISCOVERY based on MB1283 boards with firmware version lower than 1.2.0.

It is recommended to use the FTM demos using new integrated FTM protocol. Be aware that the firmware of your ST25DV-DISCOVERY (based on MB1283 board) can be updated with a new firmware version with upper revision.

Figure 89. FTM demos

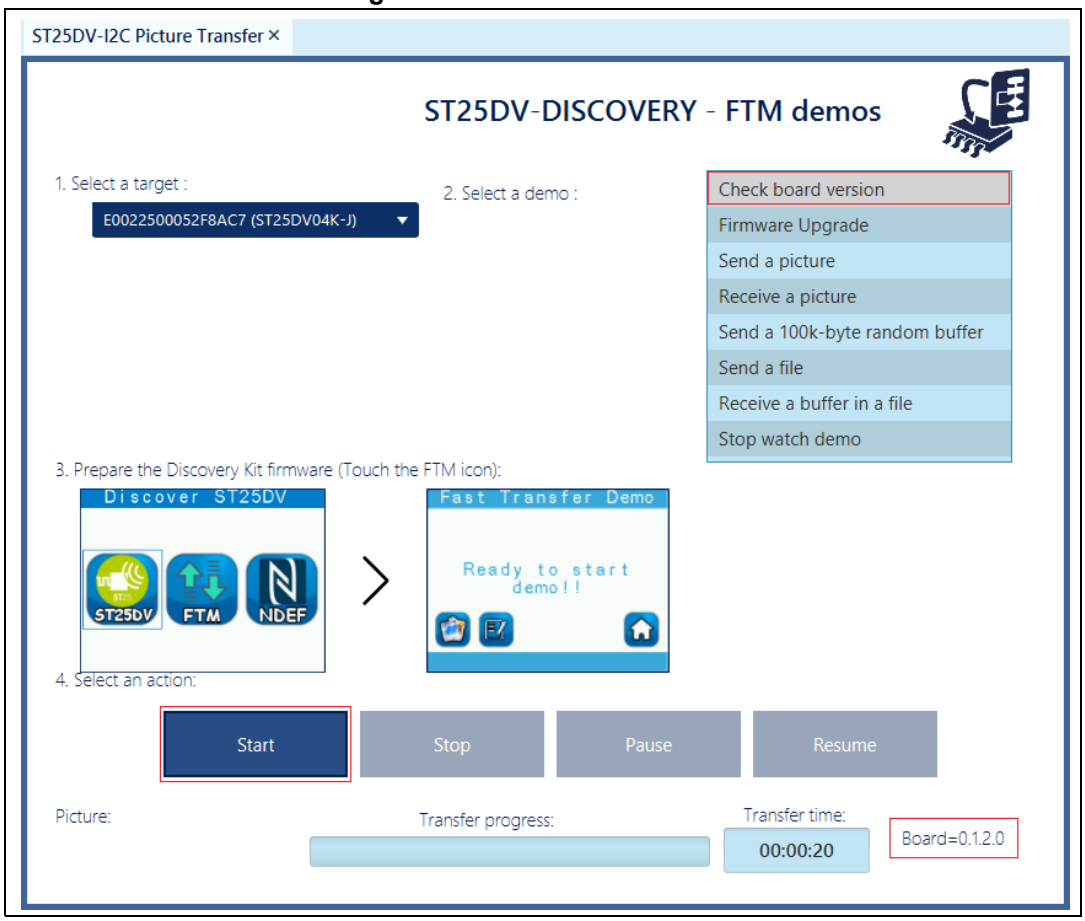
FTM demos contains all demonstrations available for your ST25DV-DISCOVERY.

Select the demonstration to be played:

- *Check board version*
- *Firmware Upgrade*
- *Send a Picture*
- *Receive a picture*
- *Send a 100k-byte random buffer*
- *Send a file*
- *Receive a buffer in a file*
- *Stop watch*

Check board version demonstration allows the user to check the firmware version of ST25DV-DISCOVERY, displaying the version number. If the firmware is not compatible with *FTM demos* menu, no version number is displayed.

Figure 90. Check board version



Firmware Upgrade, *Send a Picture*, *Send a 100k-byte random buffer* and *Send a file* demonstrate the transfer of data from the RF reader to the ST25DV-DISCOVERY using the ST25DV-I2C Fast Transfer Mode mailbox (FTM feature).

In case of *Firmware Upgrade*, the ST25DV-DISCOVERY reboots automatically with an updated firmware revision. For *Send a Picture*, the selected picture is displayed on ST25DV-DISCOVERY. *Send a 100k-byte random buffer* and *Send a file* are used as example of optimized transfer of data.

Figure 91. Send a file

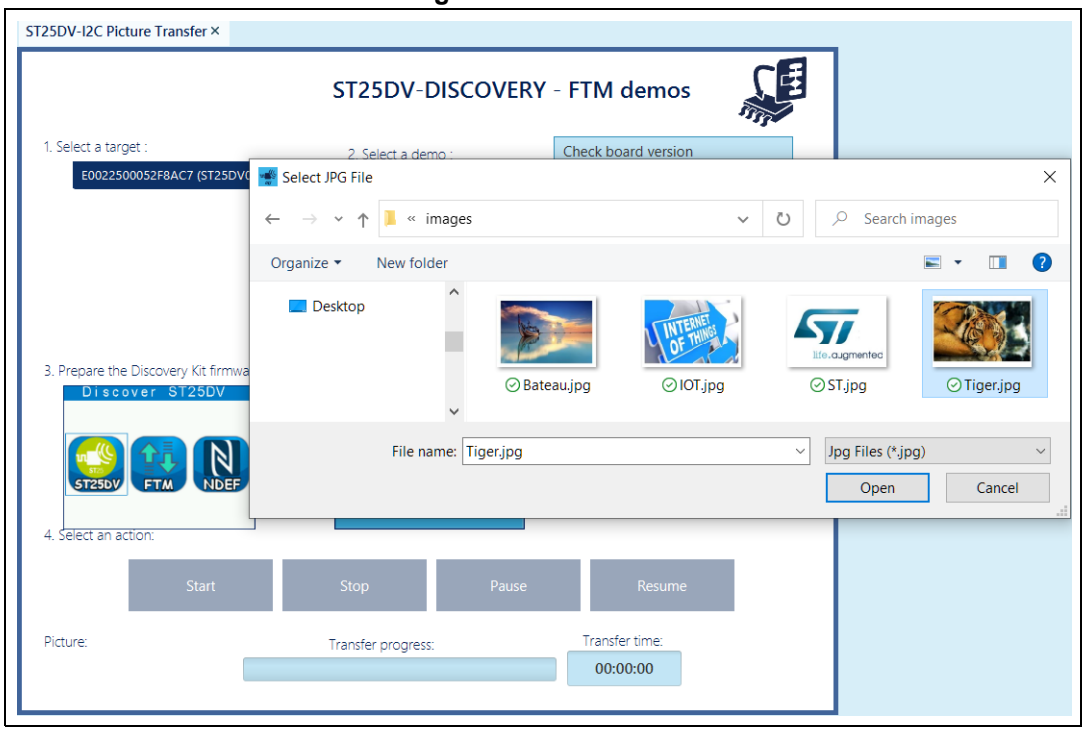
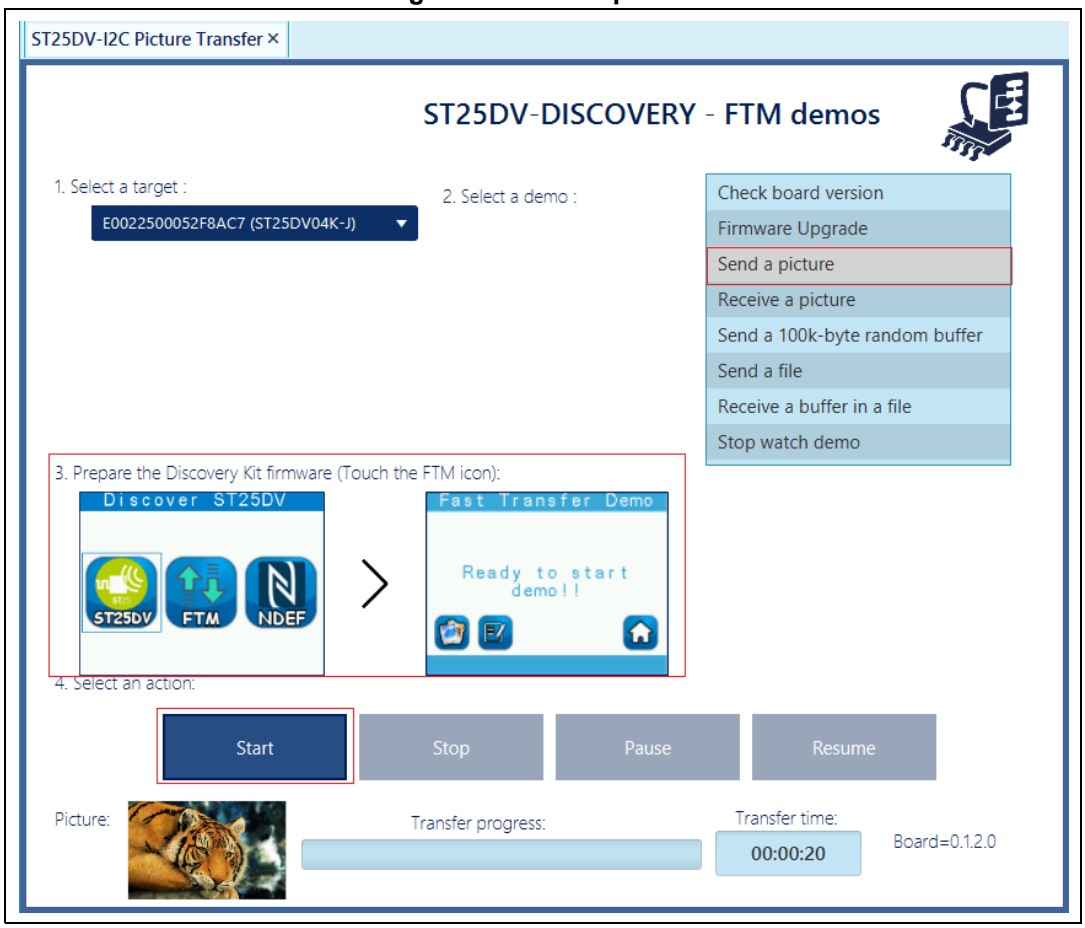


Figure 92. Send a picture



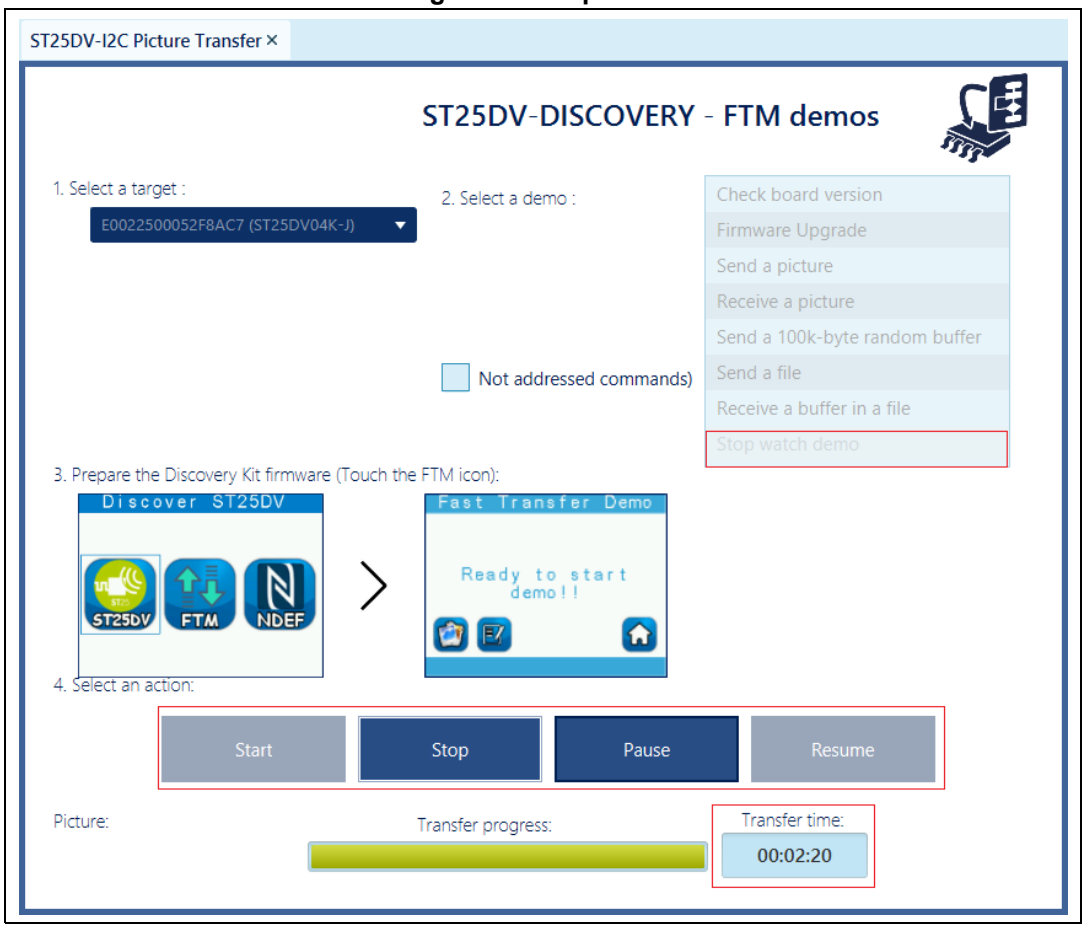
Receive a picture and *Receive a buffer in a file* demonstrate the transfer of data from the ST25DV-DISCOVERY to the RF reader using the ST25DV-I2C Fast Transfer Mode mailbox (FTM feature).

Receive a buffer in a file is used as an example of optimized transfer of data. *Receive picture* transfers the selected picture, displayed on the PC user interface.

Figure 93. Receive a picture

Stop watch displays a user interface to demonstrate the clock synchronization using the ST25DV-I2C Fast Transfer Mode mailbox (FTM). Use STOP, PAUSE and RESUME buttons to interact with the demonstration.

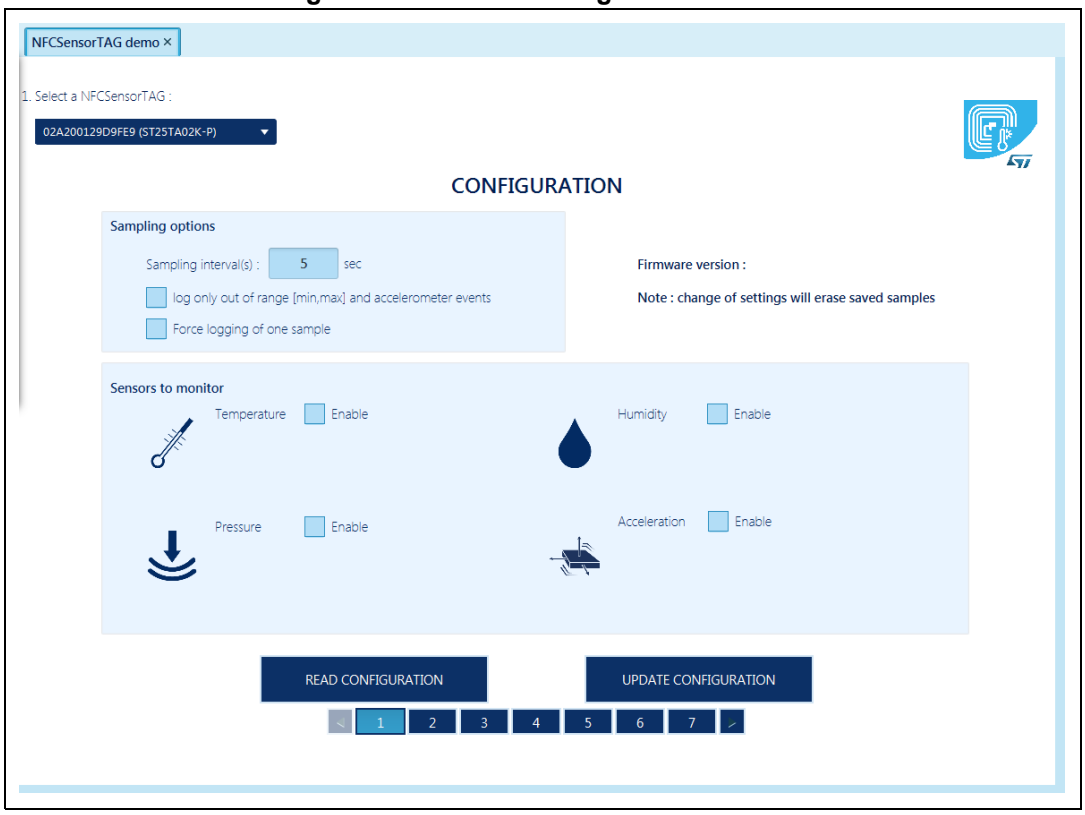
Figure 94. Stop watch



6.1.2 STEVAL-SMARTAG1 menu

STEVAL-SMARTAG1 menu displays a user interface to play with the STEVAL-SMARTAG1 board. Note that this board embeds an ST25DV-I2C used to store the demonstration parameters and the measured data, and to operate as RF interface between the RF reader and the demonstration board.

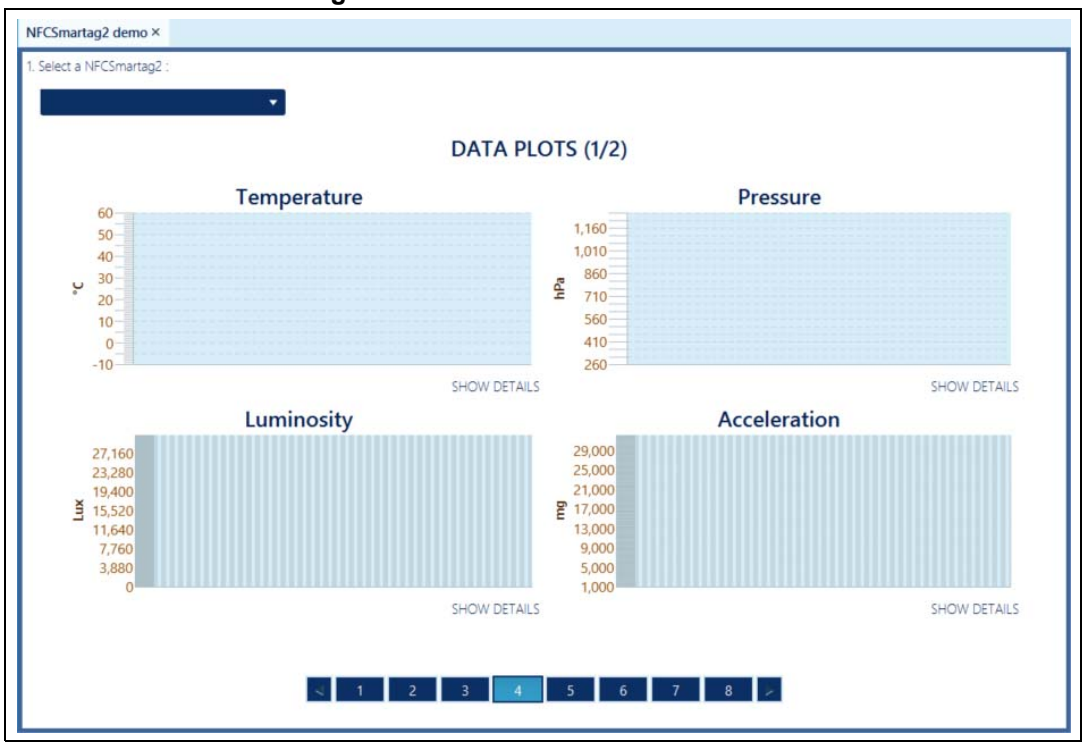
Figure 95. NFC sensor tag demonstration



6.1.3 STEVAL-SMARTAG2 menu

STEVAL-SMARTAG2 menu displays a user interface to play with the STEVAL-SMARTAG2 board. Note that this board embeds an ST25DV-I2C used to store the demonstration parameters and the measured data, and to operate as RF interface between the RF reader and the demonstration board.

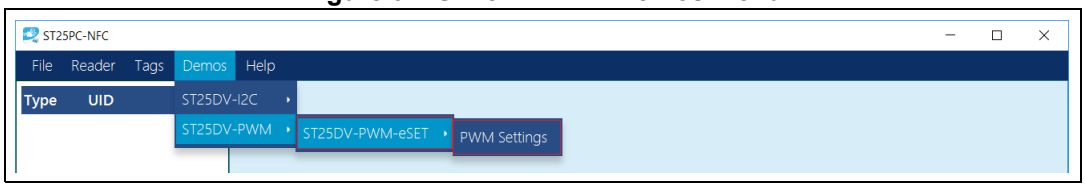
Figure 96. SMARTAG2 demonstration



6.2 ST25DV-PWM menu

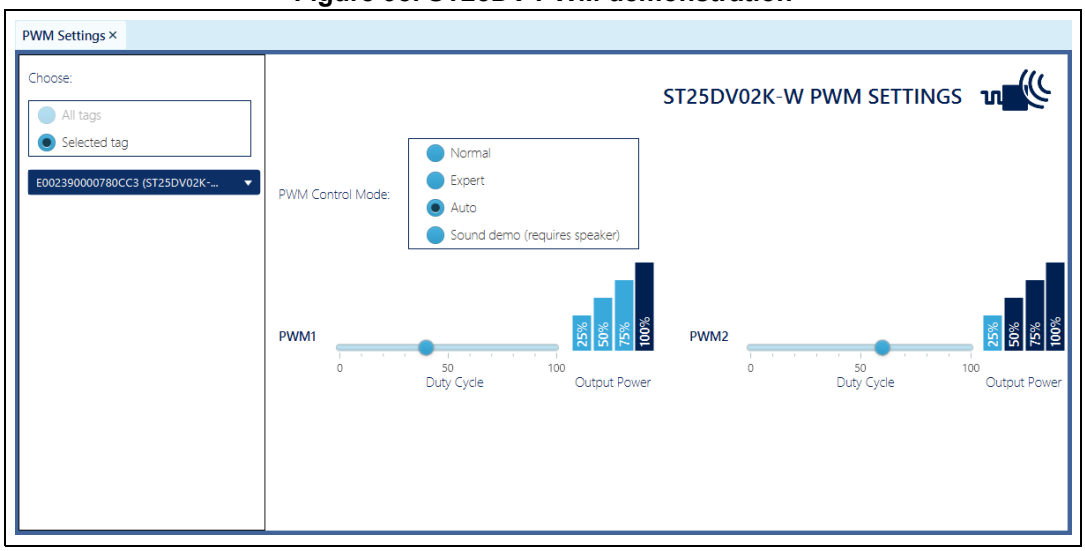
ST25DV-PWM menu displays a sub-menu containing the name of some demonstration boards. The ST25DV-PWM-eSET is the board to be used to play with this demonstration.

Figure 97. ST25DV-PWM Demos menu



PWM Settings menu displays a user interface to play with the ST25DV-PWM-eSET board.

Figure 98. ST25DV-PWM demonstration



7 Revision history

Table 2. Document revision history

Date	Revision	Changes
13-Sep-2018	1	Initial release.
17-Sep-2019	2	Updated *Section 2: Features*, *Section 2.1: Supported readers*, *Section 3.1: Download*, *Section 4: GUI overview*, *Section 4.2: Inventory panel*, *Section 4.2.1: Tag info panel*, *Section 4.2.2: Tag contextual menu*, *Section 4.3: Main menu*, *Section 4.3.4: Demos menu*, *Section 4.3.5: Help menu*, *Section 5.1: NDEF editor*, *Section 5.2: User memory*, *Section 5.3.1: Generic features*, *Section 5.3.2: ST25DV-I2C menu*, *Section 5.3.6: M24LR menu*, *Section 5.5.1: Generic features*, *Section 5.5.2: ST25TA menu* and *Section 5.5.3: M24SR menu*. Updated *Figure 1: Tag contextual menu*, *Figure 2: Get software*, *Figure 6: ST25PC-NFC main window*, *Figure 6: ST25PC-NFC main window*, *Figure 7: ST25R3911B-DISCO RF reader detected*, *Figure 8: No RF reader detected*, *Figure 9: No RF reader detected*, *Figure 10: Inventory panel*, *Figure 11: Detected tags with tool-tip*, *Figure 12: Tag info panel*, *Figure 13: Contextual menu*, *Figure 17: Reader menu*, *Figure 19: Access ST25DV-I2C features from the Main menu bar*, *Figure 20: Demonstrations associated with the ST25DV-DISCOVERY board*, *Figure 21: Help menu*, *Figure 23: Web resources menu*, *Figure 24: About menu*, *Figure 25: About menu*, *Figure 26: NDEF editor*, *Figure 30: Tag operation*, *Figure 31: File operation*, *Figure 32: ISO 15693 / NFC Type 5 menu*, *Figure 36: Password management*, *Figure 35: Type 5 CC File*, *Figure 38: ISO 15693 unitary commands*, *Figure 39: ST25DV-I2C menu*, *Figure 42: Fast transfer mode*, *Figure 41: ST25DV-I2C multi-area configuration*, *Figure 43: ST25DV-PWM menu*, *Figure 44: PWM settings*, *Figure 46: ST25TV counter*, *Figure 48: ST25TV Kill command*, *Figure 49: ST25TV Tamper detect*, *Figure 50: ST25TV Untraceable Mode*, *Figure 59: M24LR menu*, *Figure 73: ISO 14443-A / Type 4A menu*, *Figure 77: ST25TA series menu*, *Figure 80: M24SR series menu*, *Figure 82: ISO 14443-B menu*, *Figure 86: Demos menu*, *Figure 87: ST25DV-I2C menu*, *Figure 88: ST25DV-DISCOVERY menu*, *Figure 90: ST25DV-DISCOVERY stop watch demonstration*, *Figure 97: ST25DV-PWM Demos menu* and *Figure 98: ST25DV-PWM demonstration*. Added *Section 4.3.1: File menu*, *Section 5.4: ISO14443-A / Type 2 menu*, *Section 5.6: ISO14443-B / Type 4B menu* and *Section 5.8: NFC Type 3 menu*. Minor text edits across the whole document.
20-Jan-2021	3	Updated *Introduction*, *Section 2: Features*, *Section 5.3.2: ST25DV-I2C menu*, *Section 5.3.3: ST25DV-PWM menu* and *Section 5.3.4: ST25TV menu* and added *Section 5.3.5: ST25TVC menu*. Removed former *Section 3.3: Upgrading for TruST25 features*. Added *Table 1: Applicable products*. Updated *Figure 19: Access ST25DV-I2C features from the Main menu bar*, *Figure 24: About menu*, *Figure 32: ISO 15693 / NFC Type 5 menu*, *Figure 39: ST25DV-I2C menu*, *Figure 43: ST25DV-PWM menu*, *Figure 45: ST25TV menu* and *Figure 59: M24LR menu*.

Table 2. Document revision history (continued)

Date	Revision	Changes
07-Sep-2021	4	Updated *Section 2: Features*, *Section 5.4: ISO14443-A / Type 2 menu* and its subsections, and *Section 6.1.1: ST25DV-DISCOVERY menu* and its figures. Updated *Table 1: Applicable products*. Updated *Figure 2: Get software*, *Figure 20: Demonstrations associated with the ST25DV-DISCOVERY board*, *Figure 23: Web resources menu* and *Figure 87: ST25DV-I2C menu*. Minor text edits across the whole document.
18-Dec-2024	5	Updated *Section 2: Features*, *Section 2.1: Supported readers*, *Section 3.2: Running the installer*, and *Section 6.1: ST25DV-I2C menu*. Added *Section 6.1.3: STEVAL-SMARTAG2 menu*. Updated *Figure 8: No RF reader detected* and *Figure 88: ST25DV-DISCOVERY menu*.

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