

# UM11133

## TagXplorer Quick start-up guide

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488210

User manual  
COMPANY PUBLIC

### Document information

| Information | Content   |
|-------------|---|
| Keywords    | TagXplorer, TapLinx Java API                                  |
| Abstract    | TagXplorer tool for PCs allows to configure NXP NTAG products |



## Revision history

| Revision history |          |               |
|------------------|----------|---------------|
| Rev              | Date     | Description   |
| 1.0              | 20180620 | First release |

## 1 Introduction to TagXplorer

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TagXplorer is Java-based application allows users to read, analyse, and write NDEF messages to NXP's NFC tag and smart sensor ICS. TagXplorer provide the user to perform NDEF Operations defined by NFC Forum on NFC Forum type 2 and 4 tags for NXP NFC Tag ICs. It is developed using NXP's TapLinx SDK and open Java API.

TagXplorer provide user to perform the NXP proprietary operations on NTAG operations of NTAG 203, NTAG 21x, NTAG 210 $\mu$ , NTAG 213 TT, NTAG I<sup>2</sup>C *plus* and NTAG 413 DNA.

TagXplorer can be used on Windows and MAC machine.

## 2 Getting started with TagXplorer

1. Download the TagXplorer.jar file from the link

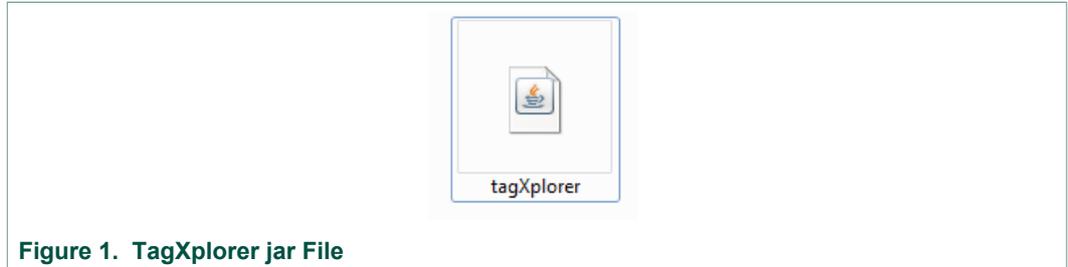


Figure 1. TagXplorer jar File

1. Double-click on the tagXplorer.jar file and application is opened.
2. Read and accept the End-User License Agreement.

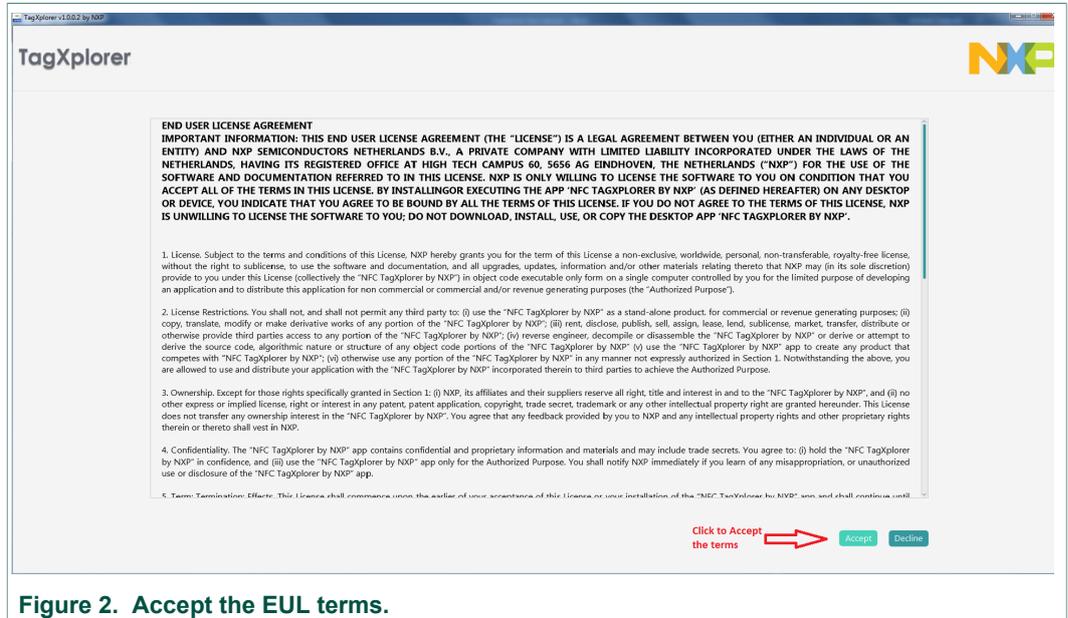


Figure 2. Accept the EUL terms.

1. Connect the supported reader and application will display list of available readers from the dropdown.



Figure 3. Select the supported reader

1. Select the reader, connect to reader and connect to tag

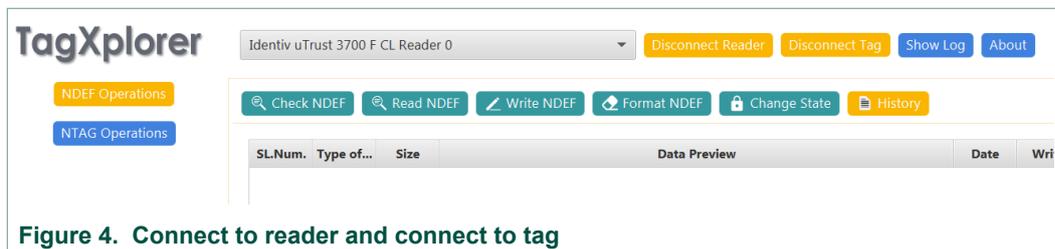


Figure 4. Connect to reader and connect to tag

## 2.1 Home screen of TagXplorer

### 2.1.1 NDEF operations

#### 2.1.2 NDEF operations that can be performed on tag are

- check NDEF (Gives information about Tag type, Access, size etc.)
- Read NDEF (Information about Tag IC, CC file, NDEF payload)
- Write NDEF (To write various types of NDEF records to tag)
- Format NDEF (Formats the tag as NDEF)
- Change State (To change the access of the card to read-only or read-write)
- History (Entry of the records used recently).

### 2.1.3 NTAG operations

Performs the NXP proprietary operations on NTAG cards like mirroring etc.

### 2.1.4 Show log

Opens log window (logs can be saved in .txt format)

### 3 NDEF operations

#### 3.1 Check NDEF message

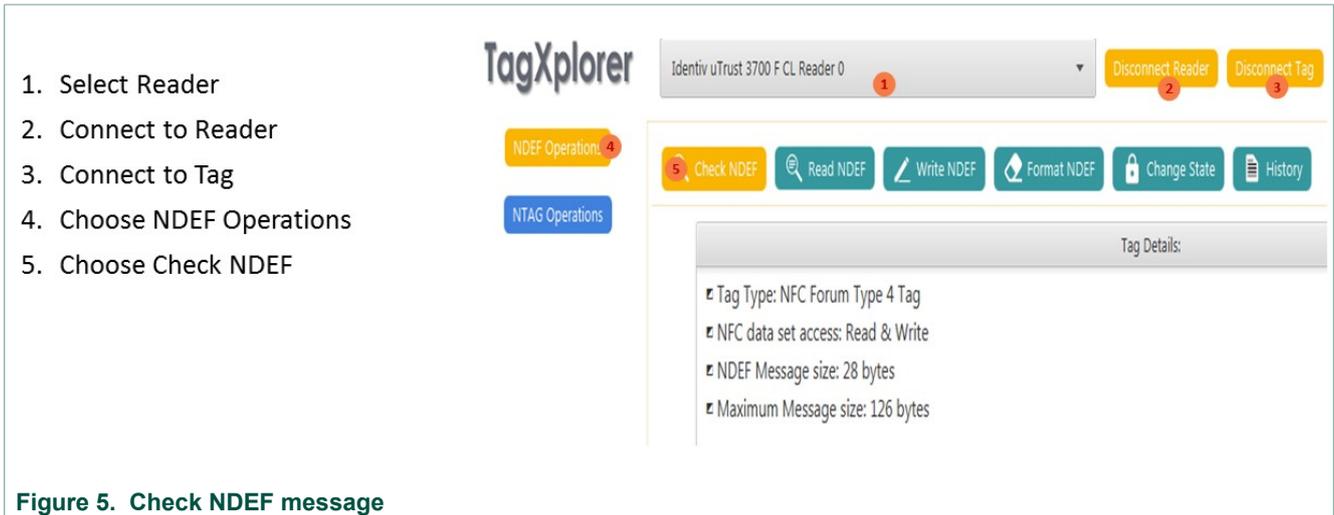


Figure 5. Check NDEF message

#### 3.2 READ NDEF message

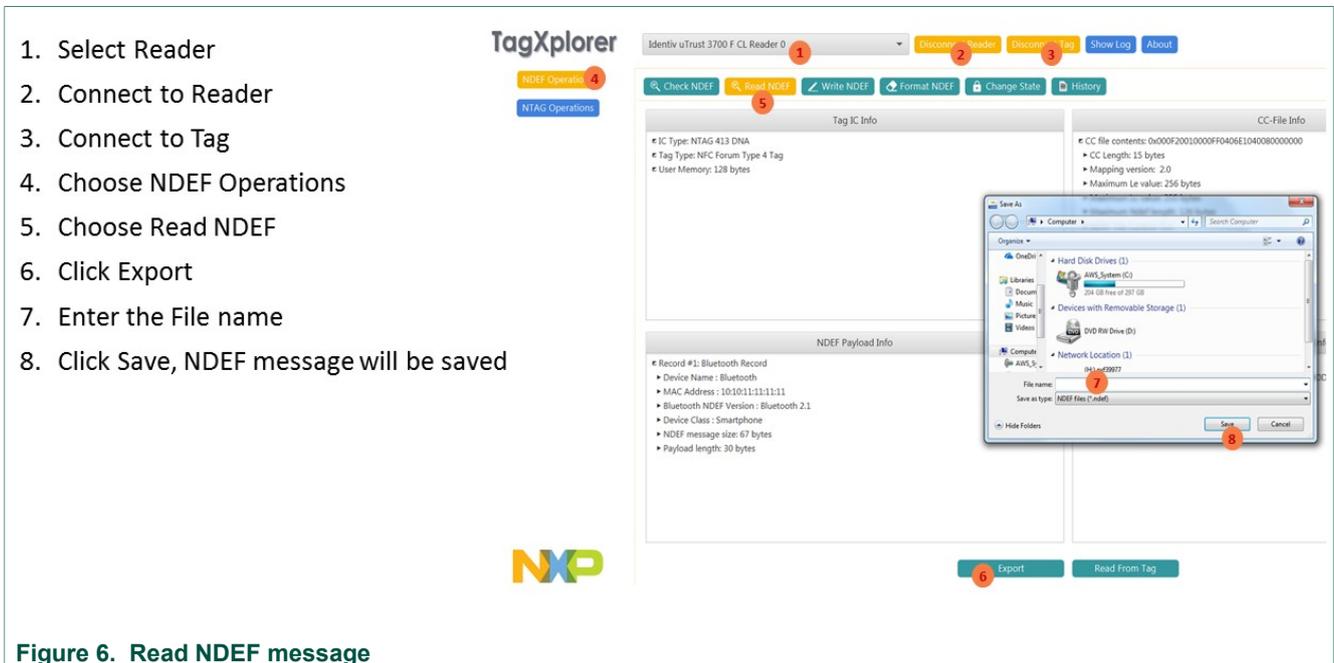


Figure 6. Read NDEF message

#### 3.3 WRITE NDEF message

Allows user to write NDEF message for the below lists:

1. Plain Text
2. URI
3. Vcard

4. WiFi
5. Email
6. Telephone
7. Geo Location
8. Launch App
9. SMS
10. Bluetooth

### 3.3.1 Write Plain Text Record as NDEF Message

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose Plain Text
7. Choose Language
8. Enter the data in the available Text field
9. Click „Write to Tag“
10. Press OK

**Figure 7. Write Plain Text Record as NDEF Message**

### 3.3.2 Write URL Link Record as NDEF Message

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose URI
7. Enter Description
8. Enter the URL in the Text field
9. Click „Write to Tag“
10. Press OK

**Figure 8. Write URL Link Record as NDEF Message**

### 3.3.3 Write Wifi record as NDEF Message

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose WiFi
7. Enter Network SSID
8. Enter WLAN MAC
9. Enter Password
10. Click on „Write to Tag“
11. Press OK

**Figure 9. Write WiFi record as NDEF Message**

3.3.4 Write Email Record as NDEF Message

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose Email
7. Enter Title
8. Enter Receipt email
9. Enter Subject of the Email
10. Enter Content(message) of the Email
11. Click „Write to Tag“
12. Press OK

Figure 10. Write Email Record as NDEF Message

3.3.5 Write NDEF Message to share a Telephone number

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose Telephone
7. Enter Title/ Name
8. Enter Destination Number
9. Click „Write to Tag“
10. Press OK

Figure 11. Write NDEF Message to share a Telephone number

3.3.6 Write NDEF Message to share GeoLocation

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose Geo Location
7. Enter Description
8. Enter Latitude
9. Enter Longitude
10. Click „Write to Tag“
11. Press OK

**Figure 12. Write NDEF Message to share GeoLocation**

3.3.7 Write NDEF Message to launch an app

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose Geo Location
7. Enter Application Package name along with path
8. Click „Write to Tag“
9. Press OK

**Figure 13. Write NDEF Message to launch an app**

3.3.8 Write NDEF Message to Send SMS

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose SMS
7. Enter Description
8. Enter Receiptient no.
9. Enter Message to send
10. Click „Write to Tag“
11. Press OK

Figure 14. Write NDEF Message to Send SMS

3.3.9 Write NDEF Message to Setup Bluetooth

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Choose Write NDEF
6. Choose SMS
7. Enter Description
8. Enter Receiptient no.
9. Enter Message to send
10. Click „Write to Tag“
11. Press OK

Figure 15. Write NDEF Message to Setup Bluetooth

### 3.4 Format NDEF message

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Click NDEF Format
6. Click OK on the confirmation message
7. Click OK on the Success message

Figure 16. Format NDEF message

### 3.5 Change State

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Click Change State
6. Select either Read Only or Read Write
7. Click OK on the Confirmation message
8. Click OK on success message

Figure 17. Change State

### 3.6 History

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NDEF Operations
5. Click History
6. Click to Edit NDEF message
7. Click to Delete NDEF Message
8. Click to Save all NDEF Messages to CSV File.
9. Click to Clear History of NDEF messages

The screenshot shows the TagXplorer application window. At the top, a dropdown menu shows 'Identiv uTrust 3700 F CL Reader 0'. Below it are buttons for 'Disconnect Reader', 'Disconnect Tag', 'Show Log', and 'About'. A toolbar contains buttons for 'Check NDEF', 'Read NDEF', 'Write NDEF', 'Format NDEF', 'Change State', and 'History'. A table with columns 'SLN...', 'Type of Record', 'Size', 'Data Preview', 'Date', 'Write', and 'Delete' lists four records. A 'Save As' dialog box is open, showing the file system tree and a 'File name' field. Red circles 1-9 are placed over the following elements: 1. Reader dropdown, 2. Disconnect Reader button, 3. Disconnect Tag button, 4. NDEF Operations button, 5. History button, 6. Edit icon in the table, 7. Delete icon in the table, 8. Save button in the dialog, 9. Clear button at the bottom.

Figure 18. History

## 4 NTAG operations

### 4.1 How to get the version of the NTAG cards

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click „Get Version“
7. Press OK

**Figure 19. How to get the version of the NTAG cards**

**Note:** Above steps are the same to get the version of NTAG 21x, NTAG 210μ, NTAG 213 TT, NTAG I<sup>2</sup>C plus and NTAG 413 DNA cards.

### 4.2 How to set password for NTAG cards\*

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Password
7. Select „Set Password“
8. Enter New Password
9. Enter New Password Acknowledgement
10. Click „Set Password“

**Figure 20. How to set password for NTAG cards**

**Note:** Above steps are the same to get the version of NTAG 21x, NTAG 213 TT and NTAG I<sup>2</sup>C plus cards.

### 4.3 How to authenticate a card if card is already password protected

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Password
7. Select „Authenticate“
8. Enter Current Password
9. Enter Current Password Acknowledgement
10. Click „Authenticate“

**Figure 21. How to authenticate a card if card is already password protected**

**Note:** Above steps are the same to get the version of NTAG 21x, NTAG 213 TT and NTAG I<sup>2</sup>C plus cards.

### 4.4 Change a password for NTAG cards\*

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Password
7. Select „Change Password“
8. Enter Current Password and Password Acknowledgement
9. Enter New Password and Password Acknowledgement
10. Click „Change Password“

**Figure 22. Change a password for NTAG cards**

**Note:** Above steps are the same to get the version of NTAG 21x, NTAG 213 TT and NTAG I<sup>2</sup>C plus cards.

### 4.5 Remove a password for NTAG cards\*

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Password
7. Select „Remove Password“
8. Enter Current Password
9. Enter Current Password Acknowledgement
10. Click „Remove Password“

**Figure 23. Remove a password for NTAG cards**

**Note:** Above steps are the same to get the version of NTAG 21x, NTAG 213 TT and NTAG I<sup>2</sup>C *plus* cards.

### 4.6 How to read Signature of NTAG cards

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Signature
7. Click „Read Signature“ and Signature of the card is displayed

**Figure 24. How to read Signature of NTAG cards**

**Note:** Above steps are the same to get the version of NTAG 21x, NTAG 210μ, NTAG 213 TT, NTAG I<sup>2</sup>C *plus* and NTAG 413 DNA cards.

### 4.7 How to perform Originality check for NTAG cards

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Signature
7. Click „Verify Authenticity“ and confirmation will be displayed.

**Figure 25. How to perform Originality check for NTAG cards**

**Note:** Above steps are hte same to get the version of NTAG 21x, NTAG 210μ, NTAG 213 TT, NTAG I<sup>2</sup>C plus and NTAG 413 DNA cards.

### 4.8 How to check NFC Counters for NTAG cards

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Signature
7. Click „Verify Authenticity“ and confirmation will be displayed.

**Figure 26. How to check NFC Counters for NTAG cards**

- Note:**
1. Above steps are the same to get the version of NTAG 203, NTAG 21x, NTAG 213 TT and NTAG 413 DNA cards
  2. NFC Counter needs to be enabled in order to display counter value from the User configuration.

### 4.9 How to Lock and Block Lock Bytes for NTAG cards

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG21x
6. Click Lock Bytes
7. Click „Read“ button and Lock Page details are displayed.
8. Select the byte to be locked and click „Write“ button
9. Once the page is locked, byte becomes non-editable.

**Figure 27. How to Lock and Block Lock Bytes for NTAG cards**

**Note:** Above steps are the same to get the version of NTAG 203, NTAG 21x, NTAG 210µ, NTAG213 TT and NTAG I<sup>2</sup>C *plus* cards.

### 4.10 User configurations available for NTAG 203

1. Select Reader
2. Connect to Reader
3. Connect to NTAG Tag
4. Choose NTAG Operations
5. Choose NTAG203
6. Click User Configuration
7. Enter the initial counter value between 0001 to FFFF
8. Click „Initial Counter“.
9. Click „Increment Counter“
10. Now Click „Read Counter“ and check incremented value is displayed.

**Figure 28. User configurations available for NTAG 203**

### 4.11 User configurations available for NTAG 21x

1. Choose the Segment Protection either Writer or Read/Write
2. Choose the Page Protect start address from 00h to card max size
3. Choose Mirror page start address
4. Choose Mirror byte start address
5. Choose Mirror Configuration from the following below:
  - No Mirroring
  - UID Mirroring
  - NFC Counter Mirroring
  - UID & NFC Counter Mirroring
6. To enable or disable NFC Counter Password protection
7. To enable or disable NFC Counter
8. To enable or disable Strong Modulation
9. To set the Negative authentication limit.
10. To enable Lock user configurations and this is irreversible
11. Click to Read already Configured card.
12. Click to Write new Configuration to card

**Figure 29. User configurations available for NTAG 21x**

### 4.12 User configurations available for NTAG 213 Tag Tamper

1. Choose the Segment Protection either Writer or Read/Write
2. Choose the Page Protect start address from 00h to card max size
3. Choose Mirror Configuration from the following below:
  - No Mirroring
  - UID Mirroring
  - NFC Counter Mirroring
  - UID & NFC Counter Mirroring
4. Choose Mirror page start address
5. Choose Mirror byte start address
6. To enable or disable NFC Counter Password protection
7. To enable or disable NFC Counter
8. To set the Negative authentication limit.
9. To enable or disable TagTamper Feature
10. Choose TT Lock from the following below:
  - Read/Write TT Message
  - TT Message Lock –(Irreversible)
11. To enable Lock user configurations and this is irreversible
12. Click to Read already configured card.
13. Click to Write new configuration to card

**Figure 30. User configurations available for NTAG 213 TT**

### 4.13 How to Get File Settings of NTAG 413 DNA card

1. Click „Get/Change File Settings“
2. Select File No.
3. Click „Get File Settings.“
4. Click „OK“

Figure 31. How to Get File Settings of NTAG 413 DNA card

### 4.14 Change File Settings of NTAG 413 DNA

1. Enter previously recorded values for UID Offset...
2. Counter Offset, ...
3. Mac Input Offset
4. MAC Offset  
(If MACInputOffset == MAC Offset, the message to be signed will be NULL; otherwise it will be the hex values between MACInputOffset and MACOffset-1)
5. Press „Change File Settings“
6. Press OK

Figure 32. Change File Settings of NTAG 413 DNA

### 4.15 Read Data of NTAG 413 DNA card

**Read data from NTAG413 DNA card**

1. Click Read/Write Data
2. Select the File No.
3. Enter Offset value
4. Enter Length value and Click Read

**Write data to NTAG413 DNA card**

1. Click Read/Write Data
2. Select the File No.
3. Enter Offset value
4. Enter Length value
5. Enter the Valid data in HEX
6. Click on „Write“

**Figure 33. Read Data of NTAG 413 DNA card**

### 4.16 Personalization example for NTAG 413 DNA

#### 4.16.1 Write NDEF

1. Select Reader
2. Connect to Reader
3. Connect to Tag
4. Choose NTAG Operations
5. Choose Mirroring Features
6. Choose NTAG413 DNA
7. Choose Protocol
8. Enable UID mirror
9. Enable Counter mirror
10. Enable SUN Mirror
11. Enter URL
12. Find and Record Offset Values for UID, Counter and SUN
13. Press „Write to tag“
14. Press OK

**Figure 34. NTAG 413 DNA Write NDEF**

4.16.2 Check offset

1. Press „NDEF Operations“
2. Press „Read NDEF“

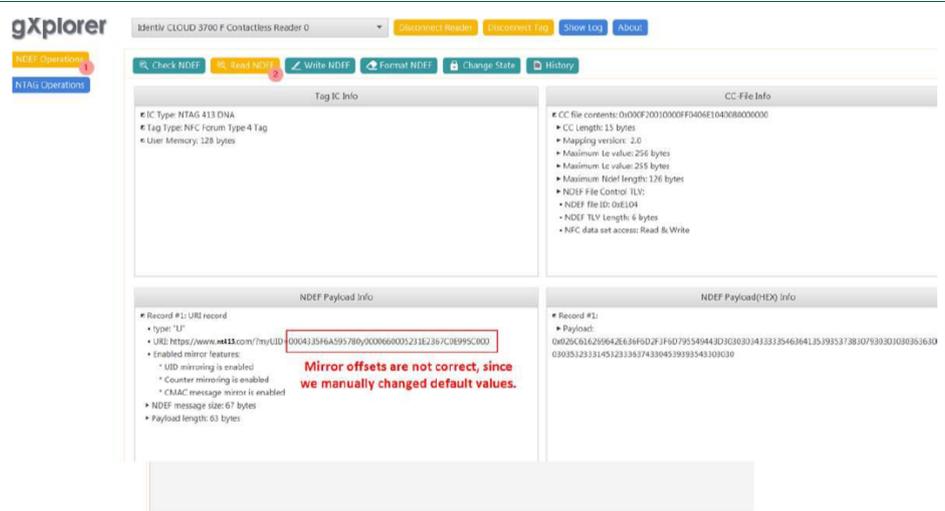


Figure 35. Check offset

4.16.3 Adopt offset values

1. Press „NTAG Operations“
2. Press „NTAG413DNA“
3. Select „NDEF Application“
4. Press „Select“

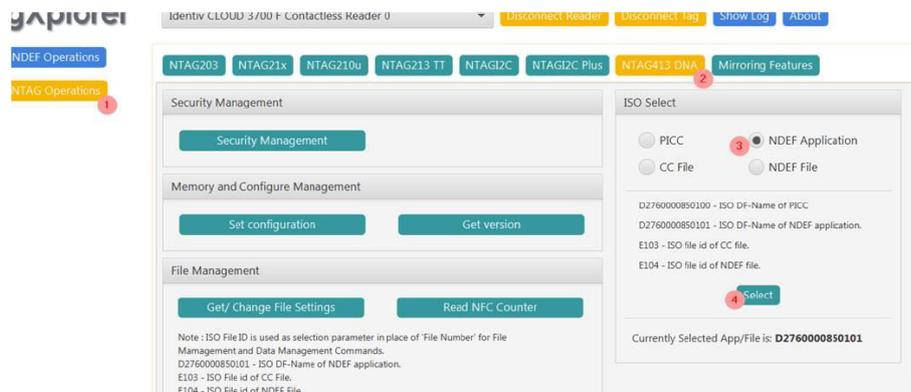


Figure 36. NTAG 413 DNA - Adopt offset values

4.16.4 Review file settings

1. Press „Get/Change File Settings“
2. Select File „02“ (NDEF File)
3. Press „Get File Settings“
4. Press „OK“

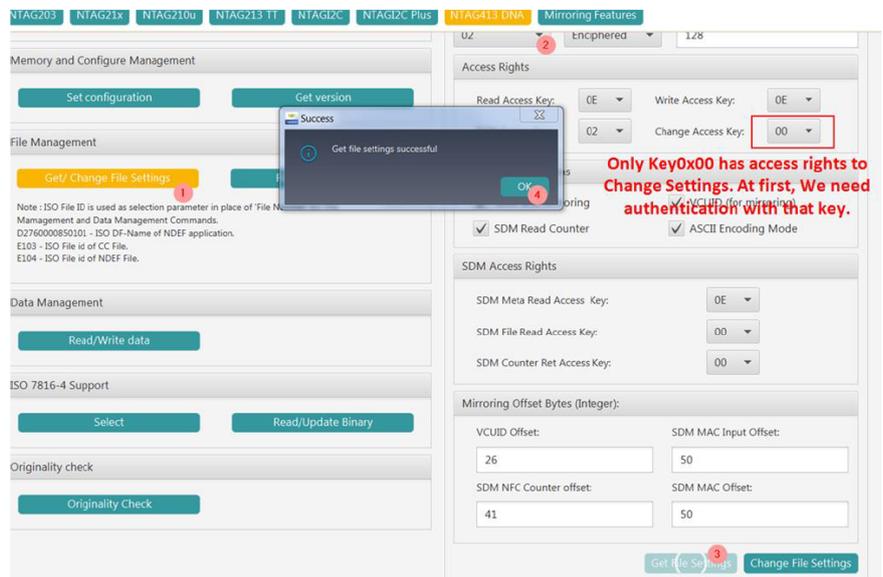


Figure 37. NTAG 413 DNA Review file settings

4.16.5 Authenticate

1. Press „Security Management“
2. Enter Key (Default Key: 00..00)
3. Press „Authenticate First“

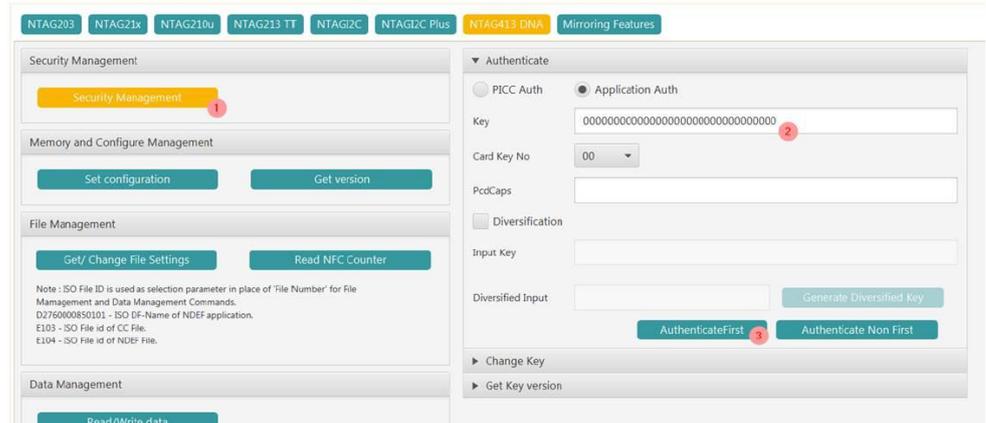


Figure 38. Authenticate

4.16.6 Change file settings

1. Enter previously recorded values for UID Offset...
2. Counter Offset, ...
3. Mac Input Offset
4. MAC Offset  
(If MACInputOffset == MAC Offset, the message to be signed will be NULL; otherwise it will be the hex values between MACInputOffset and MACOffset-1)
5. Press „Change File Settings“
6. Press OK

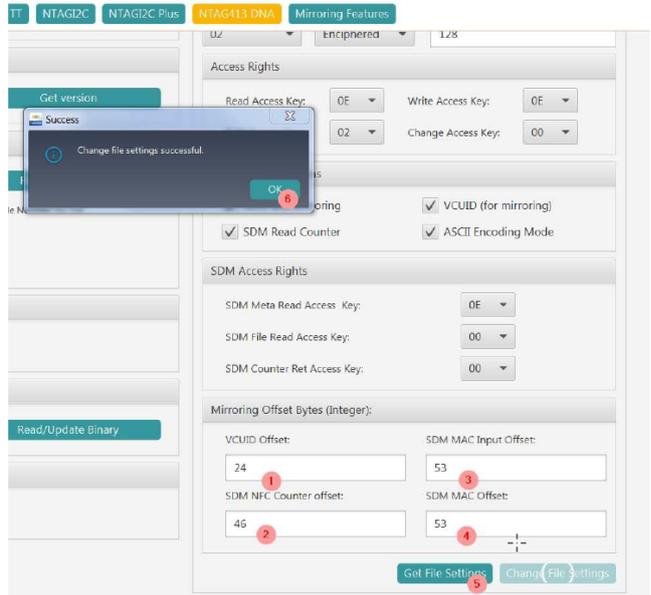


Figure 39. Change file settings

4.16.7 Check operation

1. Press „Disconnect Tag“
2. Press „Disconnect Reader“
3. Press „Connect Reader“
4. Press „Connect Tag“
5. Press „NDEF Operations“
6. Press „Read NDEF“

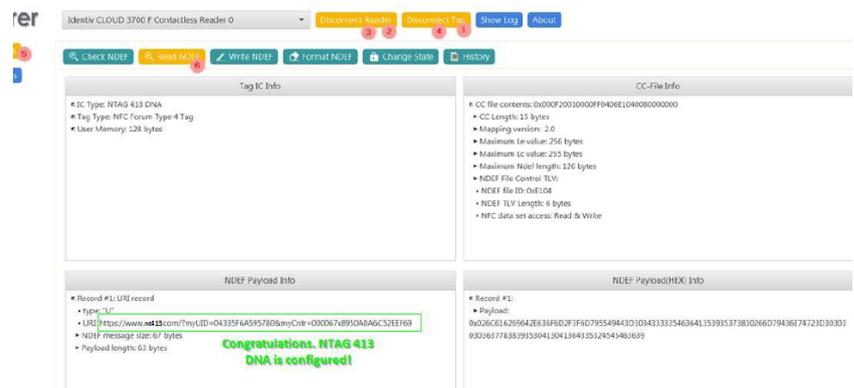


Figure 40. NTAG 413 DNA - Check operation

## 5 Reference documentation

NXP provides several documents to support the development of customized antennas.

### 5.1 Data sheets

NXP provides the following data sheets:

- NTAG203F, NFC Forum Type 2 Tag compliant IC with 144 bytes user memory and field detection; [http://www.nxp.com/restricted\\_documents/53420/NTAG203F.pdf](http://www.nxp.com/restricted_documents/53420/NTAG203F.pdf)
- [NTAG210\\_212](http://www.nxp.com/documents/data_sheet/NTAG210_212.pdf), NFC Forum Type 2 Tag compliant IC with 48/128 bytes user memory; [http://www.nxp.com/documents/data\\_sheet/NTAG210\\_212.pdf](http://www.nxp.com/documents/data_sheet/NTAG210_212.pdf)
- NTAG213\_215\_216, NFC Forum Type 2 Tag compliant IC with 144/504/888 bytes user memory [http://www.nxp.com/documents/data\\_sheet/NTAG213\\_215\\_216.pdf](http://www.nxp.com/documents/data_sheet/NTAG213_215_216.pdf)
- NTAG213F\_216F, NFC Forum Type 2 Tag compliant IC with 144/888 bytes user memory and field detection [http://www.nxp.com/documents/data\\_sheet/NTAG213F\\_216F.pdf](http://www.nxp.com/documents/data_sheet/NTAG213F_216F.pdf)
- NT3H1101/NT3H1201, NTAG I<sup>2</sup>C - Energy harvesting NFC Forum Type 2 Tag with field detection pin and I<sup>2</sup>C interface [http://www.nxp.com/documents/data\\_sheet/NT3H1101\\_1201.pdf](http://www.nxp.com/documents/data_sheet/NT3H1101_1201.pdf)
- NT3H2111/NT3H2211, NTAG I<sup>2</sup>C *plus*, NFC Forum Type 2 Tag compliant IC with I<sup>2</sup>C interface [http://www.nxp.com/documents/data\\_sheet/NT3H2111\\_2211.pdf](http://www.nxp.com/documents/data_sheet/NT3H2111_2211.pdf)

### 5.2 Application notes

NXP provides the following application notes:

- AN11141; NTAG203F, How to use the FD pin; [http://www.nxp.com/documents/application\\_note/AN11141.pdf](http://www.nxp.com/documents/application_note/AN11141.pdf)
- AN11383, NTAG21x Field Detection and sleep mode feature [http://www.nxp.com/documents/application\\_note/AN11383.pdf](http://www.nxp.com/documents/application_note/AN11383.pdf)
- AN11350; NTAG Originality Signature Validation; [http://www.nxp.com/documents/application\\_note/AN11350.pdf](http://www.nxp.com/documents/application_note/AN11350.pdf)

### 5.3 ISO/IEC standards

1. ISO/IEC 10373-6:2011, *Identification cards — Test methods — Part 6: Proximity cards*
2. ISO/IEC 14443-1:2008, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 1: Physical characteristics*
3. ISO/IEC 14443-1:2008/Amd 1:2012, *Additional PICC classes*
4. ISO/IEC 14443-2:2010, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 2: Radio frequency power and signal interface*
5. ISO/IEC 14443-2:2010/Amd 2:2012, *Additional PICC classes*
6. ISO/IEC 14443-3:2011, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 3: Initialization and anticollision*
7. ISO/IEC 18092:2004, *Information technology — Telecommunications and information exchange between systems — Near Field Communication — Interface and Protocol (NFCIP-1)*
8. ISO/IEC 21481:2012, *Information technology — Telecommunications and information exchange between systems — Near Field Communication Interface and Protocol -2 (NFCIP-2)*

## 6 Legal information

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