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## ST25 webservice demonstration for ST25TN512, ST25TN01K, ST25TV512C, and ST25TV02KC devices

### Introduction

The ST25 webservice is a web service that handles the ST25 Augmented NDEF (ANDEF) information's provided into a URL query string. The Augmented NDEF is an NDEF URL plus query string with dynamic parameters coming from the ST25TV512C, ST25TV02KC, ST25TN512, and ST25TN01K.

In this document, the term ST25TVxxxC refers interchangeably to ST25TV512C or ST25TV02KC and the term ST25TN refers interchangeably to ST25TN512 or ST25TN01K.

This demo shows the ST25TVxxxC and ST25TN Augmented NDEF features to automatically connect to a web service platform by simply tapping the tag without the need for a dedicated app installed on the mobile NFC device.

This ST25 webservice demo covers:

- ST25 tag authentication: It uses the tag UID and checks if the tag belongs to STMicroelectronics NFC tags and more precisely to ST25TVxxxC.
- Product identification and information: It uses the custom field to identify the product (for instance, wine, perfume, or drugs).
- Anti-tampering: It checks the tamper values (only for ST25TVxxxC).
- Unique tap code: It handles unique tap code value.

Depending on ANDEF parameters, the demo gives a global validity status about an NFC tag and/or a product.

This demo could be reused for a wide range of use cases:

- Anti-counterfeit solution
- Product information
- Product authentication
- Consumer loyalty
- Consumer engagement
- Asset tracking

Whole source code of the demo is available on demand and could be shared through a secure delivery process.

This document aims to help the user to understand how to use the webservice demo.

# 1 Quick start

ST25 webservice demo uses a simple URL with a query string that looks like:

<https://www.myst25.com/andef/index.php?data=E002080007AAC7CBxWINE0000x611x00c>

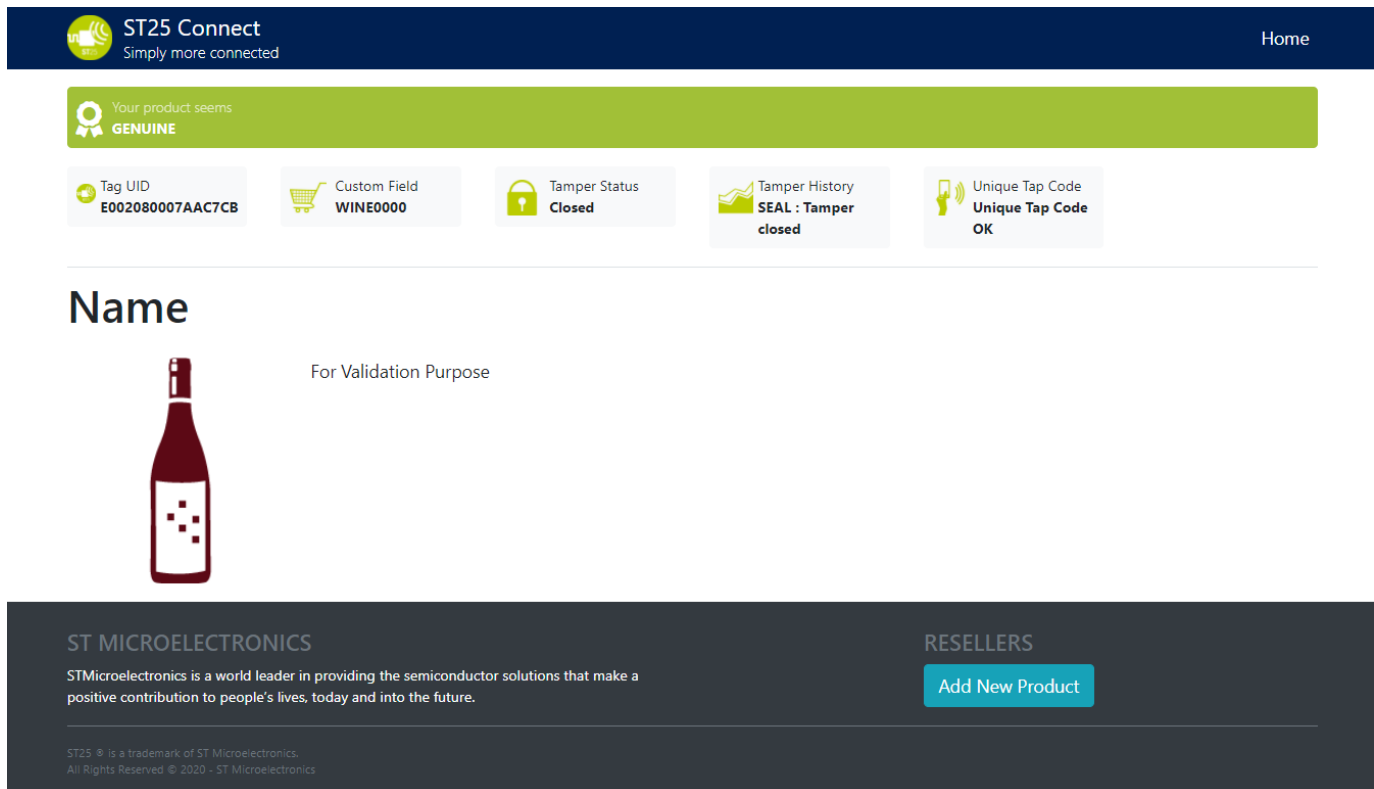
Where:

- <https://www.myst25.com/andef/index.php?data=>: is the host or domain name of the webservice, and the parameter name in the receiving data page. This part is static and depends on customer application.
- E002080007AAC7CBxWINE0000x121x00c: is the dynamic query string parameters value. This part is dynamic and automatically filled with the Augmented NDEF attributes coming from the tag and enabled by the customer application.

The webservice uses the parameters sent to the query string and handles them in order to give a global status on a product.

Hereafter, an example of the webservice demo with the above URL:

Figure 1. ST25 webservice demo overview



This demo must be used accordingly with one of our ST25 mobile application (Android™ or iOS®) or ST25PC software:

- ST25PC-SW: <https://www.st.com/en/embedded-software/stsw-st25pc001.html>
- Android™: <https://www.st.com/en/embedded-software/stsw-st25001.html>
- iOS®: <https://www.st.com/en/embedded-software/stsw-st25ios001.html>

These software use dedicated menus to configure the ST25 Augmented NDEF feature, and hence to compose the NDEF URL with the query string to be sent to the ST webservice.

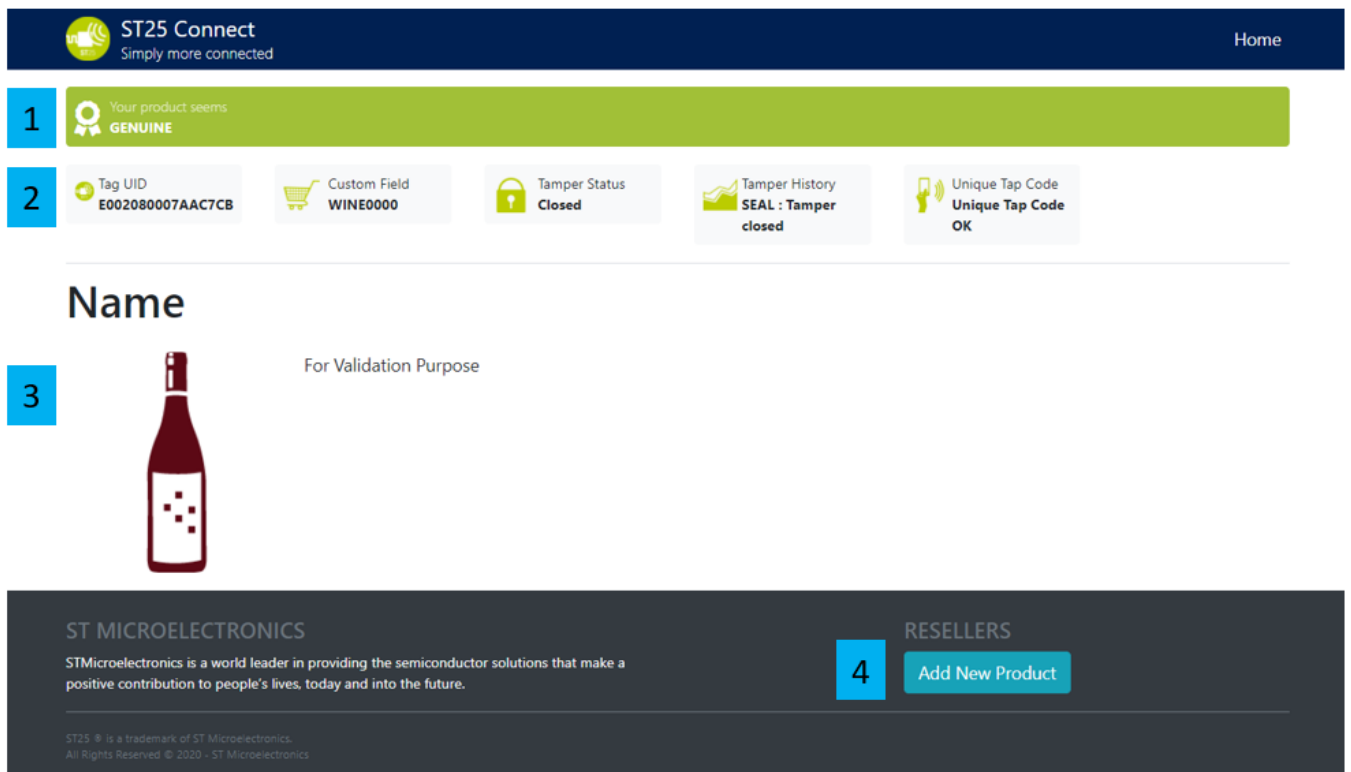
## 2 ST25 webservice overview for ST25TVxxxC devices

For ST25TVxxxC devices, the URL query string "**MUST**" be formatted as follows:

- Host domain URL: <https://www.myst25.com/andef/?data=>
- Separator field: "x"
- ANDEF parameters: UID + CustomField + UniqueTapCode + TamperDetect.
- For instance: <https://www.myst25.com/andef/index.php?data=E002080007AAC7CBxWINE0000x611x00c>

The ST25 webservice demo for ST25TVxxxC ANDEF is divided in four parts as highlighted in blue in the Figure 2 and explained below:

Figure 2. ST25 webservice overview for ST25TVxxxC devices



1. **Global status** of the Tag or the Product, according to each individual status of the ANDEF parameters defined in point 2:
  - **GENUINE**: all individual ANDEF parameters are valid. the product or the NFC tag is not suspicious.
  - **DOUBTFUL**: one of the ANDEF parameters is invalid.

## 2. Individual ANDEF Parameters status:

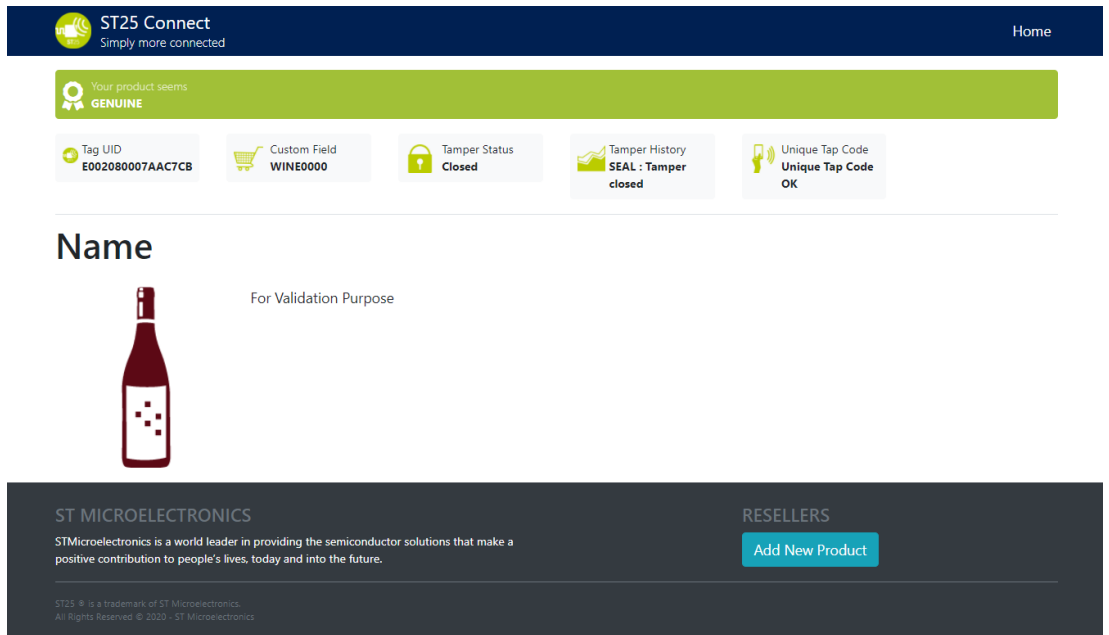
- **Tag UID** checks if the tag UID from ANDEF parameters is from STMicroelectronics, or belongs to ST25TVxxxC devices.  
A RED message is displayed otherwise:
  - If UID is not from STMicroelectronics: **This is not a ST25 NFC Tag!!!**
  - If UID is not a ST25TVxxxC UID: **This is not a ST25TV Tag!!**
- **Custom Field** checks if custom field is valid or not. The server uses a SQL database where each tag UID is linked with a custom field. A custom field corresponds to a consumer product. The server checks if the custom field is in the SQL database for the given UID. Depending on the application, it is up to the webservice solution developer to decide what information to be stored into the custom field.  
On the above example, the custom field is defined as WINE0000. It corresponds to a wine product. In this case, if the custom field is not equal to WINE0000, it returns an error message.  
For example:
  - When the product is found: **WINE0000**
  - When the product is not found: **WINE0000 custom field not found**
- **Tamper Status** gives information about the value of tamper detect retrieved from the ANDEF parameters. In details:
  - When the tamper value is shorted: **Closed**  
This means that all is OK, and that the product is sealed.
  - When the tamper value is opened: **Opened**  
It should be interpreted as a “Warning” indicating that the product has been opened.
  - **Tamper History** gives information about the values of Tamper History retrieved from the ANDEF parameters.
    - When the Tamper History field is good or seal: **SEAL: Tamper closed**
    - When the Tamper History field is resealed: **RESEAL: Tamper opened once**  
Tamper has been opened once then resealed.
    - When the Tamper History field is open: **OPEN: Tamper opened**
    - When the Tamper History field is invalid or not recognized by the server: no message displayed and status set in orange color.
- **Unique Tap Code (UTC)** gives the status about the validity of the unique tap code. The webservice uses internally a proprietary algorithm to compute UTC and then to check if UTC is valid. Refer to AN5578 - Unique tap code for ST25TV512C and ST25TV02KC devices, for more details about the unique tap code mechanism and contact your STMicroelectronics sales office to get this document.
- When UTC is valid: **Unique Tap Code OK**
- When UTC is not valid: **Unique Tap Code Invalid**

3. **Product description**

In addition to checking query string parameters, the webservice uses a MySQL database for each product linked to the UID and Custom Field.

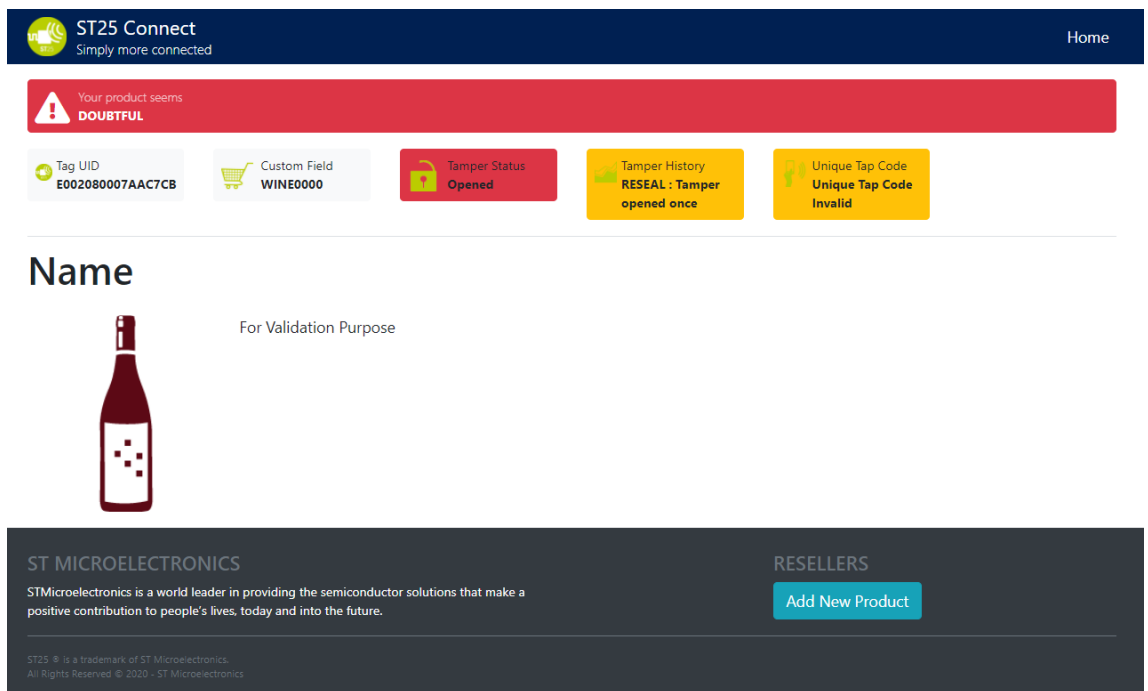
- All ANDEF parameters are valid: the webservice displays a product image and a product description according to the different information received into the ANDEF query string parameters.

**Figure 3. Known product and valid query string parameters**



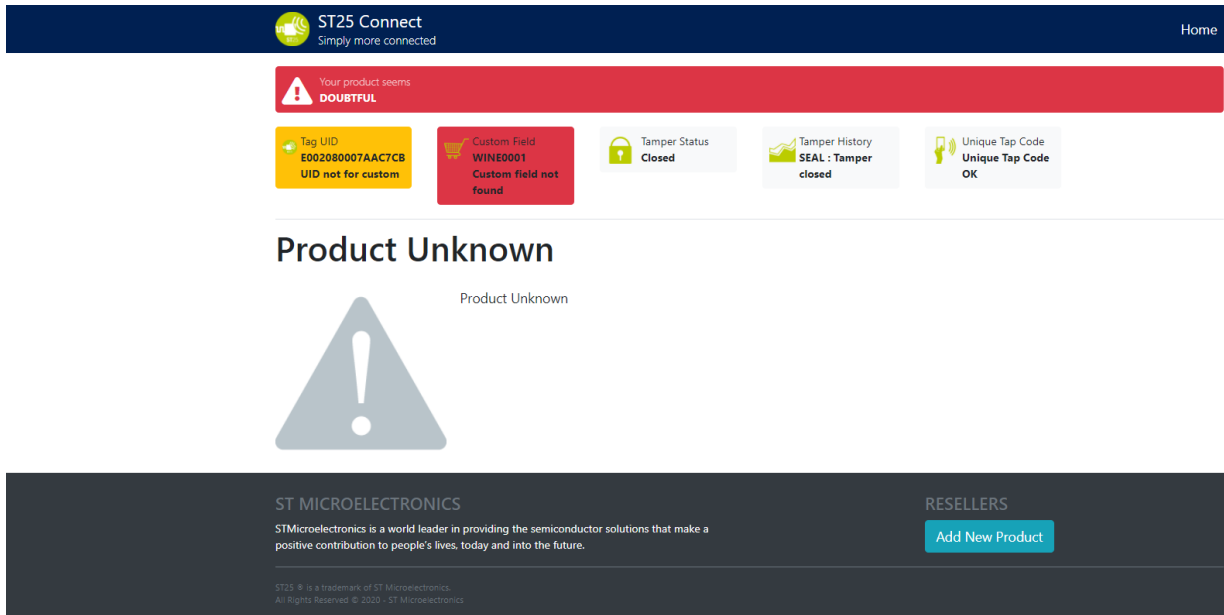
- One of the query string parameter is invalid (Tamper Status, Tamper History, or Unique Tap Code):

**Figure 4. Wrong tamper or unique Tap Code Values**



- Whenever the product is not found in the DataBase (wrong UID or customField):

Figure 5. Product Unknown (wrong UID or Custom Field)



4. **How to Add New Product**

The button “Add New Product” helps the user to add a new product into the webserver. When the user presses this button, an HTML form is displayed, and the following product form is used to collect user inputs.

Figure 6. Product form

## Product Infos

All fields marked with \* are required

UID (16 ASCII characters) \*

Custom (8 ASCII characters) \*

Tap Counter ⊕

Name

Description

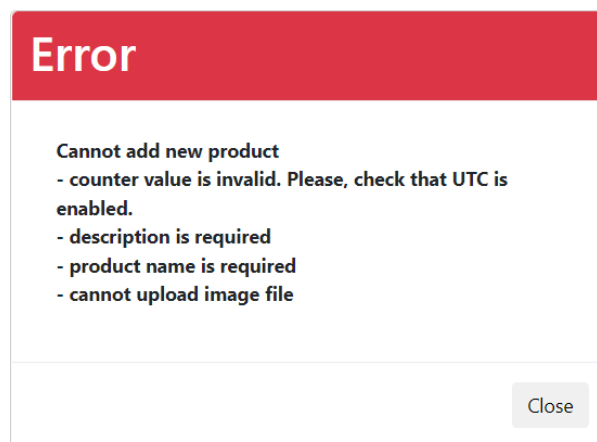
Product Image Name \*

In details:

- **UID** contains the TAG UID. It must use 8-byte data length (or 16 string characters).
- **Custom** contains the custom field value. It must be defined as a string of six characters.
- **Tap Counter** a four characters for Initial unique Tap Code. If the counter value is "111", a message warns users that UTC is not enabled.
- **Name**: this string defines the product name to be displayed when the product is found.
- **Description**: product description.
- **Product Image Name**: in this field, the user uploads on the server the image used for the product description.

If one of the user input is invalid or missing, an error window is displayed (See the figure below):

Figure 7. Error message



### 3 ST25 webservice overview for ST25TN devices

For the ST25TN devices, the query string must be formatted as follows:

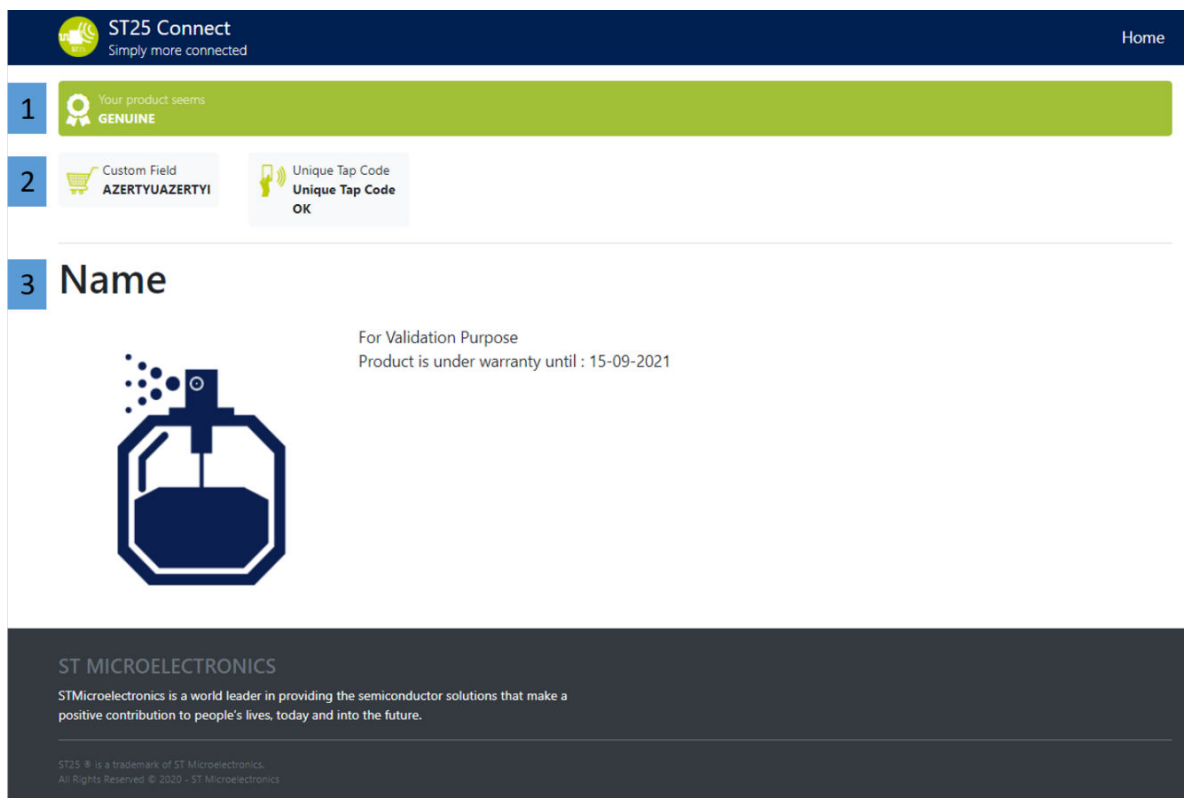
- Host domain URL: <https://www.myst25.com/andef/?data=>
- Separator field: "x"
- ANDEF parameters: UID or Custom Field + Unique Tap Code
- Example with UID: <http://www.myst25.com/andef/index.php?data=020EE565042000x411>
- Example with Custom Field: <http://www.myst25.com/andef/index.php?data=AZERTYUAZERTYIx411>

Note:

*In the ANDEF query string, the choice between UID or Custom Field depends on the type of application.*

The ST25 webservice demo for ST25TN devices is divided in three parts as highlighted in blue in the Figure 8, and explained below:

Figure 8. ST25 webservice overview for ST25TN devices

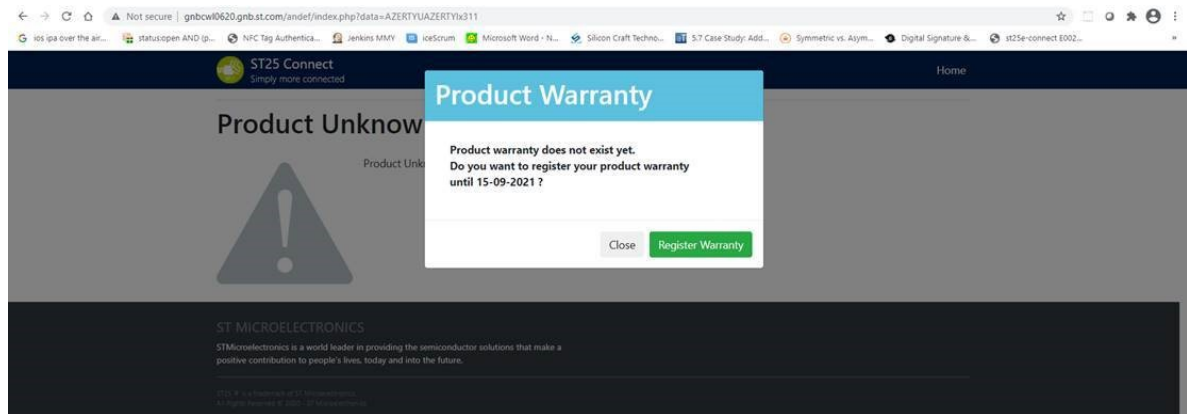


1. **Global status** of the Tag or the product according to each individual status of ANDEF parameters defined in the point 2:
  - **GENUINE:** All individual ANDEF parameters are valid. the product or NFC tag is not suspicious.
  - **DOUBTFUL:** One of the ANDEF parameters is invalid.



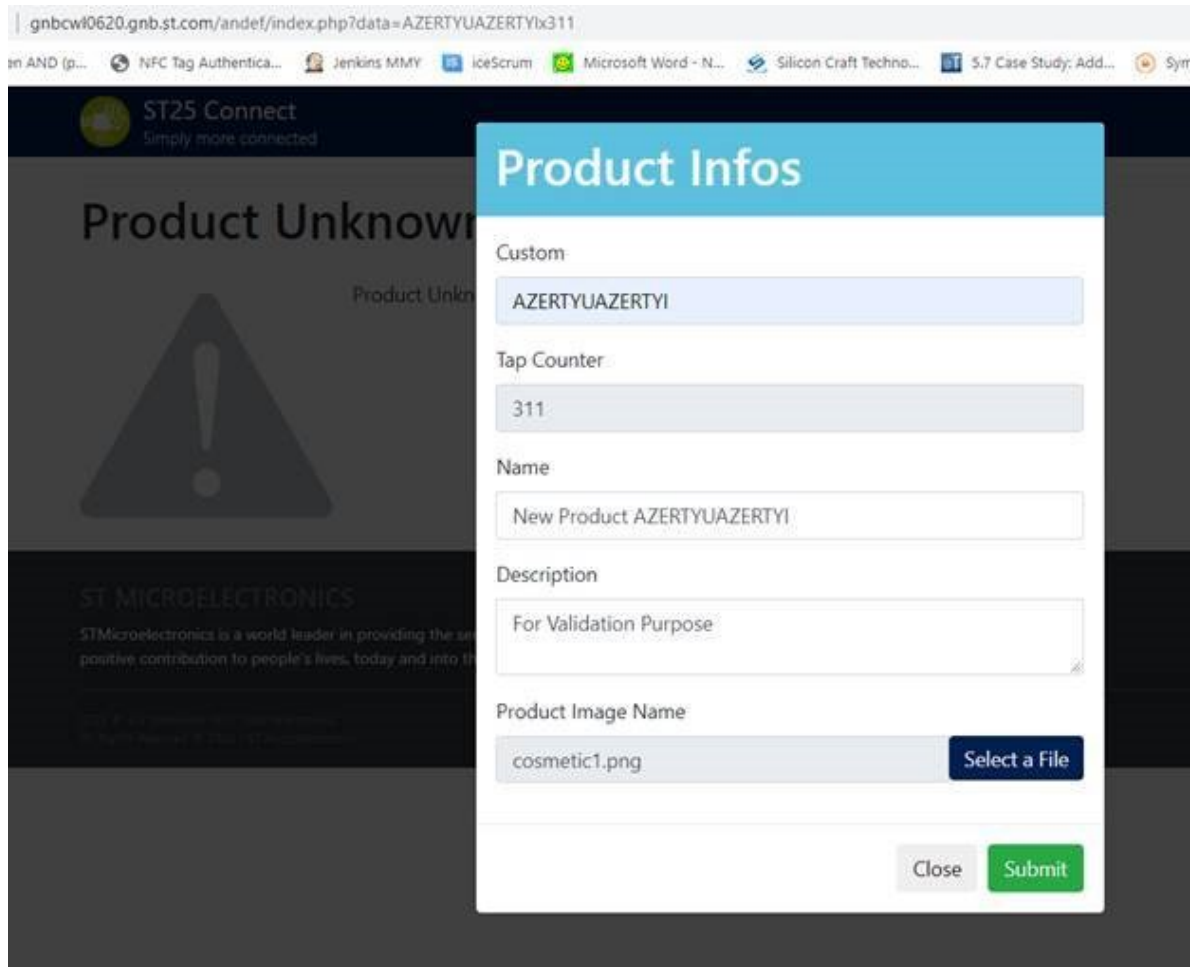
- 2. – Whenever ANDEF starts with “0x02” to indicate that the UID is used, for instance: <http://www.myst25.com/andef/index.php?data=020EE565042000x411>
  - The tag UID checks if the TAG UID from ANDEF parameters belongs to STMicroelectronics, or belongs to ST25TN devices. For ST25TN devices, the UID must be 14 characters in ASCII length, and started by “0x02”.  
A RED message is displayed otherwise. For instance:
    - If UID is not from STMicroelectronics: **This is not an ST25 tag!!!**
    - If UID is not equal to 14 characters in ASCII length, or if the unique tap code is not three characters in ASCII length, or the separator field is not “x”, the following error is displayed: **URL invalid.**
- Whenever ANDEF starts with something different from “0x02”, which indicates that custom field is used, for instance <http://www.myst25.com/andef/index.php?data=AZERTYUAZERTYix411>:
  - Custom field must be 14 characters in ASCII length.
  - If custom field is not found into SQL webservice database, a pop-up demo for “Product Warranty” is displayed (See figure [Figure 9](#)).

Figure 9. Product warranty pop-up



It invites the user to register the product in the webservice with product information as its name, its description, and its image (See figure [Figure 10](#)).

Figure 10. Product registration for ST25TN devices



3. Unique tap code (UTC) gives the status related to the validity of the unique tap code. The ST25 webservice uses a proprietary algorithm to compute UTC. This algorithm checks if UTC is valid.
  - When UTC is valid: **Unique Tap Code OK**
  - When UTC is not valid: **Unique Tap Code invalid**

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## 4 ST25 webservice deliverable

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The webservice is an open-source server, and is accessible on the <http://www.myst25.com/andef> web page.

The whole ST25 webservice is developed in HTML5 and PHP7.0, and it uses a MySQL database. The source code can be delivered on demand.

Some of the URLs referred to in this document are hosted by a third-party website. They are active at document publication, however STMicroelectronics shall not be liable for any change, move or inactivation of the URL or the referenced material.

## Revision history

**Table 1. Document revision history**

Date	Revision	Changes
02-Feb-2022	1	Initial release.
24-Jan-2023	2	Updated: <ul style="list-style-type: none"><li>• Section 1 Quick start</li><li>• Figure 6. Product form</li><li>• Figure 7. Error message</li></ul>

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