UM2274
User manual

iOS NFC application for ST25 products

Introduction

This document describes the functionalities of the ST25 NFC iOS application, helping the user to understand the application features and how to use them.

The ST25 NFC iOS App is an Apple iOS application for reading ST25 NFC/RFID tags and ST25 Dynamic NFC tags that contain data in the NFC Data Exchange Format (NDEF). It allows the user to read or display NDEF messages such as URL, text, SMS, Email, vCard (including picture), phone call, calendar event, geolocation, and any kind of URIs. Depending on option, the user can automatically run iOS applications according to NDEF messages, whose individual content is displayed in both raw and decoded formats.

Bluetooth® pairing NDEF demonstration is also included in the application, that allows the user to pair with iPhone and ST25DV Discovery kit, and to display in real time the battery and RSSI levels of the ST25DV Discovery kit. The Bluetooth® pairing demonstration requires specific firmware and discovery kits.

The ST25 NFC iOS application is based on the STSW-ST25IOS001 (binary package) and STSW-ST25IOS002 (source code), both available on *www.st.com*, and operates with ST25 NFC/RFID tags and ST25 Dynamic NFC tags.

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1 List of acronyms

Table 1. List of acronyms

Acronym	Description
BLE	Bluetooth® Low Energy
FW	Firmware
ISO	International Organization for Standardization
NDEF	NFC Data Exchange Format
PICC	Proximity Integrated Circuit (IC) Card
RFID	Radio Frequency IDentification
Tag	PICC in form of a patch, key fob or similar, without autonomous power source and not generating RF electromagnetic field, but capable of communicating with a reader / writer
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name

2 References

- DB3357 “iOS NFC application for ST25 products” databrief (available on *www.st.com*)
- Datasheets of ST25 devices (available on *www.st.com*)

3 Overview

This section describes the main features of the ST25 NFC iOS application, available on *www.st.com*, as well as the prerequisites to use it.

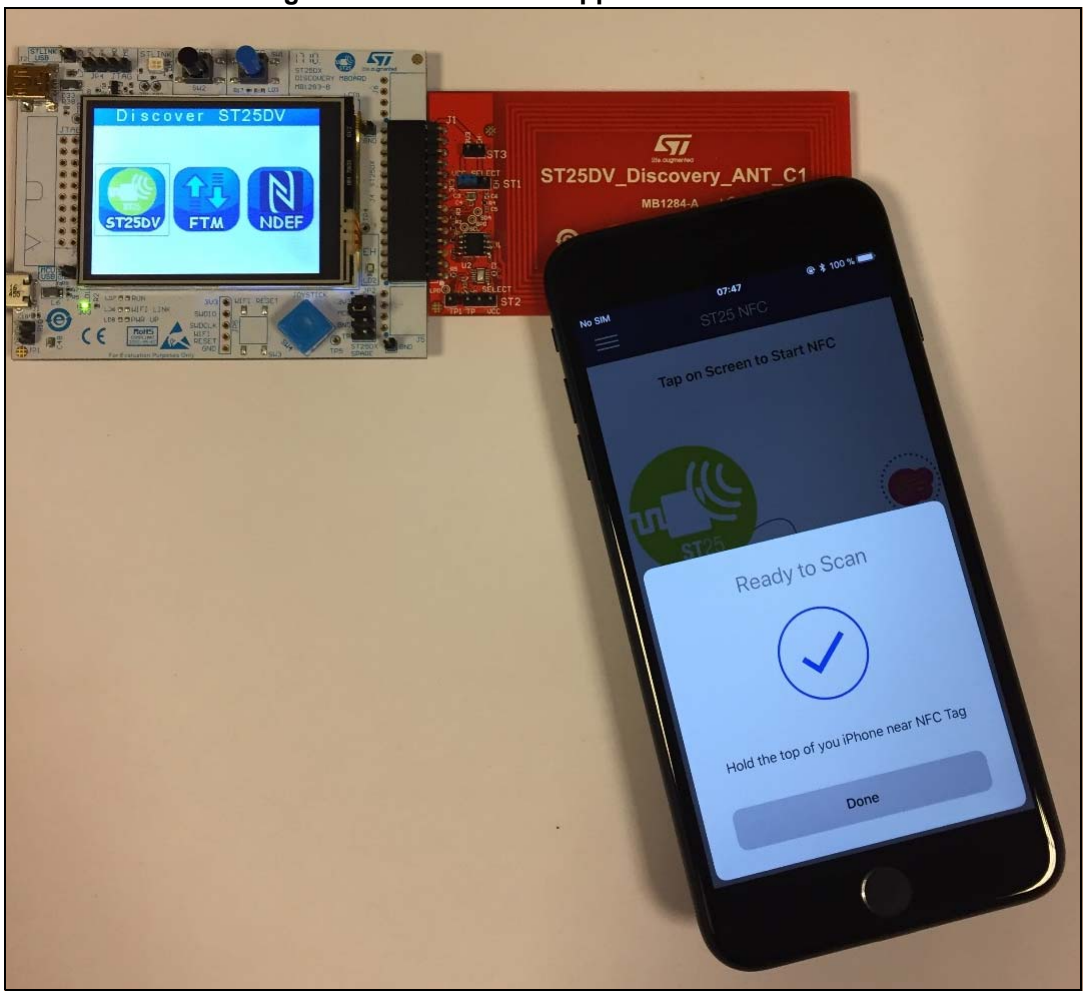
3.1 Prerequisites

The prerequisites to run the application are

- an iPhone7 or higher iPhone Mobile with iOS11 latest version
- iTunes for Windows® or macOs®

Note: Pictures used in this document illustrate the firmware features. They are based on version 1.0.0 of the application. Some discrepancies can appear between the documentation and the application.

Figure 1. ST25 NFC iOS application overview



3.2 Functionalities overview

The ST25 NFC iOS application allows to handle the following STMicroelectronics products:

- ST25 NFC / RFID Tags
- ST25TA series NFC tags (with CLOUD ST25TA02K-P board)
- M24SR series Dynamic NFC Tags (with X-NUCLEO-NFC01A1 and M24SR Discovery boards)
- LRIxx NFC tags
- M24LR series Dynamic NFC Tags
- M24LR04E products, X-NUCLEO-NFC02A1 and M24LR Discovery kits

It supports reading of ST25 NFC/RFID tags and ST25 Dynamic NFC tags of types 1 through 5, containing data in the NFC Data Exchange Format (NDEF).

Writing mode is not supported in iOS11.

The ST25 NFC iOS application features are:

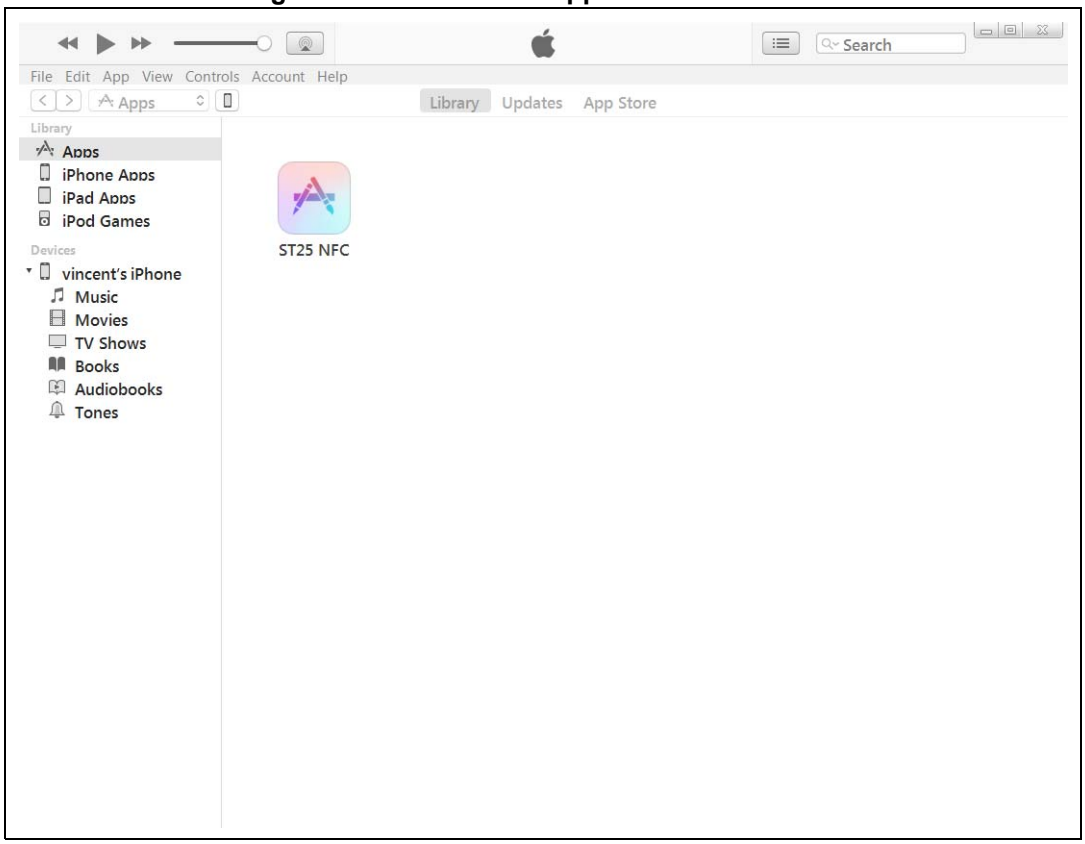
- Starting NFC session on demand
- Running NFC session (in foreground mode only)
- Reading NDEF messages that are NFC forum compliant:
  - URL
  - Text
  - SMS
  - Email
  - vCard with picture
  - Phone call
  - Bluetooth® pairing
  - Geolocation
  - URIs
- Support of ST25 NFC/RFID tags and ST25 Dynamic NFC tags
- Automatic run of iOS applications according to NDEF message type
- Bluetooth® pairing demonstration with ST25DV Discovery kit
- Maximum 60 seconds of scanning per session

3.3 Installation

This section describes how to install the ST25 NFC iOS App (IPA fil) using iTunes.

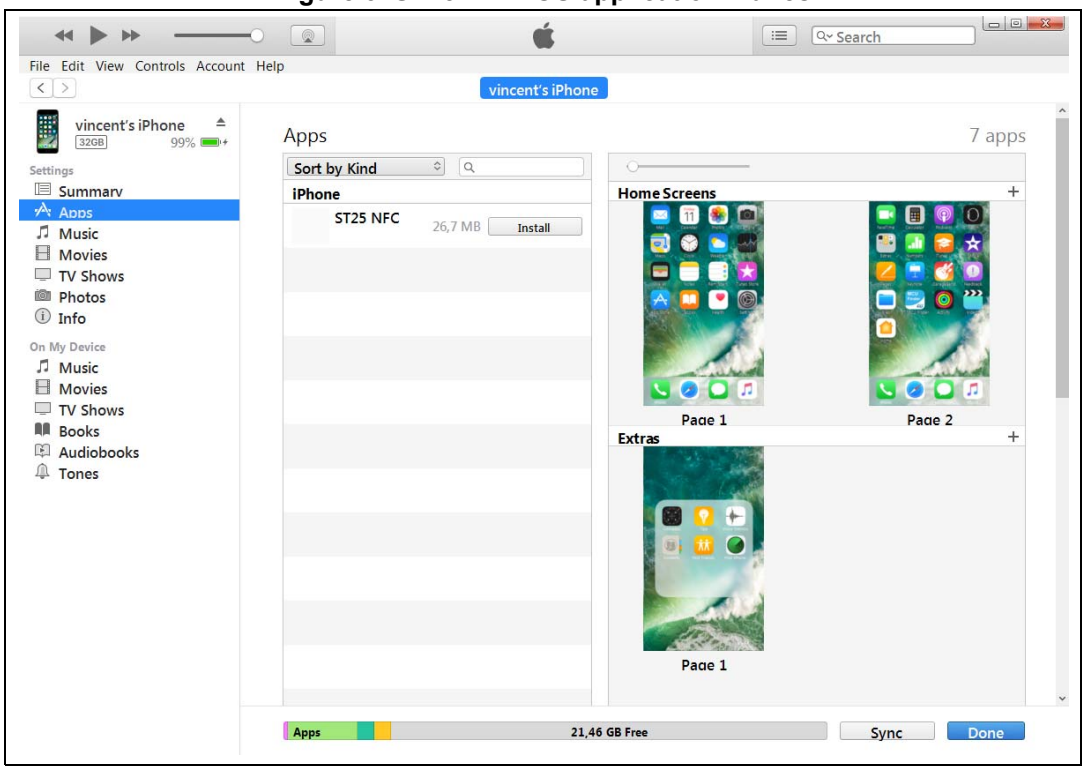
1. Download application files from the dedicated webpage available on *www.st.com* (*Figure 2*).

Figure 2. ST25 NFC iOS application installation



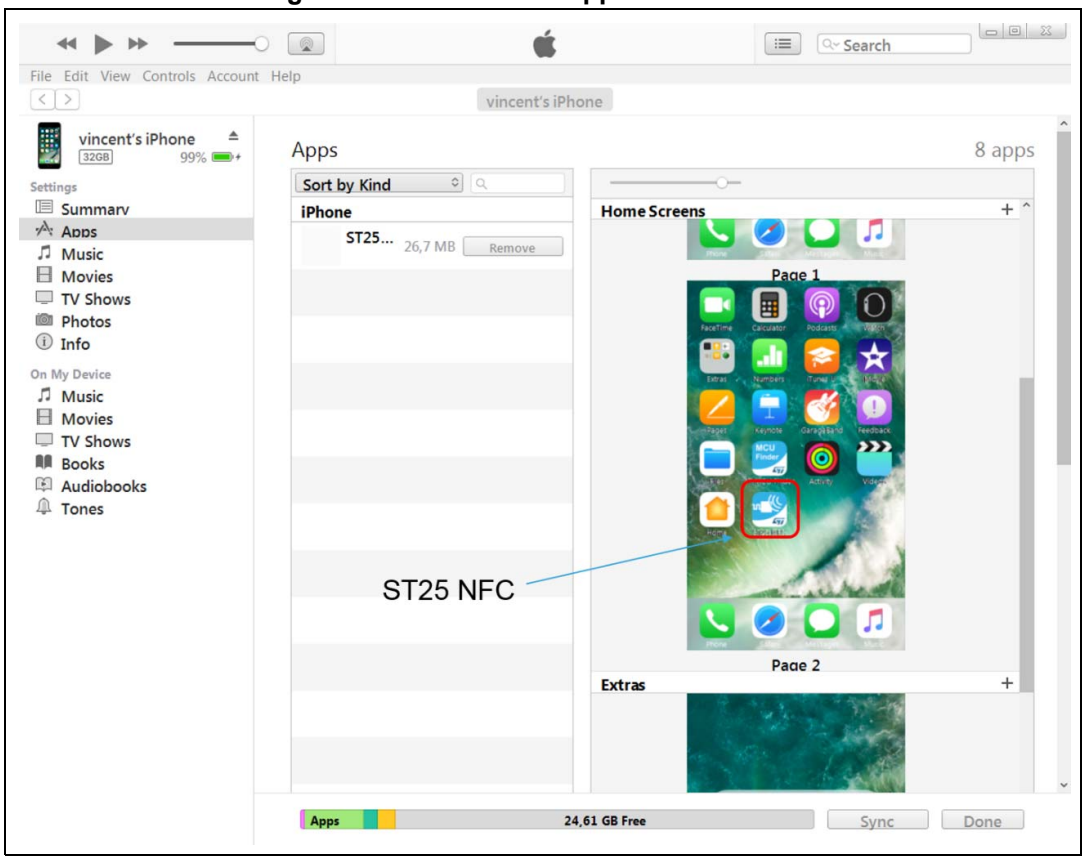
2. Open iTunes, then select the “Apps” section, within it select “Library” (*Figure 3*).

Figure 3. ST25 NFC iOS application iTunes



3. Drag and drop the file ST25NFCApp.ipa in the Library section (before connecting the iOS device to the computer).
4. Connect the iOS device to the computer, you should see your device in iTunes.
5. Select your device, go to “Apps” section of your device and search the application in the list of apps with “Install” button in front of it.
6. Hit the “Install” button and then press the “Done” button in the bottom right corner. The “Install” button will turn to “Will Install”, and an alert will be shown with two options:
   a) “Don’t Apply”
   b) “Apply”
7. Hit on option “Apply”.
8. The “App installation” will start on your device, with a progress bar indicating status.
9. The application will be installed on your iOS device, and you will be able to use it (*Figure 4*).
10. As you first open a manually installed enterprise application, you will see a notification that the developer is not trusted on your device. You will be prompted to go through a few steps to trust the application.
11. After having dismissed this message, you need to establish trust for the application developer, through Tap Settings > General > Profiles or Profiles & Device Management. Under the "Enterprise App" heading, you will see a profile for the developer (see https://support.apple.com for additional informations).
12. The application can be used.

Figure 4. ST25 NFC iOS application installed



4 Application description

The application is composed of the following main activities:

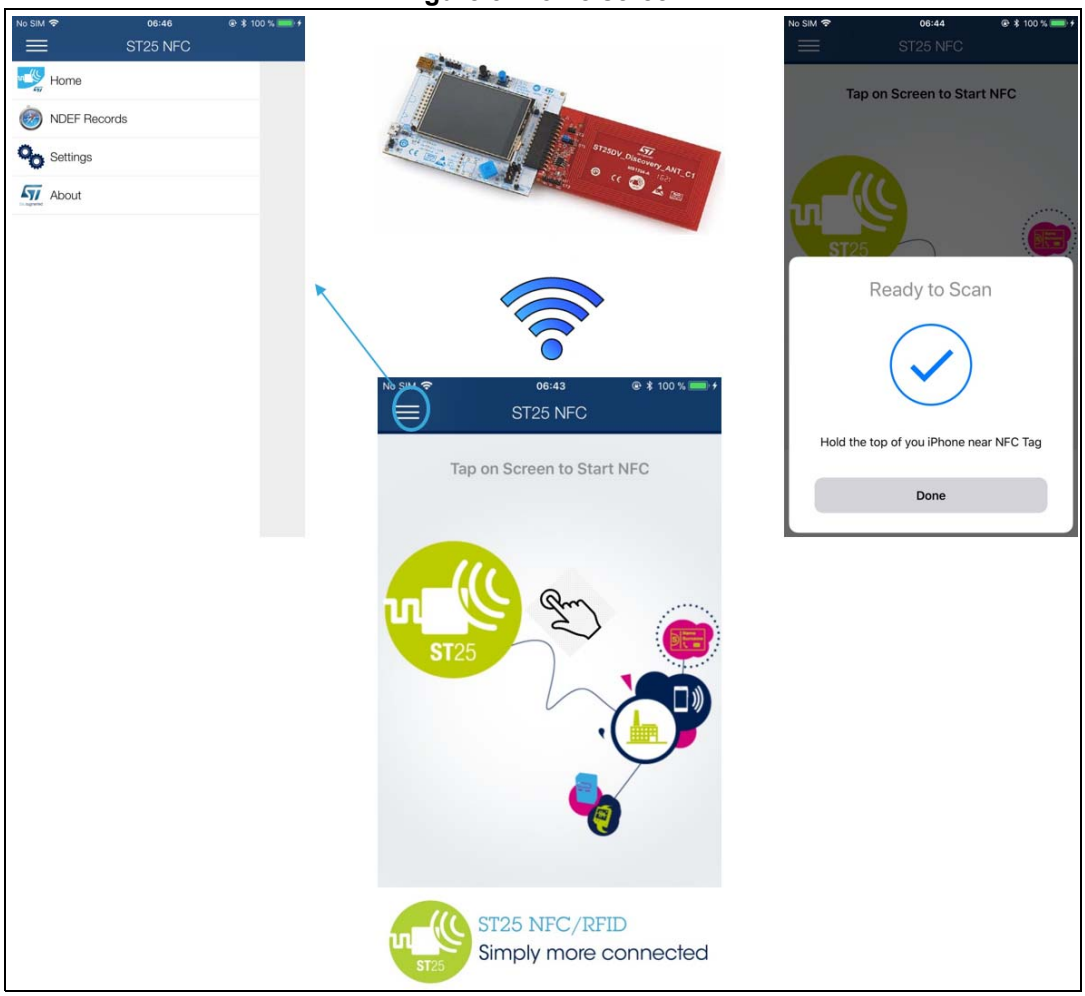
- Home screen to run NFC session on-demand
- NDEF editor with a list of NDEF records that contain:
  - NDEF icon type
  - NDEF messages, whose individual content is displayed in both raw and decoded format
  - Button action to run iOS application according to NDEF type
- Bluetooth® pairing demonstration with ST25DV Discovery kit:
  - Scan Bluetooth® devices
  - Connect via Bluetooth® to BLE device.
  - Display RSSI and battery levels of ST25DV Discovery kit
- A Setting menu that allows the user to:
  - Enable/Disable automatic run of iOS application whenever NDEF is detected
  - Enable/Disable RF Continuous loop to prevent stopping RF scan

The following sections describe the main activities and the associated functionalities, with demonstration use cases included in each section.

4.1 Home screen

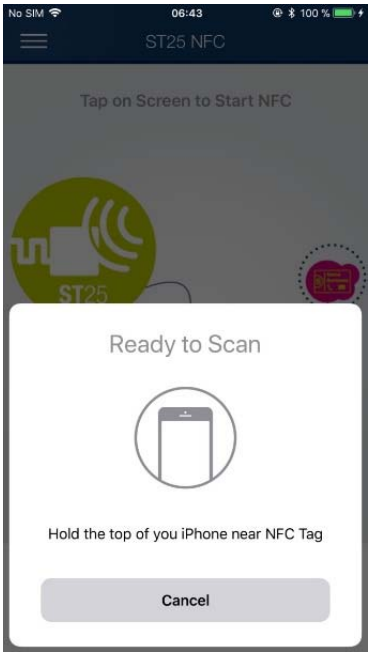
When the application starts, the user is invited to “tap” on screen to start an NFC session (*Figure 5*).

Figure 5. Home screen



Tap on screen, then hold the phone close to a compatible NDEF tag (the actual NFC antenna is in the upper part of the iPhone 7 and 7 Plus), and the overlay shown in *Figure 6* will appear.

Figure 6. iPhone ready to scan

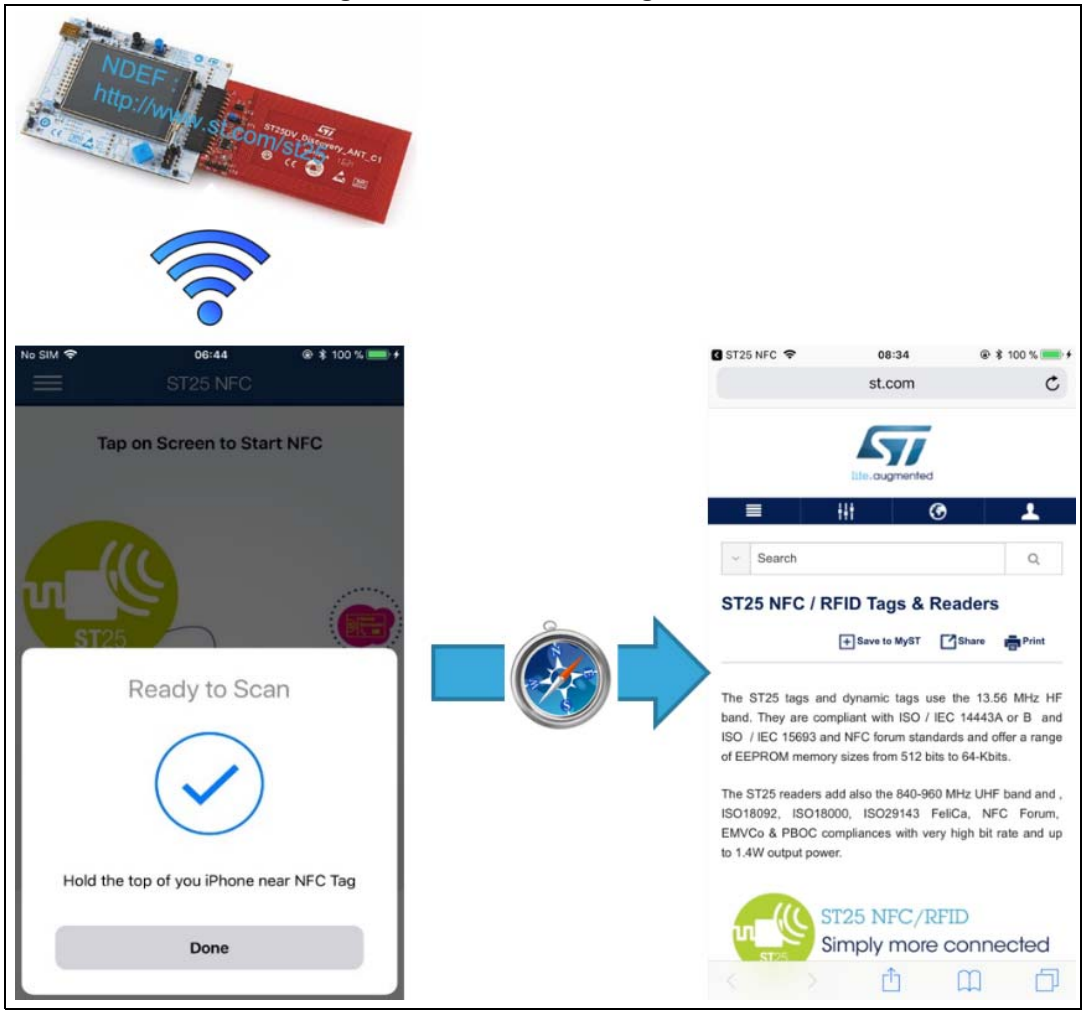


Once this dialog appears the user has about one minute to detect the iPhone close to the NFC tag to be read. The NFC session will expire after 60 seconds, the user needs to stop and restart it each time.

When an NDEF is detected, a check-mark is displayed on screen, then the ST25 NFC iOS App runs automatically the iOS “native” application according to NDEF type.

Figure 7 shows that the Safari® browser of iPhone is launched automatically with the URL read from the ST25 tag.

Figure 7. Home Screen Tag detected



Depending on NDEF message type, the ST25 NFC iOS App is able to run iOS native applications:

- URL: launches Safari® browser
- Text: launches Note and displays text
- SMS: launches Messages and composes SMS with phone number and message contained into NDEF
- Email: launches Mail and opens the email compose sheet
- vCard: launches Contact, then creates new contact if it does not exist yet
- Phone Call: launches Phone and initiates dialing of the specified phone number
- Bluetooth® pairing: launches Bluetooth® demonstration with ST25DV Discovery kit (see *Section 4.4*)
- Geolocation: launches the Map app, and shows geographical locations specified in NDEF (native map app URL string is http://maps.apple.com/?q= latitude>,<longitude>)

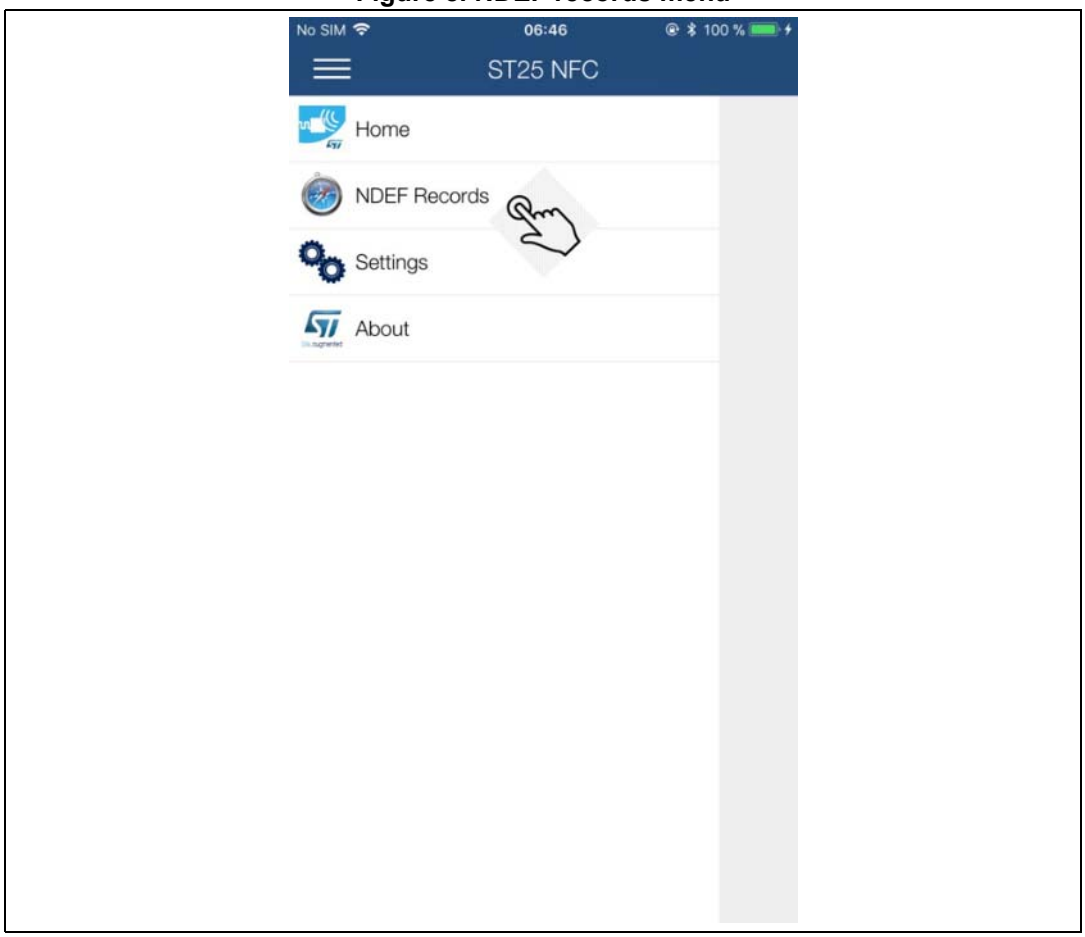
4.2 NDEF tag details

The ST25 NFC iOS App allows the user to display detailed NDEF messages in both raw and decoded formats, then to run the iOS native application if needed.

The feature is enabled only when the option “NDEF Run Native Application” in “Setting Menu” is turned off (see *Section 4.3*).

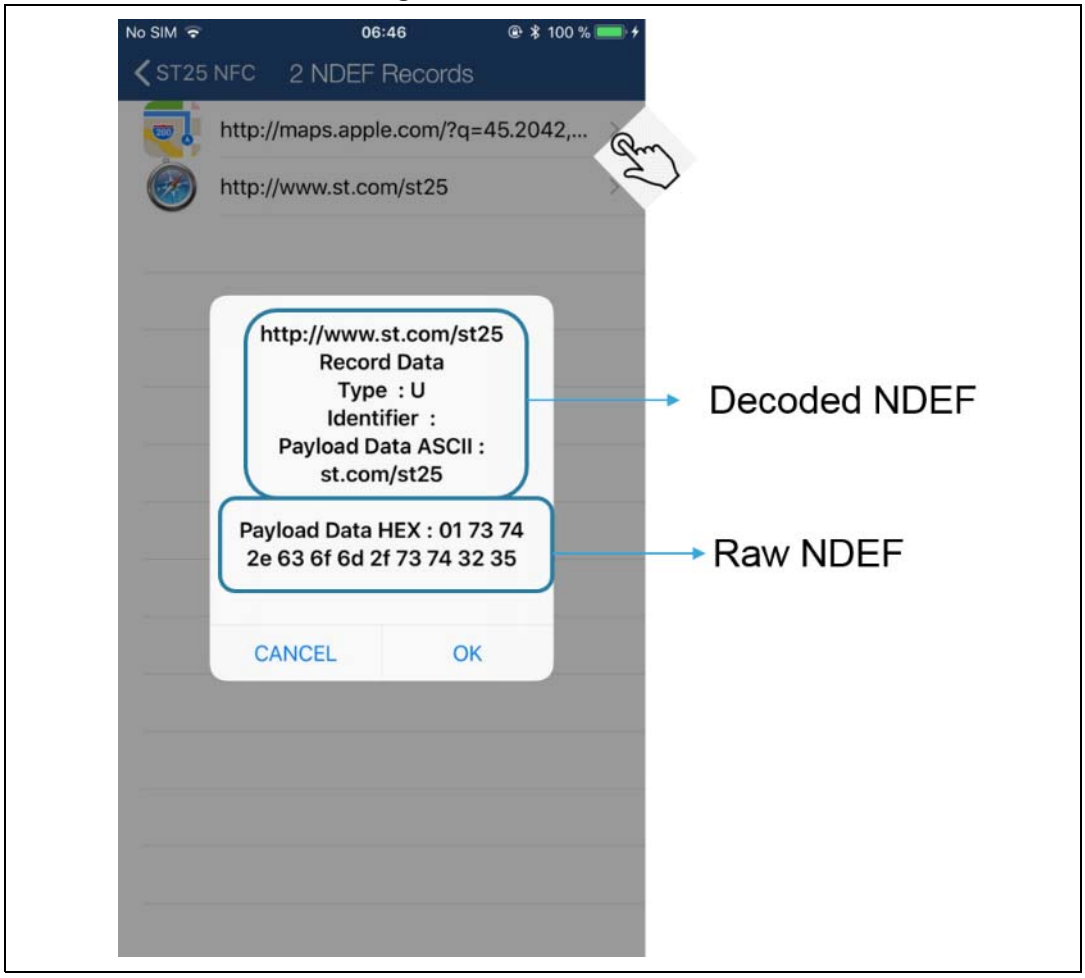
- Select “NDEF Record” item as indicated in *Figure 8*: this will display a new screen with the NDEF record list read from the ST25 tag.

Figure 8. NDEF records menu



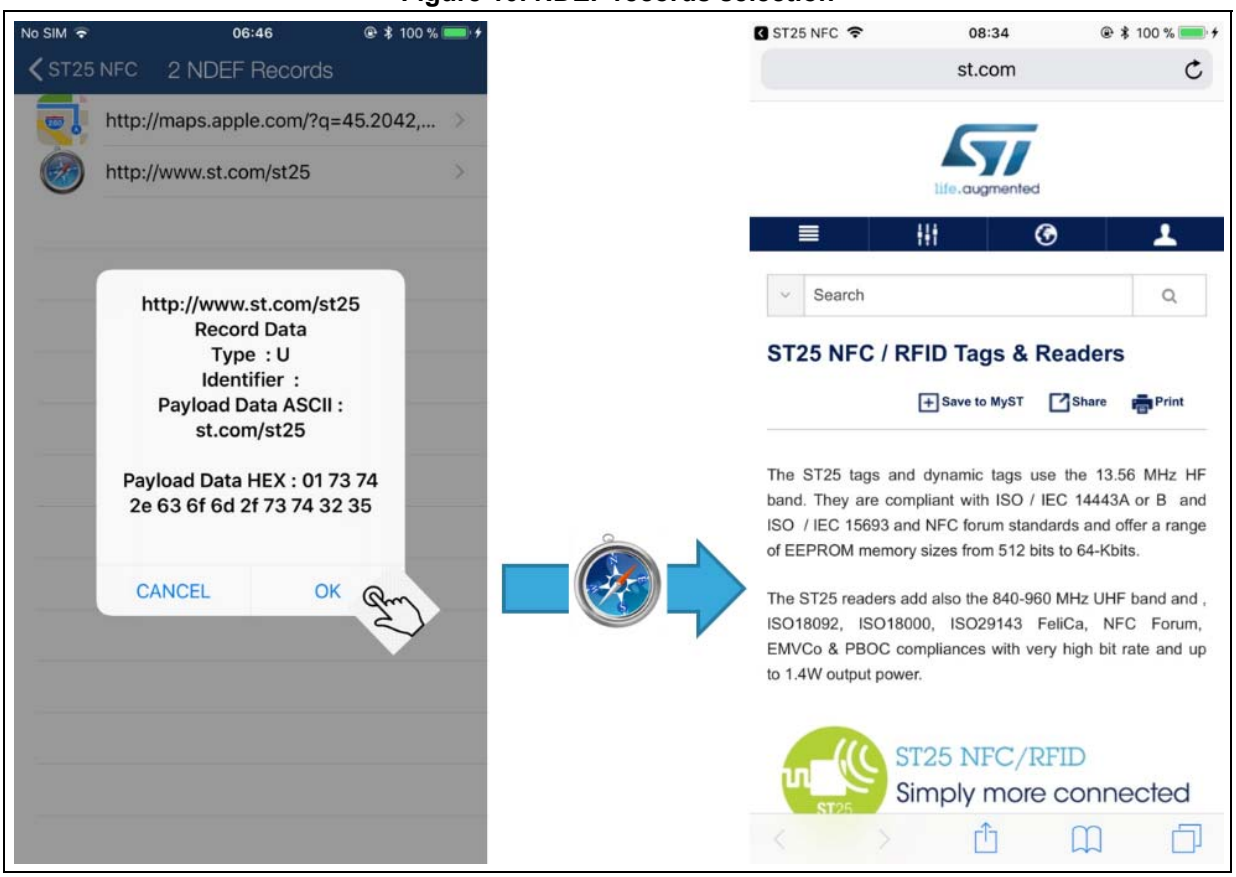
- Select one entry of the table to display the discovered messages. A pop-up dialog box (*Figure 9*) will display the message in both decoded and raw formats.

Figure 9. NDEF records list



- If the user acknowledges it (by tapping on the “OK” button), the ST25 iOS application will launch the iOS native application corresponding to the selected NDEF (*Figure 10*).

Figure 10. NDEF records selection

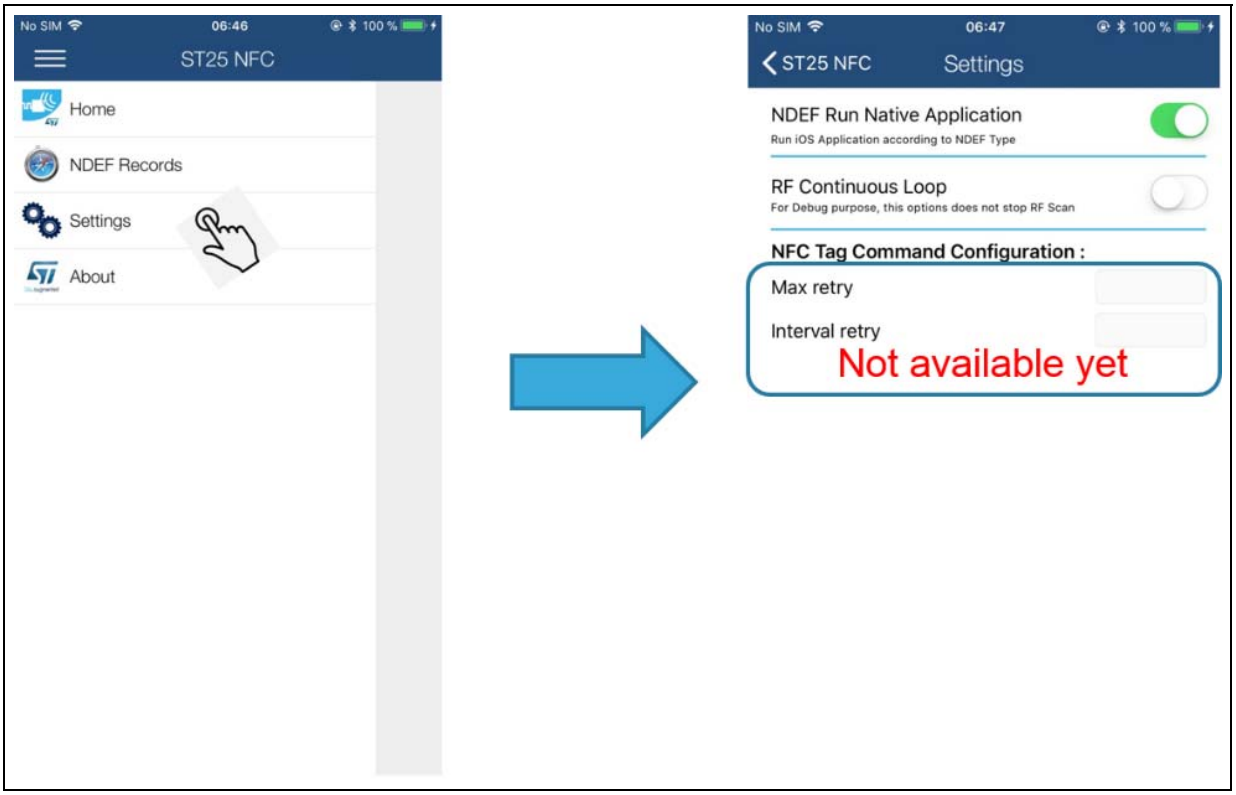


4.3 Setting menu

The Setting menu allows the user to change behavior of ST25iOS NFC application depending on the option configuration.

- Select “Setting” item (*Figure 11*) into Menu list: this displays a new screen with the different configuration for the application.

Figure 11. Setting menu



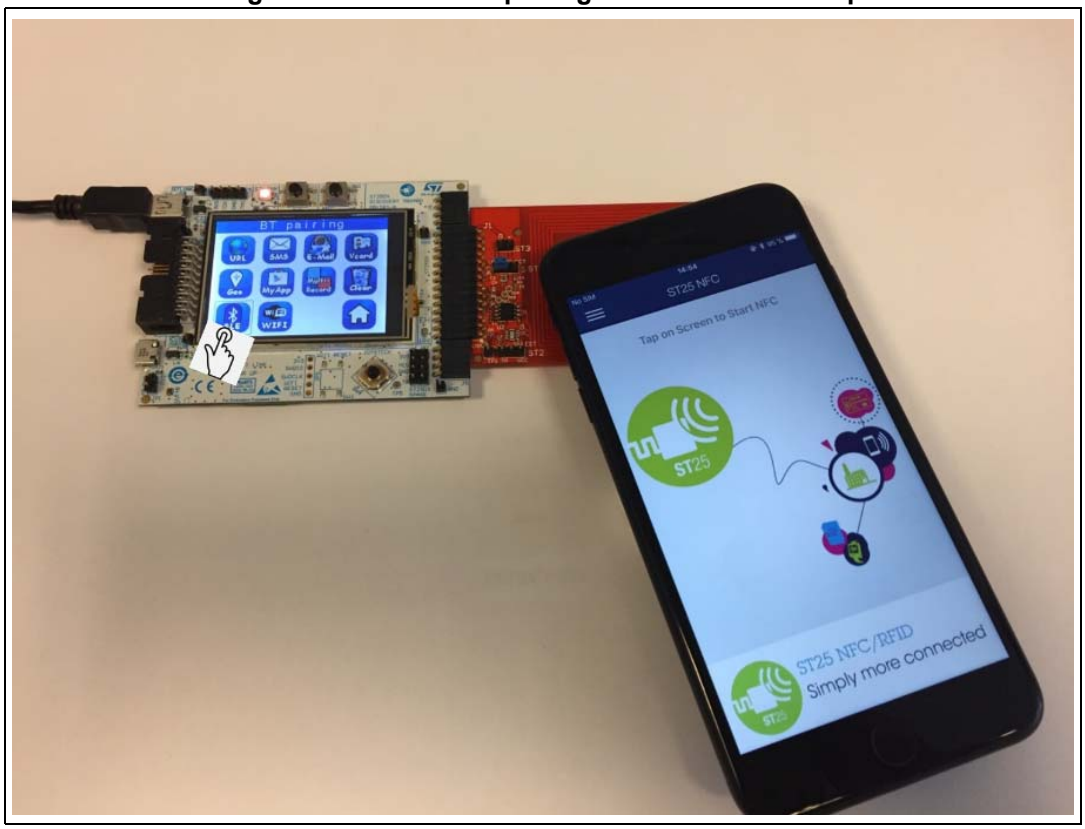
- So far, two options are defined:
  - “NDEF Run Native Application”: set by default. It enables to launch automatically iOS native app whenever NDEF is read.
    When option is disabled, the application reads NDEF, then opens the NDEF tag detail screen as described in NDEF Tag details.
  - “RF Continuous Loop”: disabled by default. This options enables RF Continuous loop to prevent stopping RF scan.
    It is mainly used for debug and test purposes. It shall be used carefully because it always starts NFC scan, even when NDEF is detected.
    This option is exclusive, meaning that “NDEF Run Native Application” is not used anyway.
  - “NFC tag command configuration”: Reserved for future uses. Options not available yet.

4.4 Bluetooth® pairing

A Bluetooth® pairing NDEF demonstration (*Figure 12*) is also included in the application, it allows the user to pair with iPhone and ST25DV Discovery kit, and to display in real time the battery and RSSI levels of the ST25DV Discovery kit.

The Bluetooth® pairing demonstration requires specific firmware (version 1.0.6 or higher) and Discovery kits.

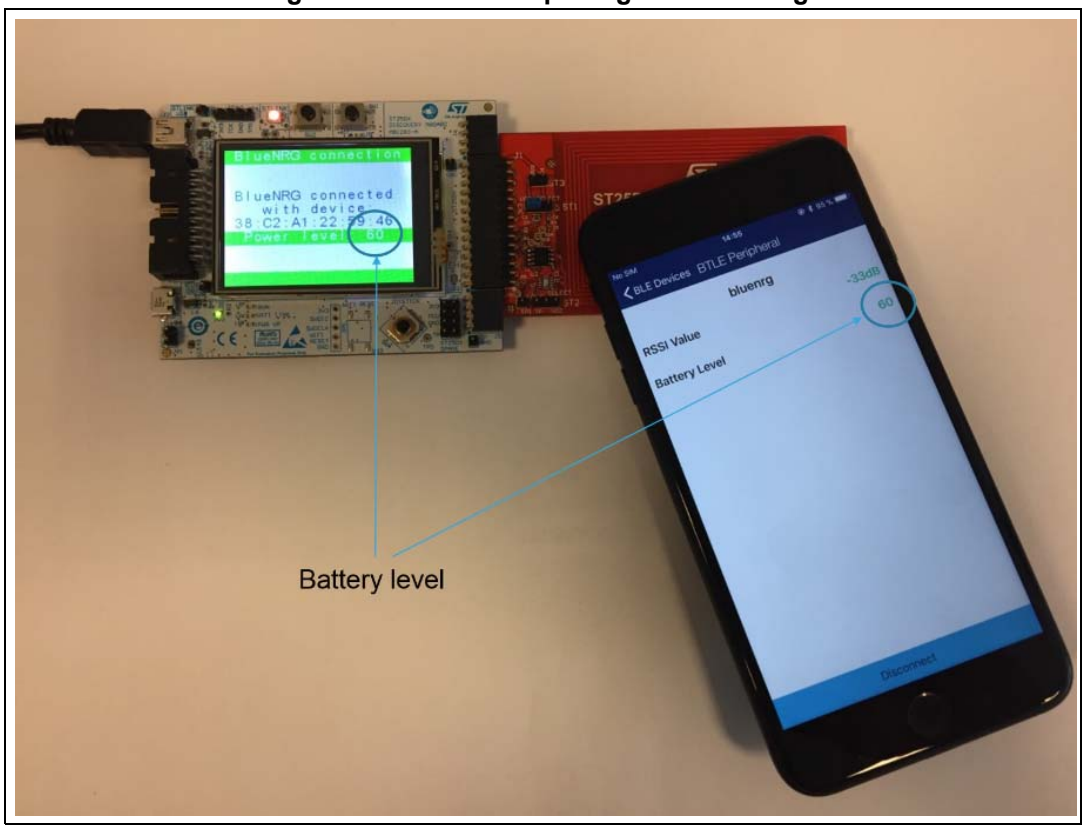
Figure 12. Bluetooth® pairing demonstration setup



"RF Continuous Loop" should be "on", and "RF Continuous Loop" should be "off" under "Settings" menu.

- Storing a NDEF Bluetooth® with the ST25DV discovery kit. The NDEF message Bluetooth® contains BLE device name "HID".
- Run ST25 NFC iOS app, then start NFC scanning session.
- The iPhone starts NFC scan, then detects and reads NDEF Bluetooth® message. According to the information contained into the NDEF record, the ST25 NFC iOS app runs a NFC connection handover with the BLE device of the ST25DV discovery kit. When connection is established, the iPhone requests (every second) data such as RSSI and battery levels to the BLE devices (*Figure 13*).

Figure 13. Bluetooth® pairing data exchange



- Click on “Disconnect” button to stop the demonstration.

5 Revision history

Table 2. Document revision history

Date	Revision	Changes
05-Sep-2017	1	Initial release.
15-Sep-2017	2	Updated *Introduction*, *Section 3: Overview*, *Section 3.2: Functionalities overview*, *Section 3.3: Installation*, *Section 4.2: NDEF tag details* and *Section 4.4: Bluetooth® pairing*. Updated *Note:* in *Section 3.1*. Updated captions of figures from *1* to *4*.