Advanced Card Systems Ltd.
Card & Reader Technologies

ACR3901U-S1
ACS Secure Bluetooth®
Contact Card Reader

User Manual V1.03

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1.0. Introduction

The ACR3901U-S1 ACS Secure Bluetooth® Contact Card Reader combines the latest technology in the world of smart card readers with Bluetooth connectivity. This compact and wireless smart card reader brings together sophisticated technology with fresh design to meet different requirements in various smart card-based applications using Bluetooth-enabled devices, such as smart phones and tablets.

This document provides general procedures for installation of drivers and applications when using the ACR3901U-S1 ACS Secure Bluetooth Contact Card Reader.

The topics covered in this user manual are as follows:

- **Section 2.0** – provides procedures on how to install the ACS Bluetooth driver, pair Bluetooth devices and use the ACS Bluetooth Device Management Tool

- **Section 3.0** - provides procedures on how to install and use the BLE demo application with the ACR3901U-S1 using an iOS device and the ACS SmartCardIO library *(with Extended APDU Support; FW 1.22 and above)*

- **Section 4.0** - provides procedures on how to install and use the BLE demo application with the ACR3901U-S1 using an Android device and the ACS SmartCardIO library *(with Extended APDU Support; FW 1.22 and above)*

- **Section 5.0** - provides procedures on how to install and use the BT demo application with the ACR3901U-S1 using an iOS device and the ACS library

- **Section 6.0** – provides procedures on how to install and use the BT demo application with the ACR3901U-S1 using an Android device and the ACS library
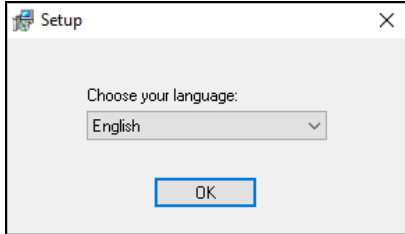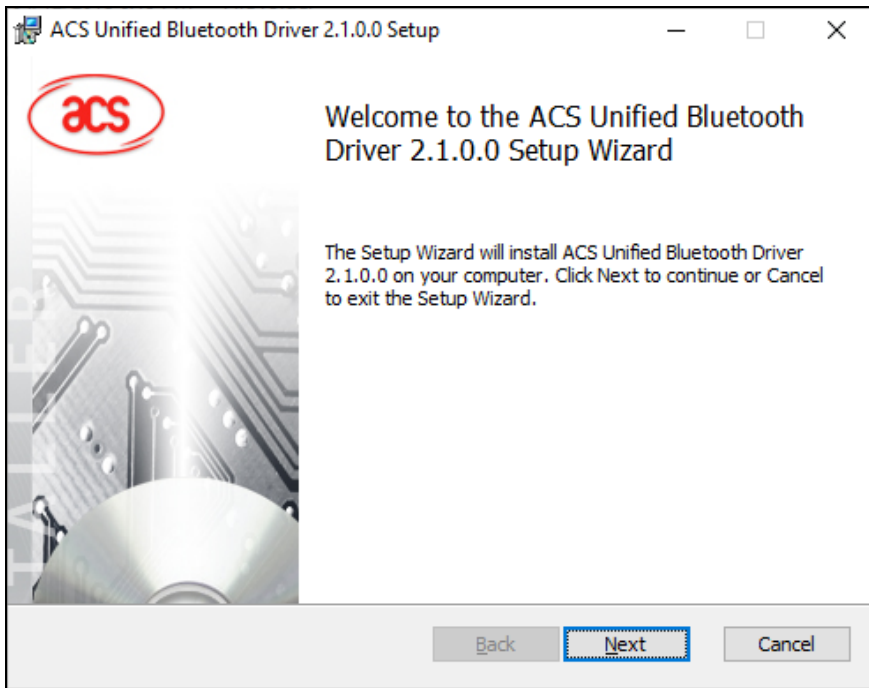
2.0. For Windows®

2.1. Installing ACS Unified Bluetooth driver

To install the driver:

1. Run the **ACS Unified Bluetooth Driver**.

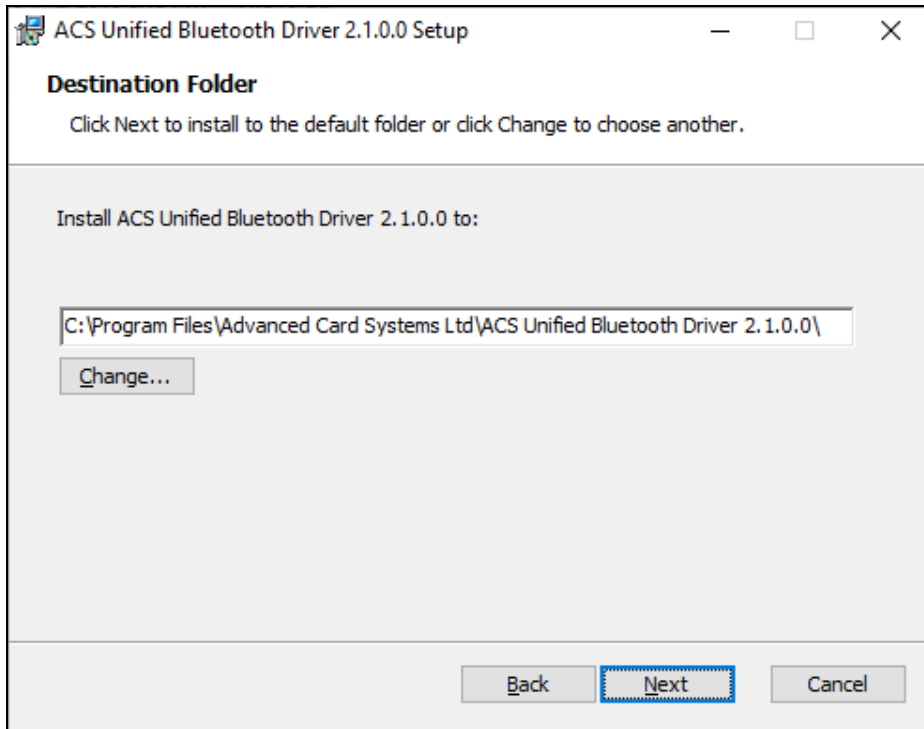2. The Setup Wizard will appear. To start the installation, click **OK.**
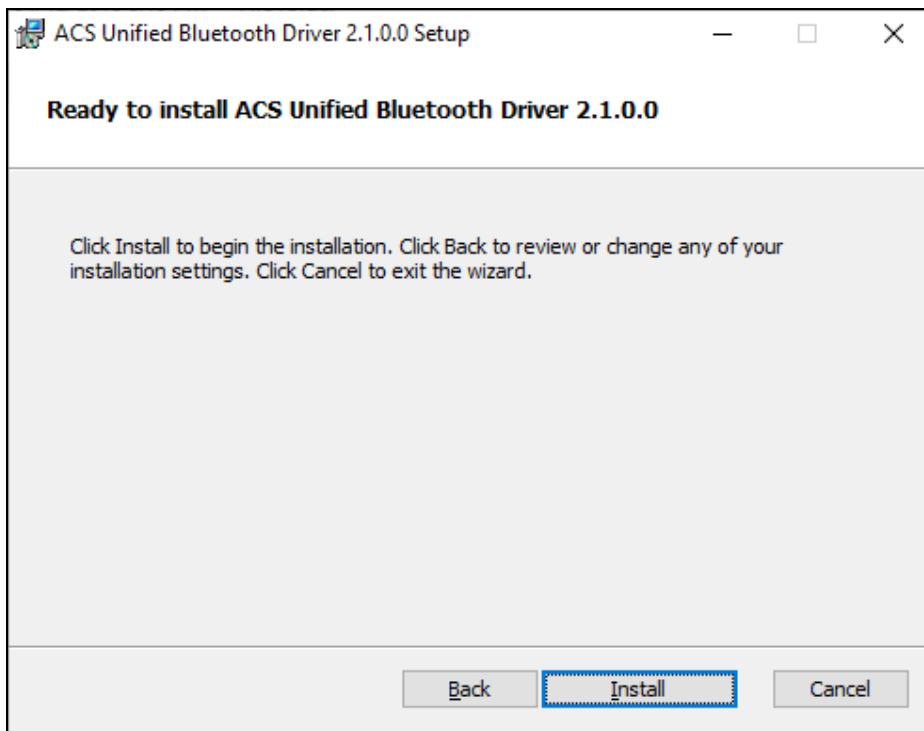

3. Then click **Next**.

4. Click **Next** to install the driver to the default destination, located at **X:\Program Files\Advanced Card Systems Ltd\ACS Unified Bluetooth Driver 2.1.0.0**, with **X** as your local Windows drive.
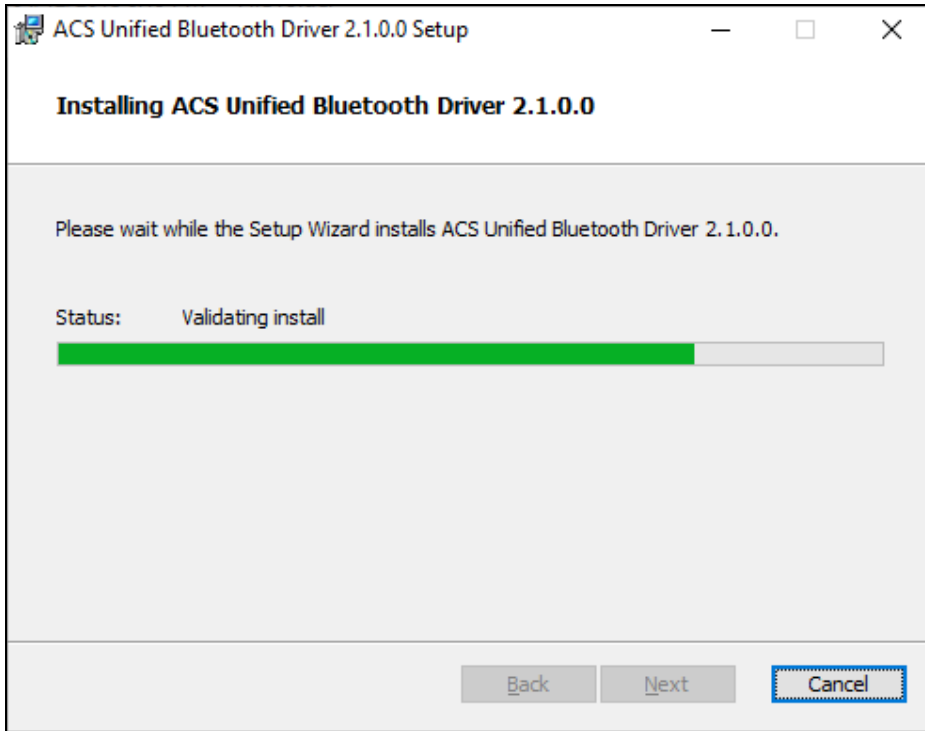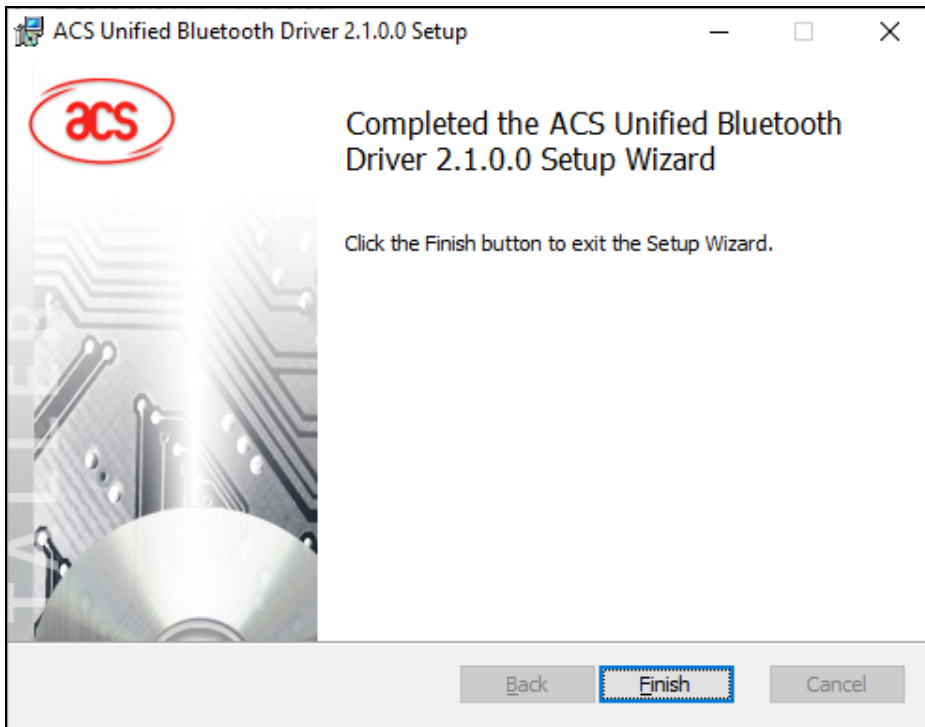

5. Click **Install**.

6. Wait while the driver installs.

7. Once the installation is complete, click **Finish**.

2.2. Setting up device pairing with built-in Bluetooth adapter

Note: This procedure only applies to Windows 8 and later. Windows 7 does not support devices using Bluetooth 4.0/Bluetooth Low Energy interface.

To pair using this setup:

1. Enable the Bluetooth mode of the ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.
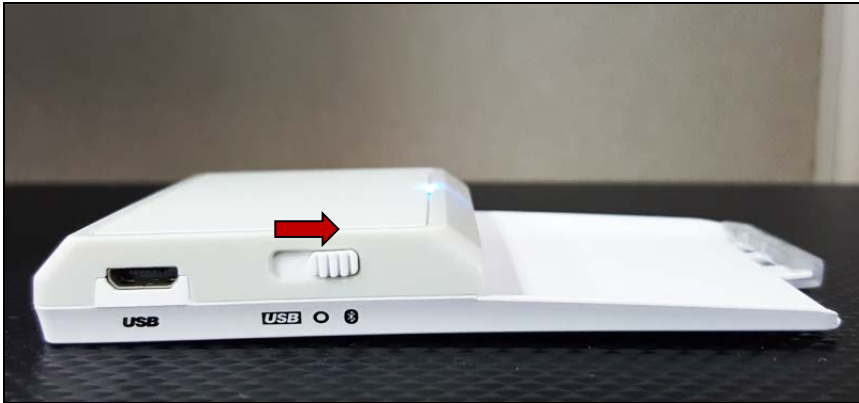
2. Go to **PC Settings** , choose **Devices**, and then click **Bluetooth & other devices**.

3. Turn on **Bluetooth**.

4. Click **Add Bluetooth or other device**
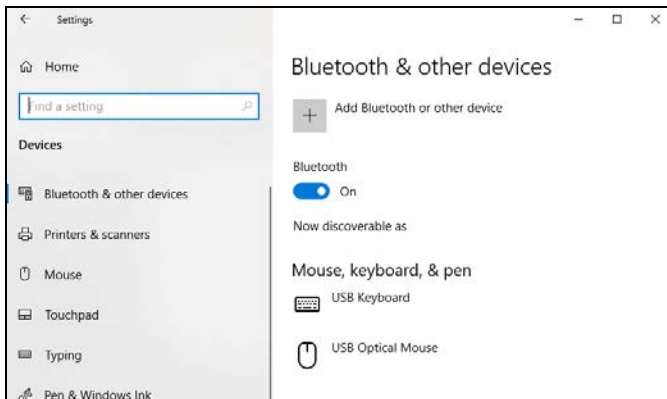
5. At the **Add a device** pane, click **Bluetooth** and select the **ACR3901U-S1** reader to pair.

6. The pairing is complete when you see the ACR3901U-S1 is connected.
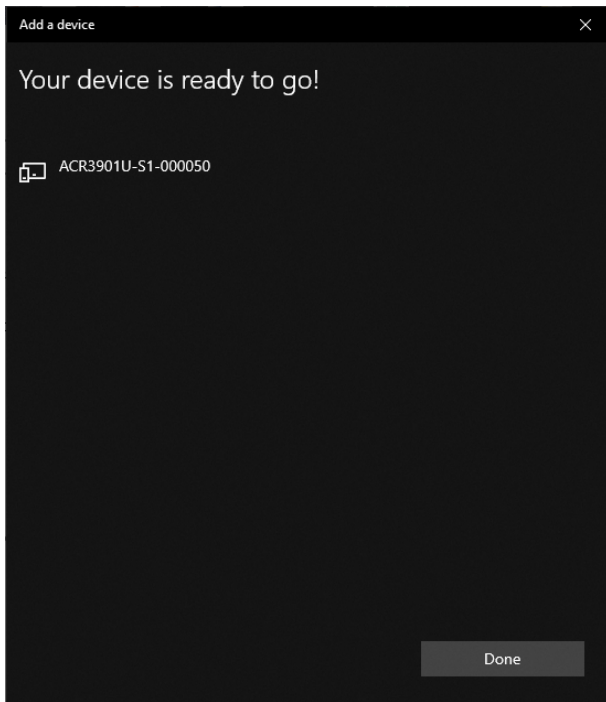
7. To complete the installation of the Bluetooth card reader, go to **ACS Bluetooth Device Management Tool**

2.3. Setting up device pairing with Bluetooth USB dongle

*Note: This procedure will use the TI USB dongle as the Bluetooth adapter. Make sure that you have installed the ACS Bluetooth driver before performing this procedure (see **Installing ACS Unified Bluetooth driver**).*

To pair using this set up:

1. Plug in the TI Bluetooth USB dongle to your computer.

2. Windows will automatically install the device driver.

3. Wait while the device driver installs.

4. When it is ready, you will see the dongle in Device Manager.
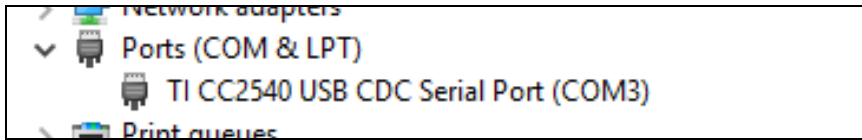
5. When you open the **ACS Bluetooth Device Management Tool**, it will automatically pair the dongle with your system.

2.4. Using the ACS Bluetooth Device Management Tool

ACS Bluetooth Device Management Tool is an application that enables you to easily manage device pairings between ACS Bluetooth card readers and computers.

2.4.1. Installing a device

To establish full connection, you must install the Bluetooth card reader in the ACS Bluetooth Device Management Tool.

Note: The TI USB dongle can only work on a one-to-one connection with an installed ACS Bluetooth card reader. If there is a previously installed Bluetooth card reader in the tool, uninstall it first (see Uninstalling a device).

To begin:

1. Turn on the Bluetooth mode of the ACR3901U-S1 and make it discoverable. To do this, slide the toggle switch to the right.

2. Run the **ACS Bluetooth Device Management Tool**.

3. Wait while the tool scans for Bluetooth devices within range.

   *Note: If the device is not immediately discovered, click **Refresh**.*

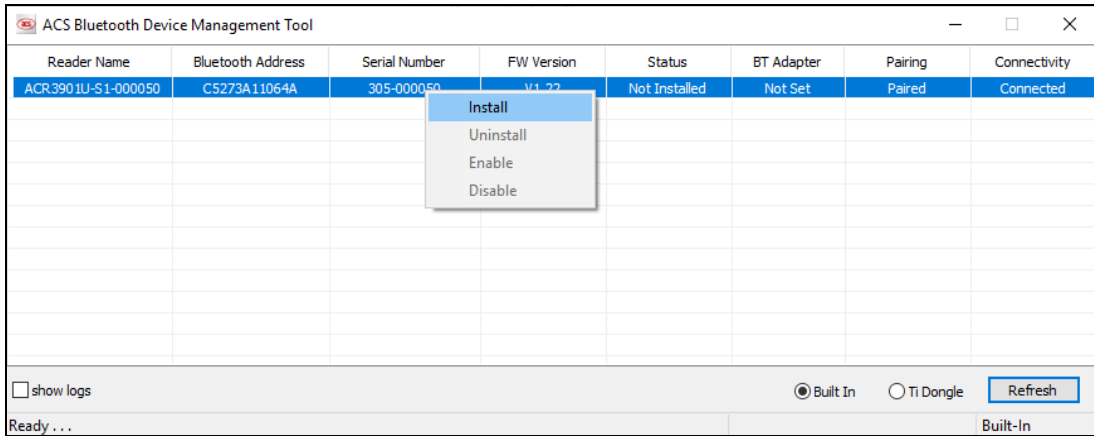4. Once the tool discovers the ACR3901U-S1, it will appear in the list.
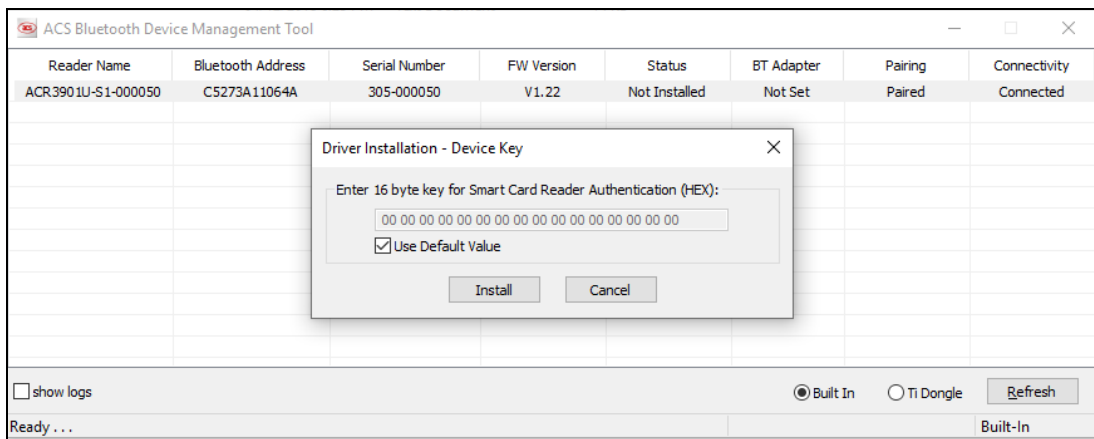
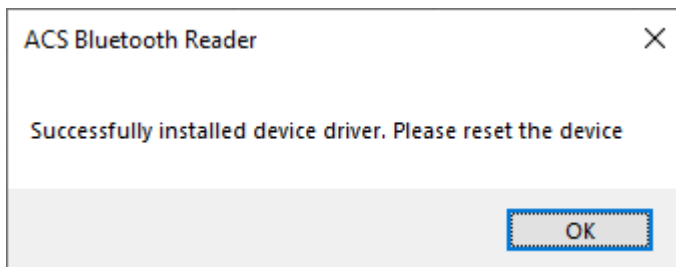5. Right-click on the device, and then click **Install**.

6. Type in a 16-byte hexadecimal key for authentication, or use the default value. Click **Install**.

*Note:* *The default authentication key is FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF.*

7. Wait while the application installs the driver.

8. A message will appear confirming a successful installation. Click **OK**, and then restart your computer.
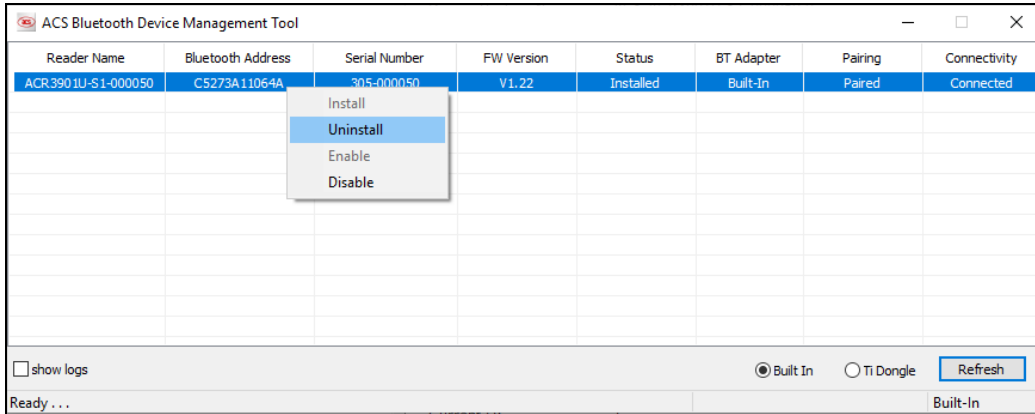
9. After a successful driver installation, you can now use the ACR3901U-S1 with various smart card applications. Below is a sample of the ACR3901U-S1 connected in **QuickView**.
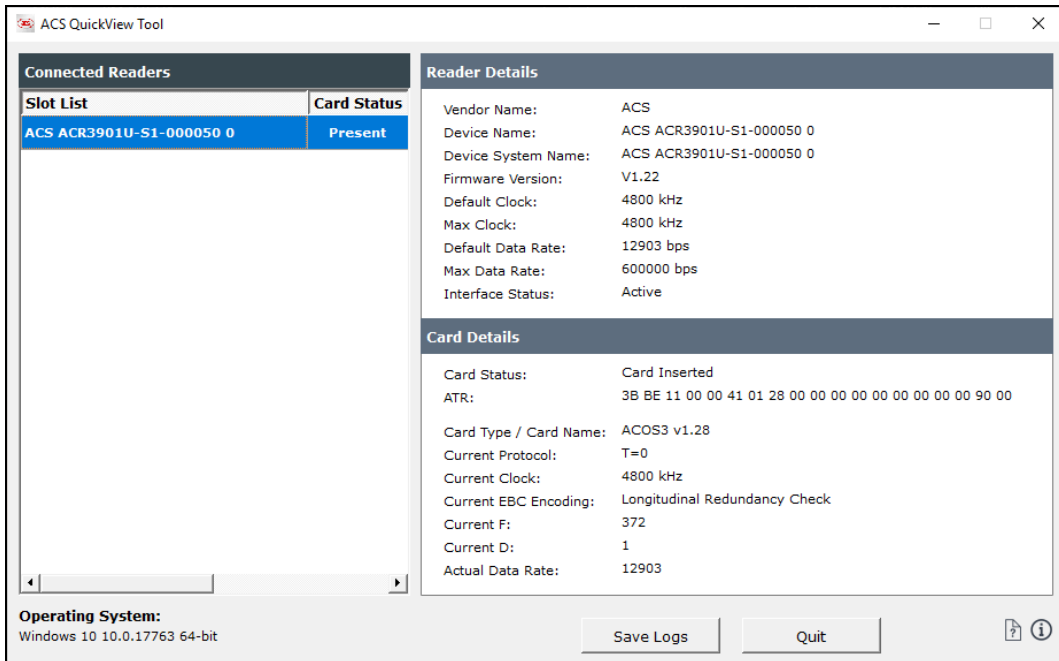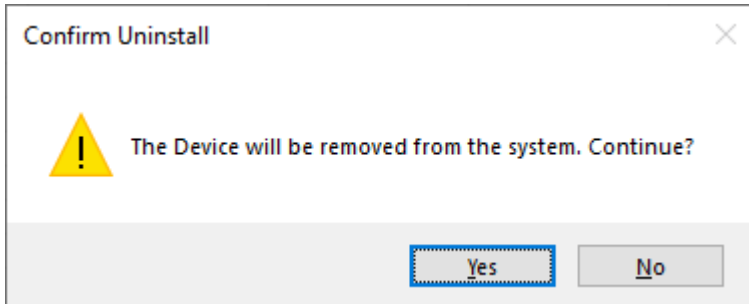
2.4.2. Uninstalling a device

To uninstall a device:

1. Right-click on the device, and then click **Uninstall**.


2. Click **Yes** to confirm uninstallation.

3. The device will be removed from the reader list.

Note: *The TI USB dongle will work with multiple reader connections when using the ACS Unified Bluetooth Driver v2.1.0.0 and above ONLY.*

2.5. Checking if Bluetooth card reader is correctly installed

1. Go to **Device Manager**.

2. Under **Smart card readers**, the ACR3901U-S1 reader should show as **ACR3901 BLE ICC Reader**.
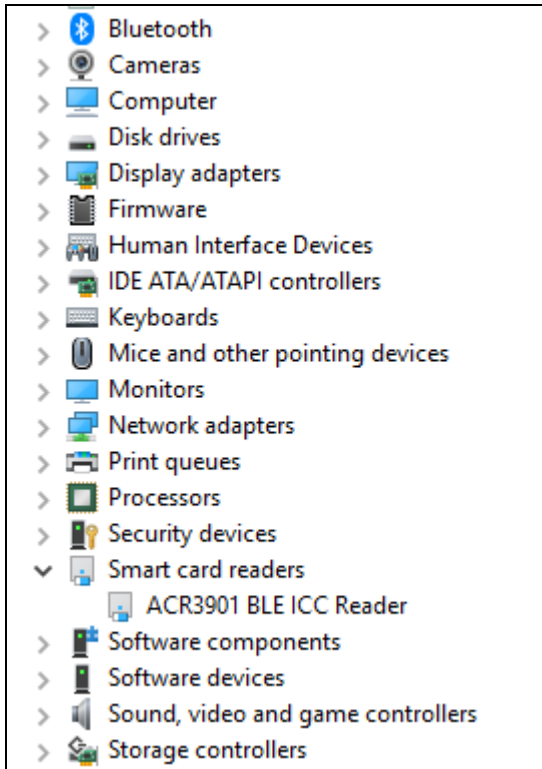
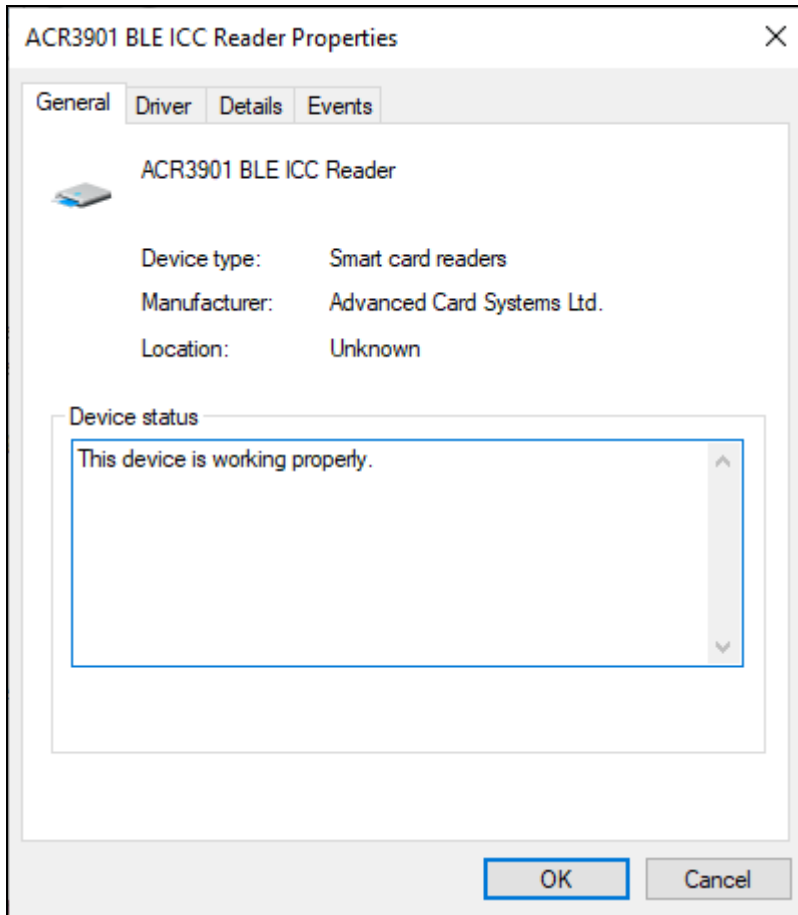3. Right-click on the device, and then click **Properties**.

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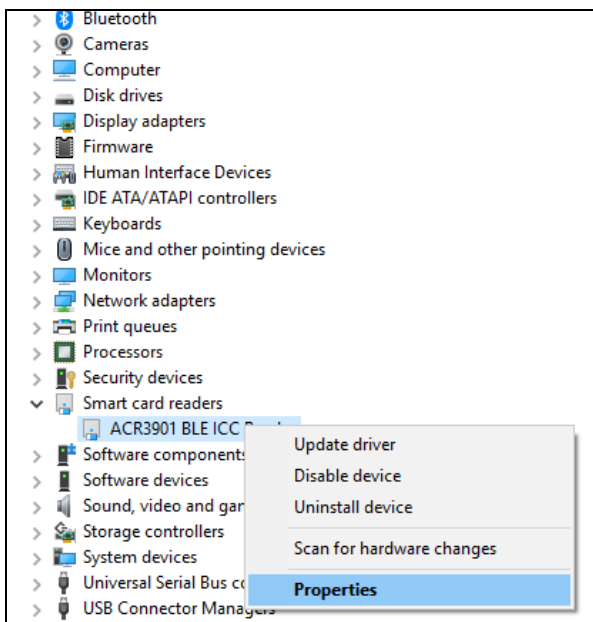
4. The Bluetooth reader and driver are installed correctly if the sevice status shows *"This device is working properly"*.

3.0. For iOS (BLE Test Application)

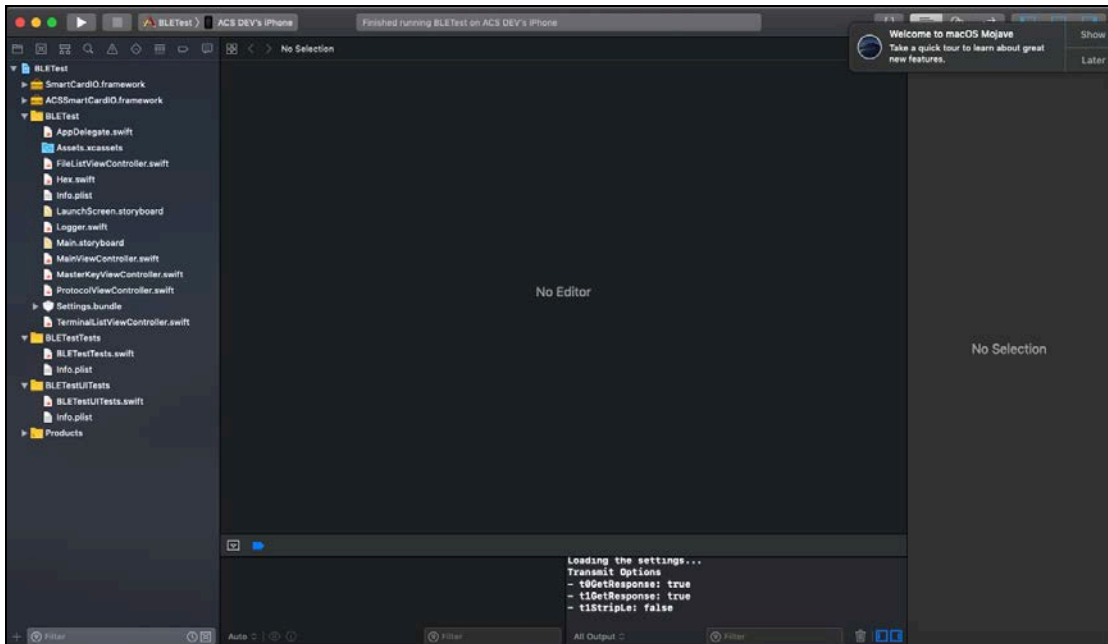## 3.1. Installing the BLE Test application

1. You can access the device library by downloading the **iOS BLE EVK (SmartCardIO)** from the ACS website.

2. Using the XCode application, open **BLETest.xcodeproj**.
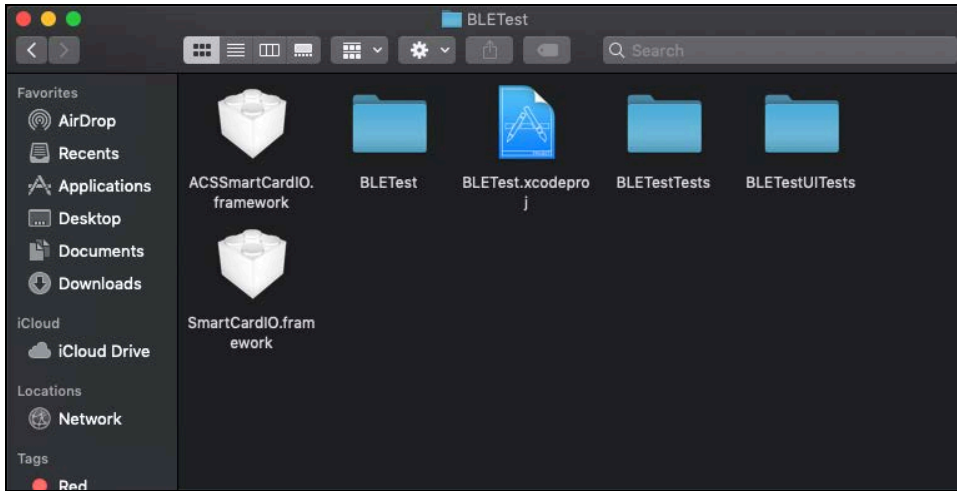
3. Transfer **BLETest.xcodeproj** to your mobile device. Choose your mobile device, and then click **Play**.

   Note: Make sure that your mobile device is connected to your computer.

## 3.2. Using the ACS Bluetooth demo application

This section provides a simple step-by-step procedure on how to use the ACR3901U-S1 using the BLE Test application.
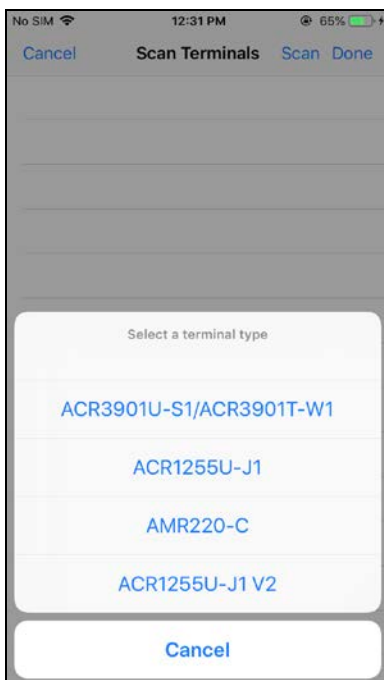
3.2.1. Connecting a device

1. Turn on the Bluetooth mode of the ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.

2. Turn on your device's Bluetooth by going to **Settings > Bluetooth**.

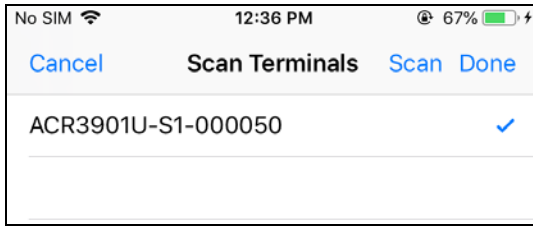3. Open the **BLE Test application**.

4. Tap **Scan**.
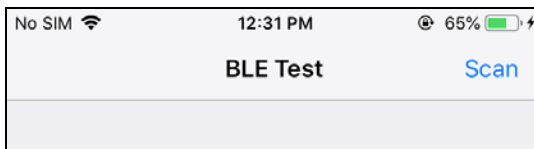
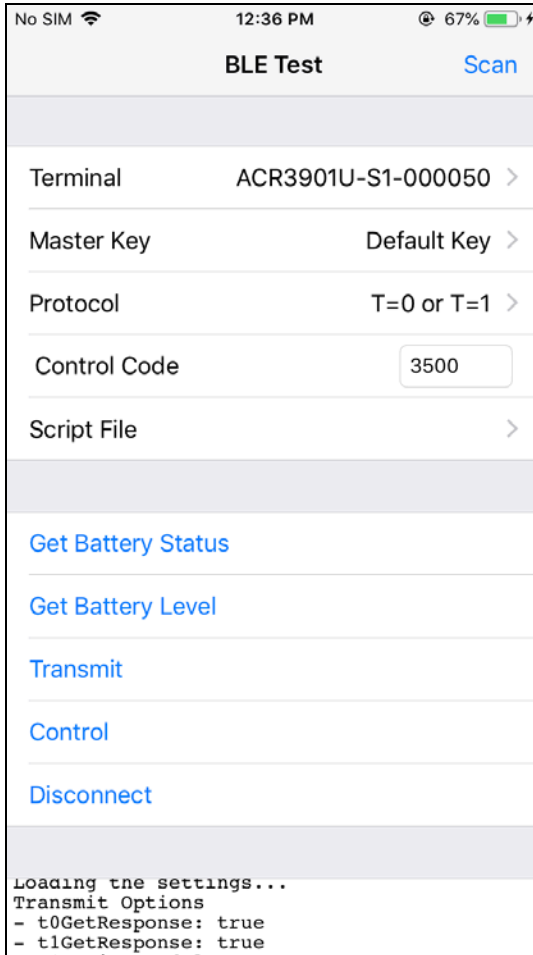

5. Select the terminal type **ACR3901U-S1/ACR3901T-W1**.

6. Choose the reader with which to pair your iOS device, then tap **Done**.

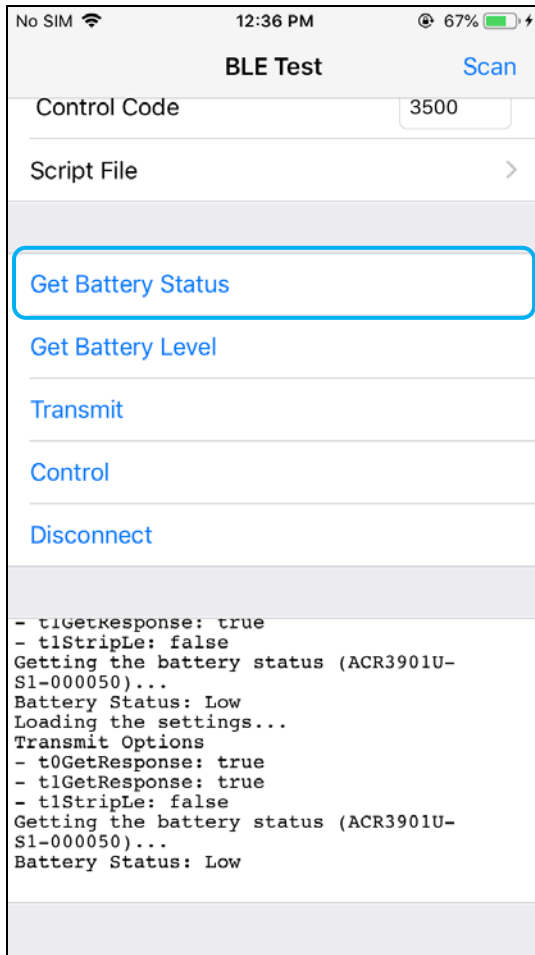7. When the pairing is successful, the main page will be displayed.

3.2.2. Getting the battery status

To get the battery status, tap **Get Battery Status**.

The status should be displayed as part of the logs.

3.2.3. Transmitting an APDU command

To transmit APDU commands:

1. Connect the mobile device to iTunes and locate the File Sharing tab.

2. Under Apps section, click on **BLETest app** and add a text file (.txt) containing the APDU commands.
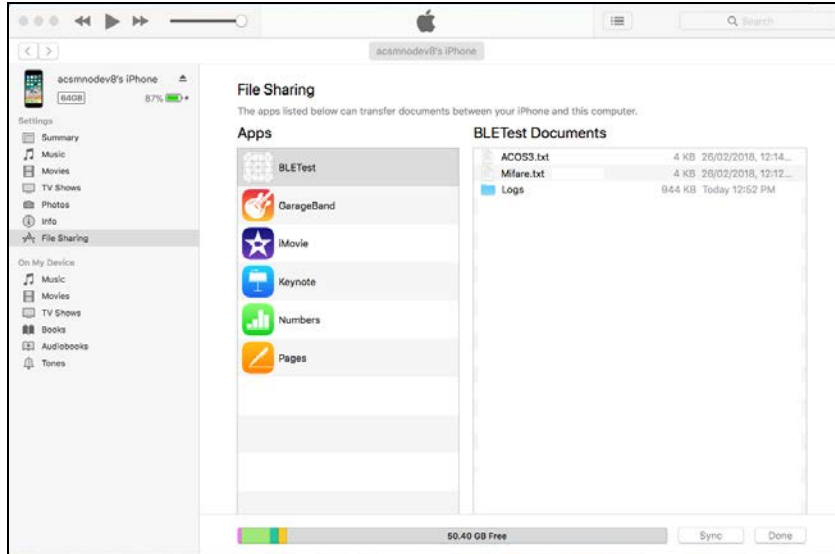
3. Insert a smart card into the ACR3901U-S1 reader.

4. In the demo application on the mobile device, tap **Script File**, and then locate the .txt file you want to run.

5. Go back to the main page then tap the **Transmit** button.

6. The Response APDU will be displayed as part of the logs.

Note: The application is designed to get the ATR of the card before sending the APDU commands.
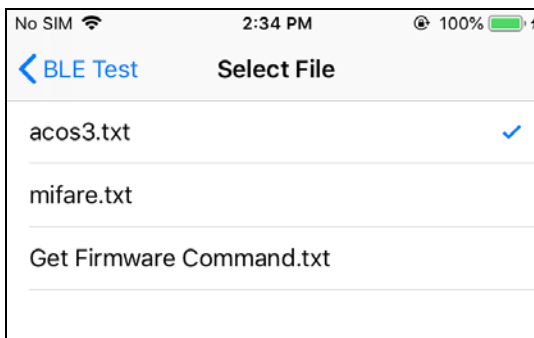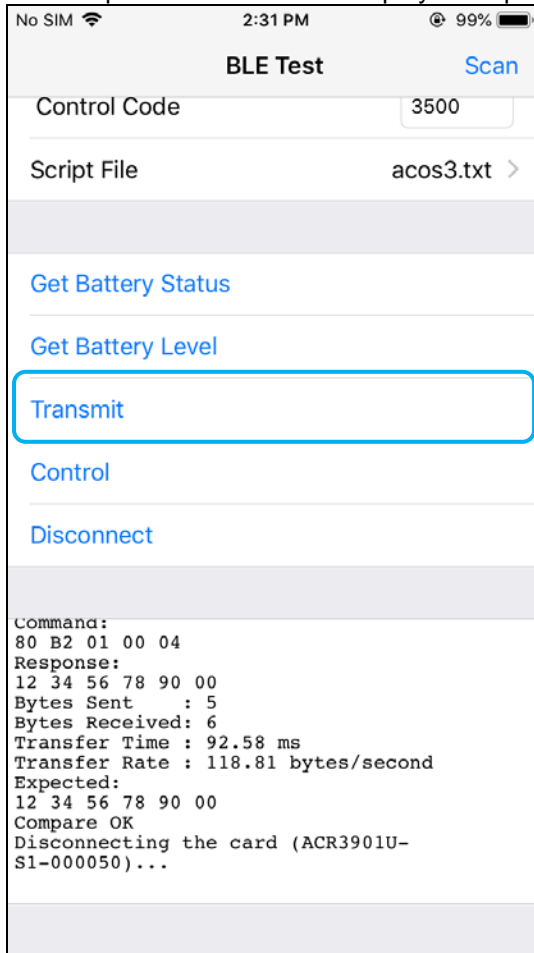
3.2.4. Transmitting an escape command

To transmit an escape command:

1. Connect the mobile device to iTunes and locate the File Sharing tab.

2. Under the Apps section, click on **BLETest app** and add a text file (.txt) containing the APDU commands.
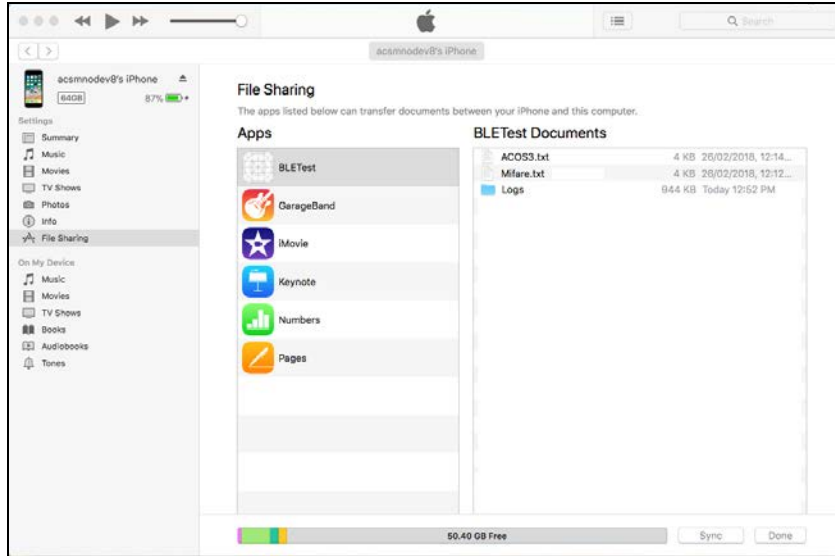
3. In the demo application on the mobile device, tap **Script File**, and then locate the .txt file you want to run.

4. Go back to the main page then tap the **Control** button.

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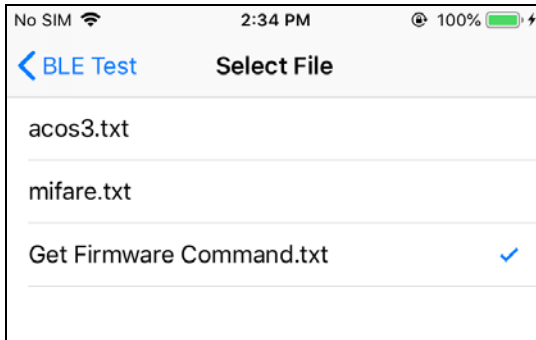
5. The Escape Response will be displayed as part of the logs.

4.0. For Android (BLE Test Application)

4.1. Installing the BLE Test application

1. Connect your mobile device to the computer.
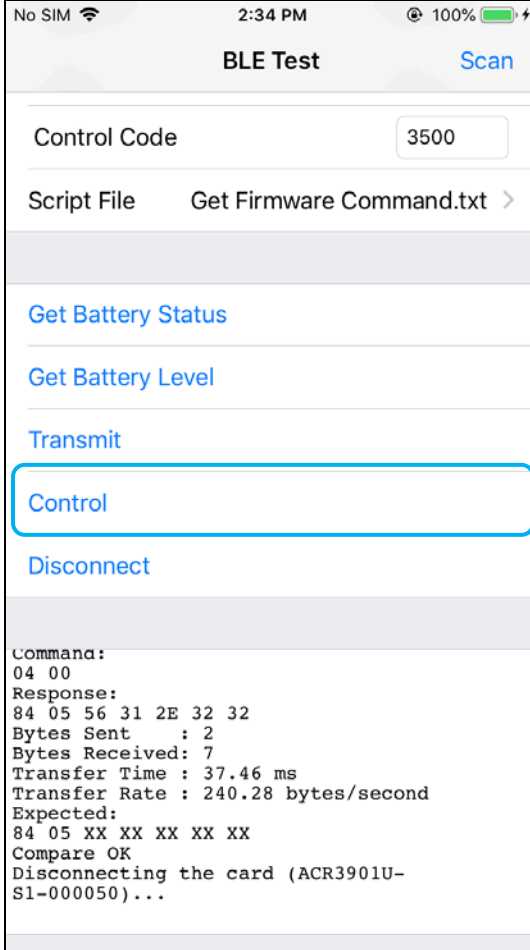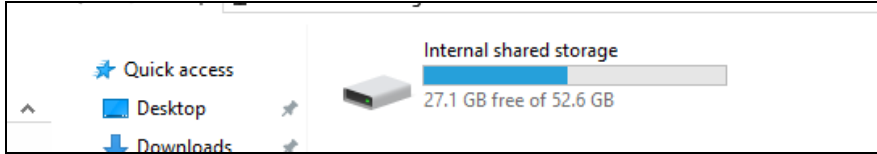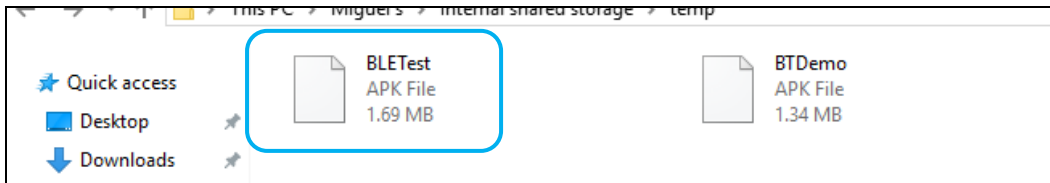

2. In the internal storage of your device, create a folder where the ACR3901U-S1 BLE Test will be placed.

3. You can access the device library by downloading the **Android BLE EVK (SmartCardIO)** from the ACS website.

4. In the Android library, copy the **BLETest.apk** and the **test scripts(.txt)** files to the previously created folder.

5. Disconnect your mobile device from the computer. Locate the **BLETest.apk** using a file manager application.

6. To start the installation, tap the **BLETest.apk** file.
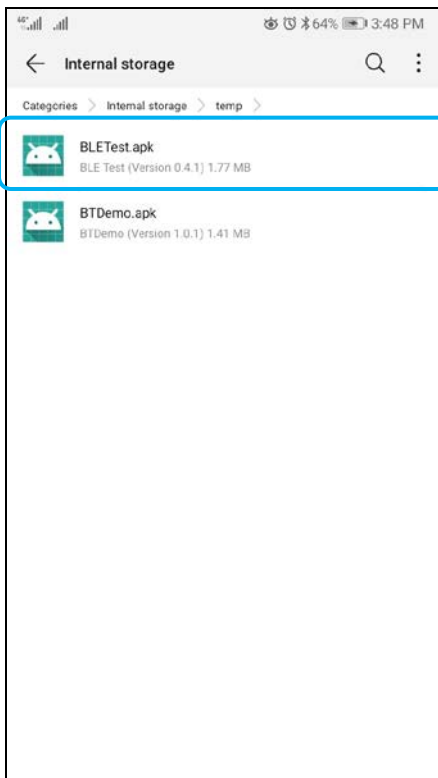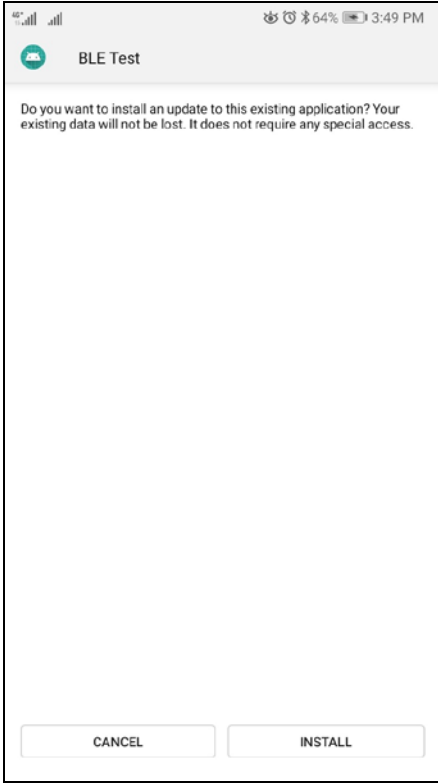
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7. Complete the action using **Package Installer**.

8. A prompt will ask for hardware control access. Tap **Install** to proceed.

9. Once the installation is complete, you can now open the BLE Test application.
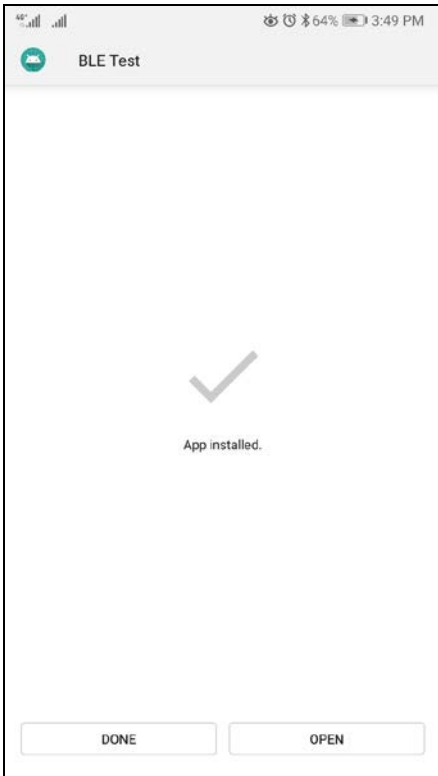
4.2. Using the ACS Bluetooth demo application

4.2.1. Connecting a device

1. Turn on the Bluetooth mode of the ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.

2. Turn on your device's Bluetooth by going to **Settings | Bluetooth**.

3. Open the **BLE Test application**.

4. Tap **Scan**.
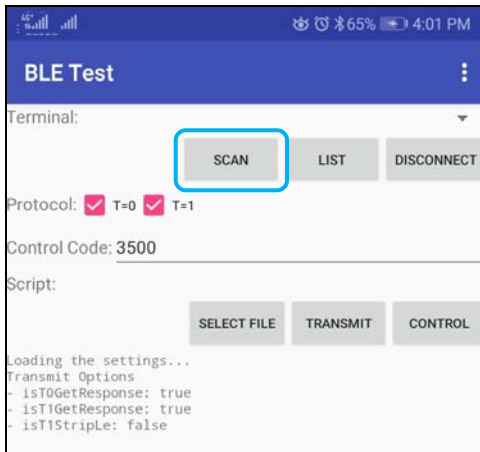
5. Select the terminal type **ACR3901U-S1/ACR3901T-W1**.

6. Available devices will be displayed. Tap the drop down button to show the complete list of available devices
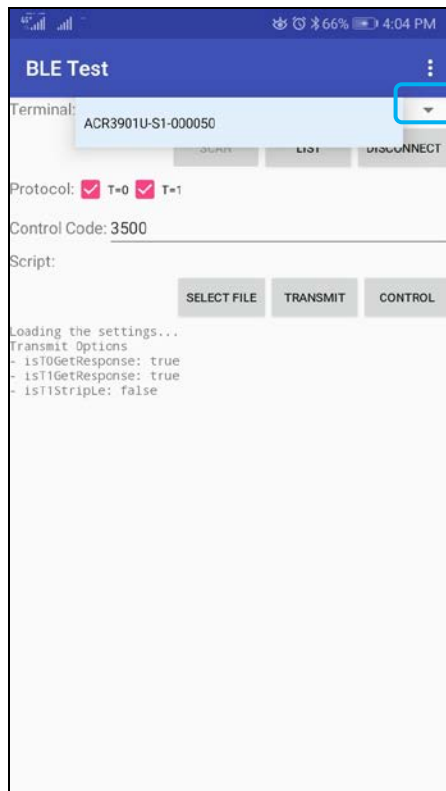
4.2.2. Transmitting an APDU command

To transmit APDU commands:

1. Insert a smart card into the ACR3901U-S1 reader.

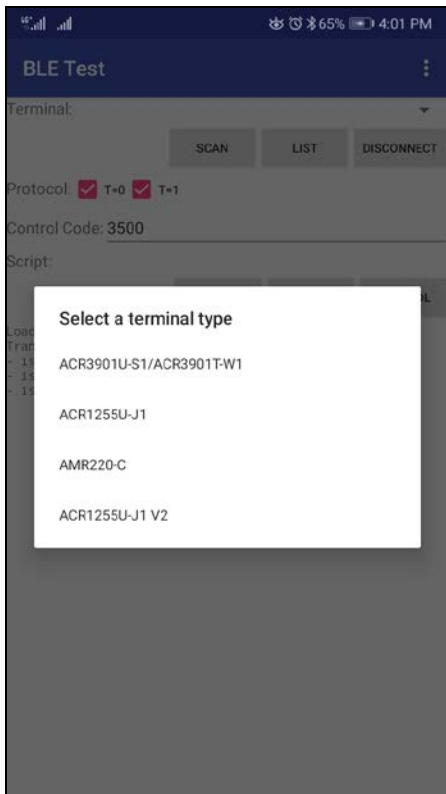2. In the demo application on the mobile device, tap **Select File**, and then locate the .txt file you want to run.
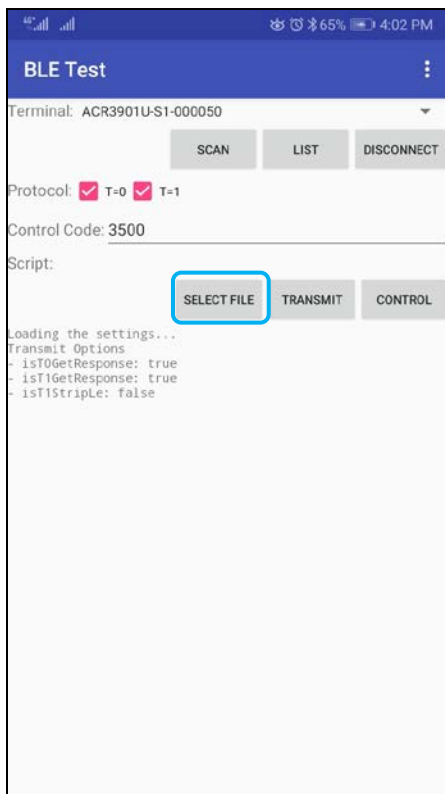
3. Go back to the main page then tap the **Transmit** button.

4. The Response APDU will be displayed as part of the logs.
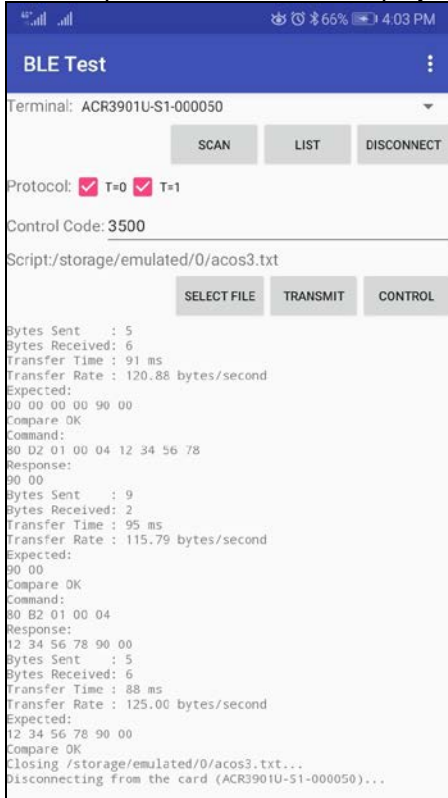
Note: The application is designed to get the ATR of the card before sending the APDU commands.

4.2.3. Transmitting an escape command

To transmit an escape command:

1. In the demo application on the mobile device, tap **Select File**, and then locate the .txt file you want to run.

2. Go back to the main page then tap the **Control** button.

3. The Escape Response will be displayed as part of the logs.

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Advanced Card Systems Ltd.
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5.0. For iOS (BT Demo Application)

5.1. Installing the Bluetooth demo application

1. You can access the device library by downloading the **iOS & Mac BT EVK** from the ACS website.

2. Using the XCode application, open **BTDemo.xcodeproj**.
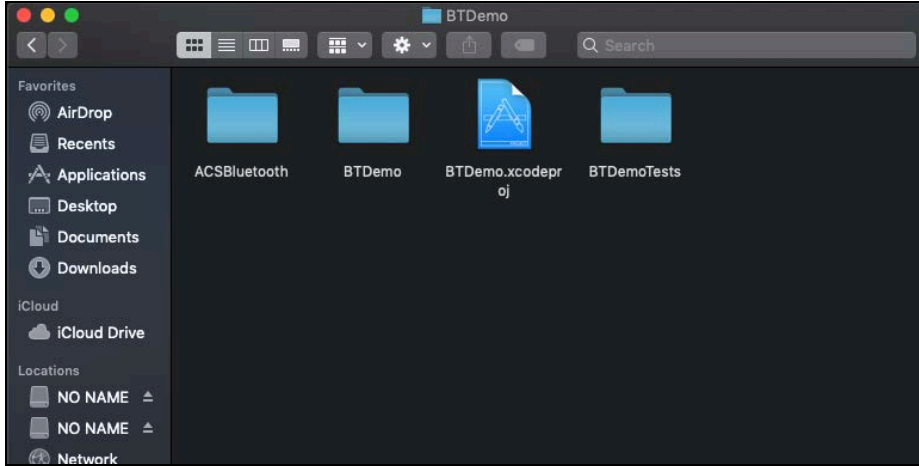
3. Transfer **BTDemo.xcodeproj** to your mobile device. Choose your mobile device, and then click **Play**.

Note: Make sure that your mobile device is connected to your computer.

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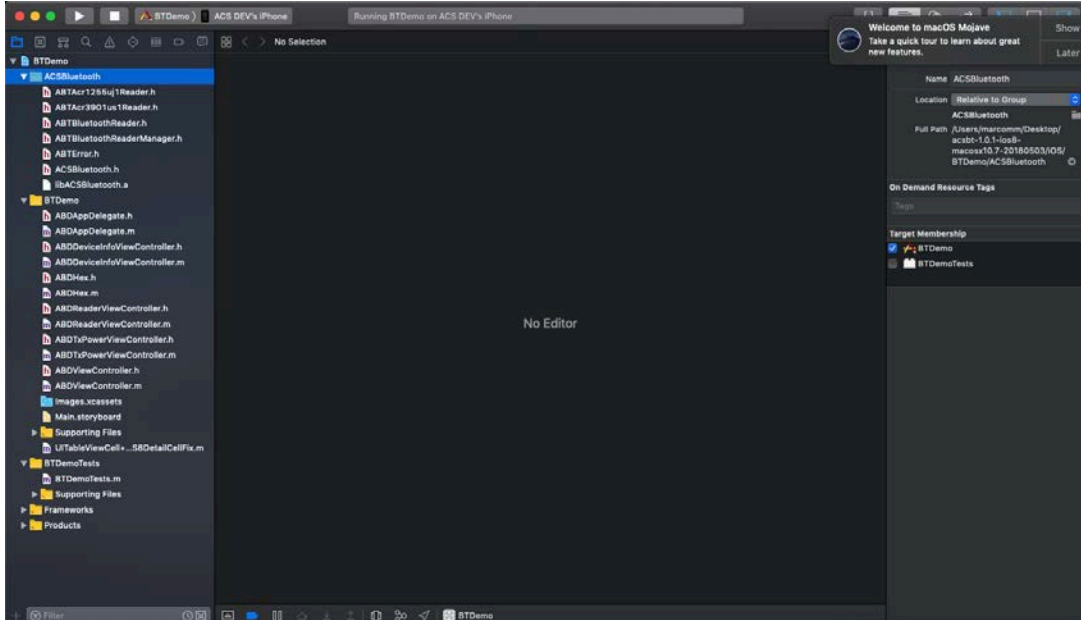
## 5.2.   Using the ACS Bluetooth demo application

This section provides a simple step-by-step procedure on how to use the ACR3901U-S1 using the BT Demo application.
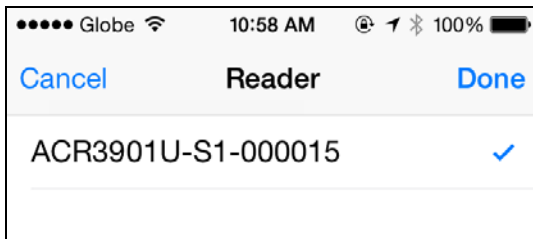
5.2.1.   Connecting a device

1.   Turn on the Bluetooth mode of the ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.

2.   Turn on your device's Bluetooth by going to **Settings > Bluetooth**.

3.   Open the **BT Demo application**.

4.   Tap **Select**.
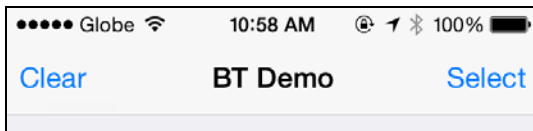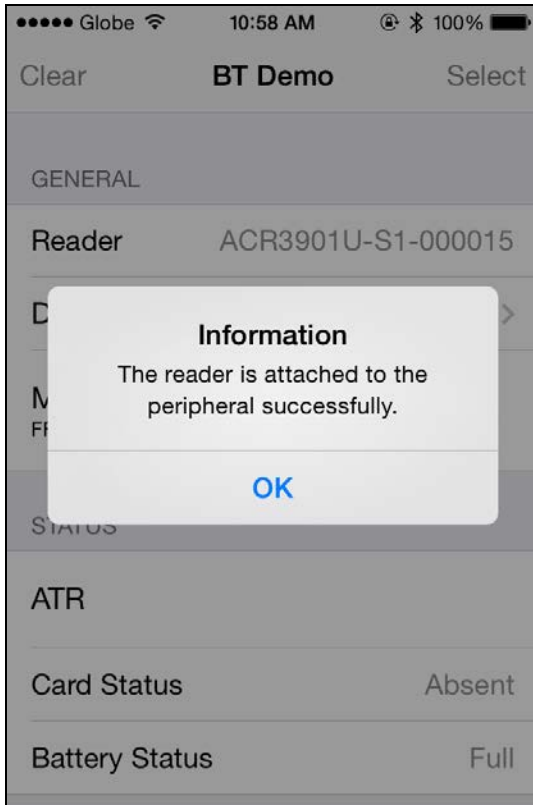

5.   Choose the reader with which to pair your iOS device, then tap **Done**.

6. When the pairing is successful, tap **OK** to close the prompt.

5.2.2. Getting the device information

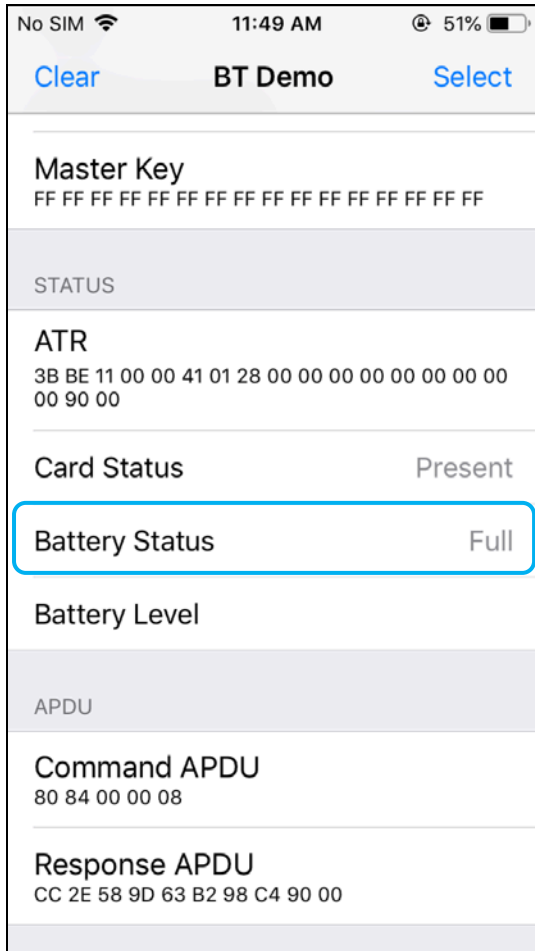To get the reader's information, tap **Device Information**.

5.2.3. Getting the battery status

To get the battery status, scroll down and tap **Get Battery Status**.

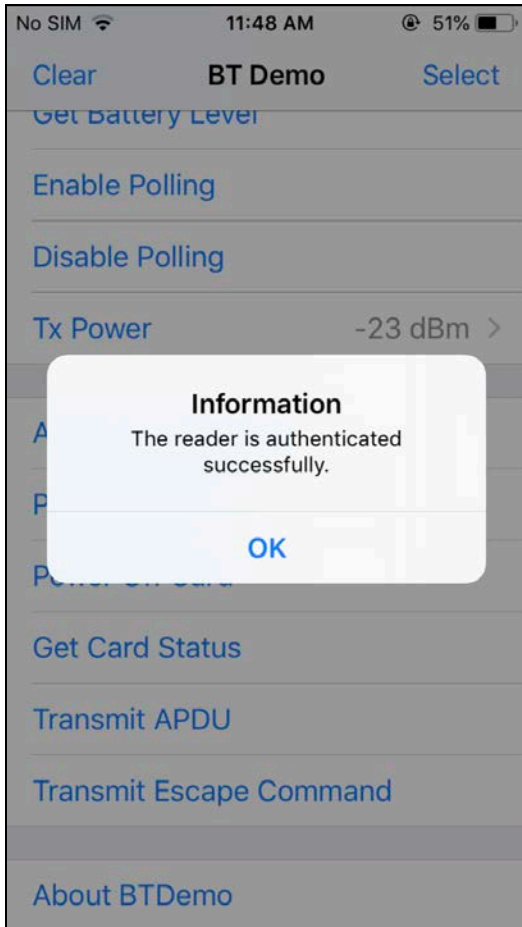The battery status will be shown as below:

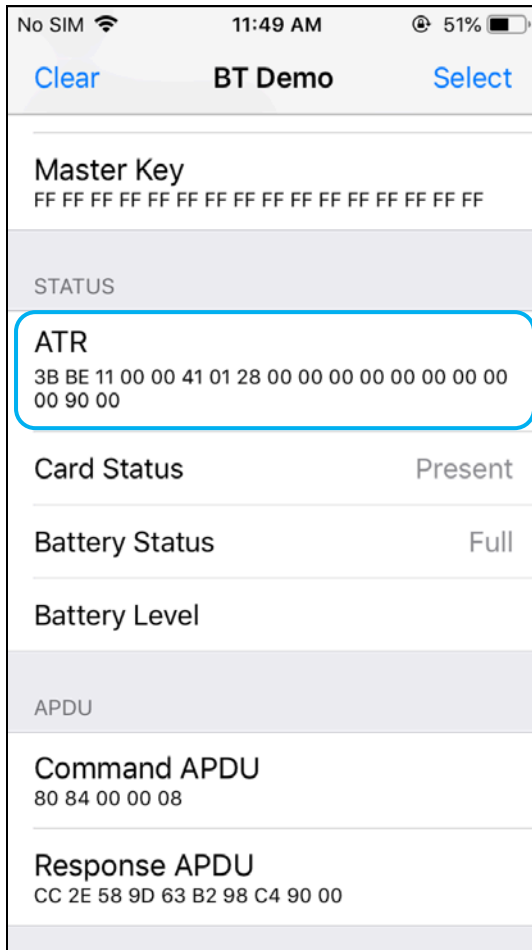### 5.2.4.   Getting the card's ATR (Answer ToReset)

To get the ATR of the card:

1. Insert a smart card into the ACR3901U-S1 reader.

2. In the demo application, scroll down and tap **Authenticate Reader**.

3. When the authentication is successful, tap **OK** to close the prompt.

4. Tap **Power On Card**.

5. The card's ATR will be displayed.

5.2.5.   Transmitting an APDU command

To transmit APDU commands:

1. Insert a smart card into the ACR3901U-S1 reader.

2. In the demo application, scroll down and tap **Authenticate Reader**.

3. When the authentication is successful, tap **OK** to close the prompt.

4. Tap **Power On Card**, and then tap **Transmit APDU**.

5. The Response APDU will be displayed.

Note: You can edit the APDU command by tapping **Command APDU**.

5.2.6. Transmitting an escape command

To transmit an escape command:

1. In the demo application, scroll down and tap **Authenticate Reader**.

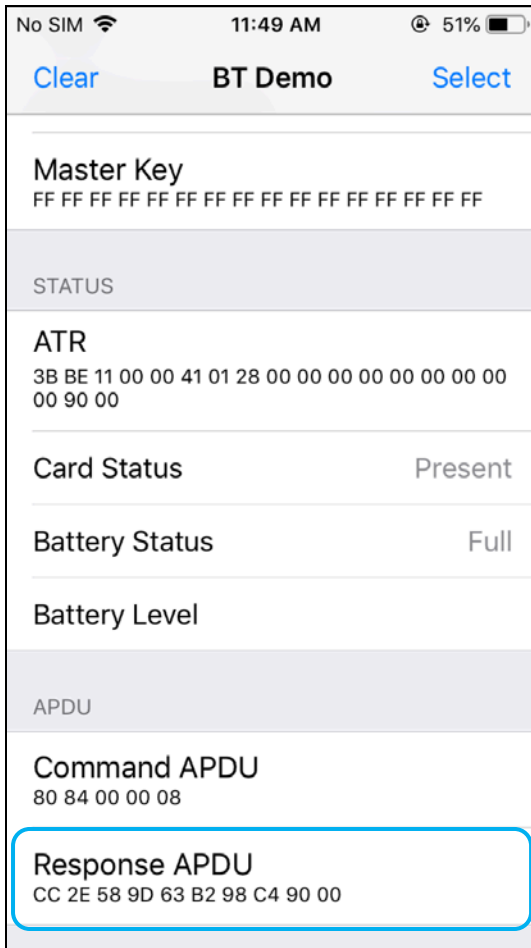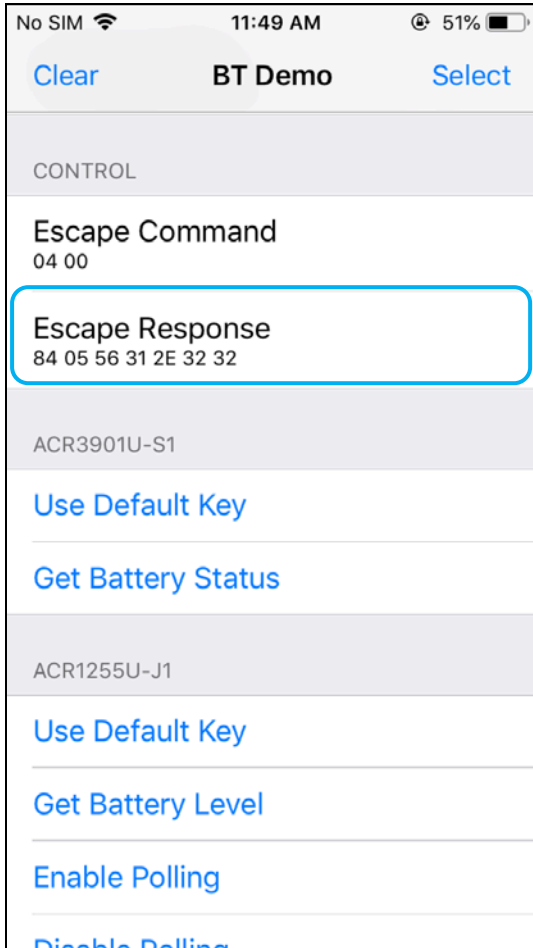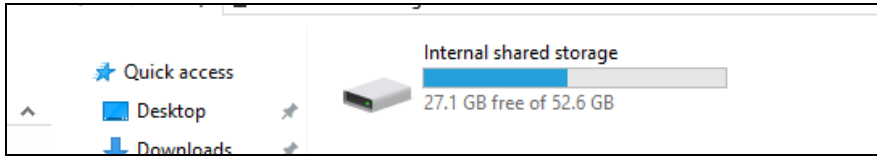2. When the authentication is successful, tap **OK** to close the prompt.

3. Tap **Transmit Escape Command**.

4. The Escape Response will be displayed.

6.0. For Android (BT Demo Application)

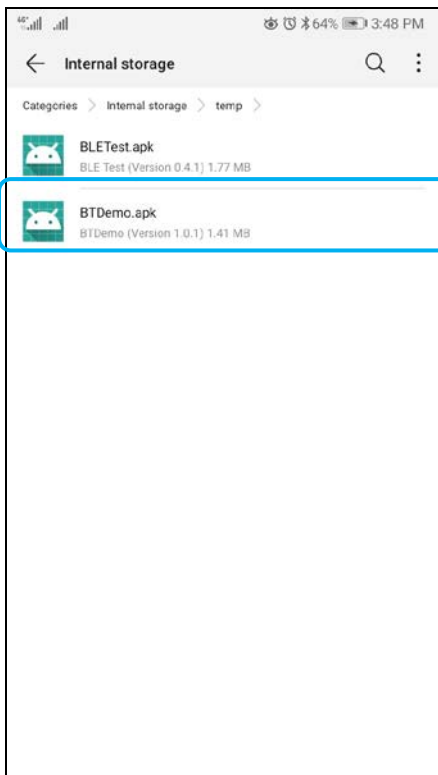## 6.1. Installing the Bluetooth demo application

1. Connect your mobile device to the computer.

2. In the internal storage of your device, create a folder where the ACR3901U-S1 BTdemo will be placed.

3. You can access the device library by downloading the **Android BT EVK** from the ACS website.

4. In the Android library, copy the **BTDemo.apk** file to the previously created folder.
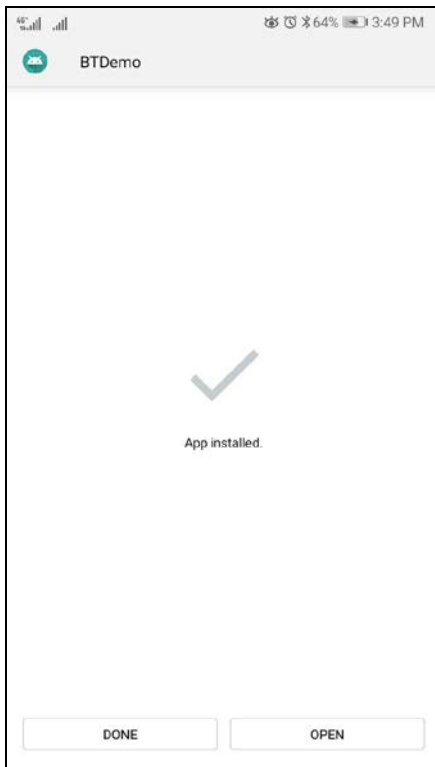

5. Disconnect your mobile device from the computer. Locate the **BTDemo.apk** using a file manager application.

6. To start the installation, tap the **BTDemo.apk** file.

7. Complete the action using **Package Installer**.
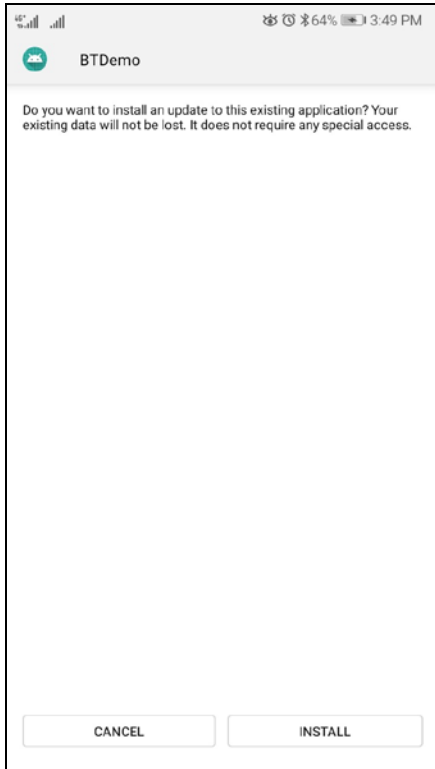
8. A prompt will ask for hardware control access. Tap **Install** to proceed.

9. Once the installation is complete, you can now open the BT demo application.
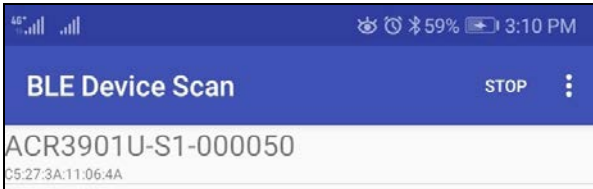
6.2. Using the ACS Bluetooth demo application

6.2.1. Connecting a device

1. Turn on the Bluetooth mode of the ACR3901U-S1 to make it discoverable. To do this, slide the toggle switch to the right.

2. Turn on your device's Bluetooth by going to **Settings | Bluetooth**.

3. Open the **ACS BT Demo application**.

4. Choose the reader to pair with your Android device.

5. Once pairing is complete, the ACR3901U-S1 is now ready to be used with the mobile device.

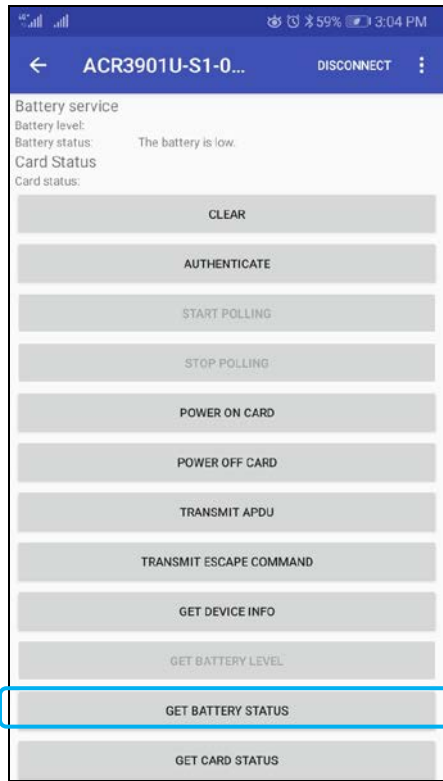### 6.2.2. Getting the device information

To get the reader's information, tap **Get Device Info**.

6.2.3.   Getting the battery status

To get the battery status, tap **Get Battery Status**.

6.2.4. Getting the card's ATR (Answer To Reset)

To get the ATR of the card:

1. Insert a smart card into the ACR3901U-S1 reader.

2. In the demo application, tap **Authenticate**.

3. Once it is finished, it will show an **Authentication Success** message.

4. Tap **Power On Card** to display the ATR.

6.2.5. Transmitting an APDU command

To transmit APDU commands:

1. Insert a smart card into the ACR3901U-S1 reader.
2. In the demo application, tap **Authenticate**.
3. Once it is finished, it will show an **Authentication Success** message.
4. Tap **Power On Card**, and then tap **Transmit APDU Command**.
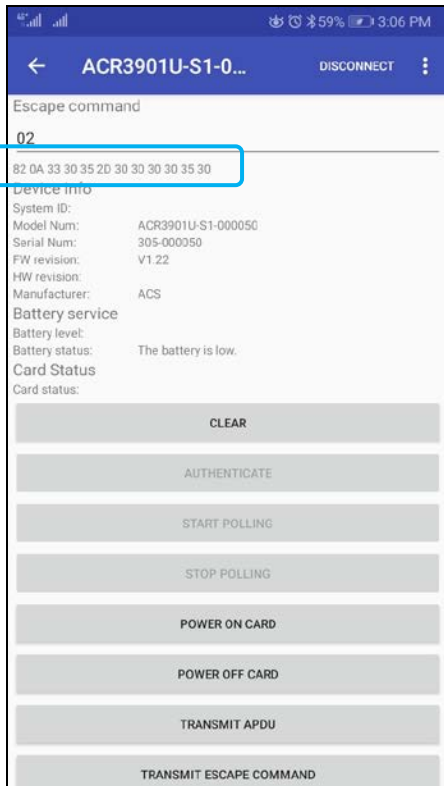5. The APDU command response will be displayed.

*Note: You can edit the APDU command by tapping **Command APDU**.*

6.2.6. Transmitting an escape command

To transmit an escape command:

1. In the demo application, tap **Authenticate**.

2. Once it is finished, it will show an **Authentication Success** message.

3. Tap **Transmit Escape Command**.

4. The Escape Response will be displayed.

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