P+F Manual
IUT-HH41-FR*
IUT-HH42-FR*
IUT-HH42-FR*

RFID-UHF Handheld Reader

CE

Your automation, our passion.

PEPPERL+FUCHS

Table of Contents

Artikelnummer • JJJJ-MM

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1. Introduction

1.1. Content of this Document

This document contains information required to use the product in the relevant phases of the product life cycle. Those can include:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

i Note

Visit www.pepperl-fuchs.com to access further documentation for full information about the product.

The documentation comprises the following parts:

- This document
- Datasheet

In addition, the documentation may comprise the following parts, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Instruction manual
- Other documents

1.2. Manufacturer

Pepperl+Fuchs GmbH

Lilienthalstraße 200, 68307 Mannheim, Germany

Website: www.pepperl-fuchs.com

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1.3. Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only trained and qualified personnel may carry out the mounting, commissioning, operation, maintenance, and dismounting of the product. The trained and qualified personnel must have read and understood the instruction manual and other documentation.

Familiarize yourself with the device before use. Read the document carefully.

1.4. Symbols Used

This document contains symbols to identify warning messages and information messages.

Warning messages

You always find warning messages whenever hazards could result from your actions. It is essential that you observe these warning messages to ensure your personal safety and to prevent property damage.

Warning messages are shown in descending order according to the risk level, as follows:

DANGER!

This symbol warns you of an immediate and present danger.

If you do not observe this warning message there is a risk of personal injury and even death.

WARNING!

This symbol warns you of a potential fault or hazard.

If you do not observe this warning message, there is a risk of personal injury or severe property damage.

CAUTION!

This symbol warns you of a potential fault.

Failure to observe this warning message may result in the malfunctioning or complete failure of the product or any systems and plants connected to it.

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Information messages

i **Note**

This symbol draws your attention to important information.

〉 **Action**

This symbol highlights an action. You are prompted to perform an action or sequence of actions.

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2. General Declaration

2.1. Device Versions

Europe:	IUT-HH41-FR1-01
	IUT-HH42-FR1-01
	IUT-HH43-FR1-01
USA:	IUT-HH41-FR2-02
	IUT-HH42-FR2-02
	IUT-HH43-FR2-02
China:	IUT-HH41-FR2-03

Details of other countries are available online at www.pepperl-fuchs.com or on request.

2.2. Accessories

IUT-HH41-FR* and IUT-HH43-FR*	
	Charger: Europe: IUZ-HH41/HH43-CHARGER-EU USA: IUZ-HH41/HH43-CHARGER-US China: IUZ-HH41/HH43-CHARGER-CN Included in delivery: Power supply unit USB connection cable
	Replacement battery: IUZ-HH41/HH43-BAT

IUT-HH42-FR*	
	Charger: IUZ-HH42-CHARGER Included in delivery: USB connection cable
	Replacement battery: IUZ-HH42-BAT

2.3. Features

Area of Application:

The IUT-HH4* devices are suitable for portable use to identify RFID read/write tags in the UHF frequency range. As the devices have a rugged housing, they can even be used in harsh environmental conditions. The backlit display allows them to be used in any lighting conditions.

RFID Standard:

You can use the IUT-HH4* portable readers to access all read/write tags that are based on Standard ISO18000-63 (EPC Class1 Gen2). These read/write tags are indicated by "IUC*" within the Pepperl+Fuchs portfolio.

User Program:

The IUT-HH4* devices are used through the RFIDControl user program. This is a free program that must be installed by the user during the initial commissioning process. This program covers the standard functions (such as read and write) for accessing a read/write tag.

Interfaces:

You can connect the device to a PC or network via a USB or Ethernet cable using the charging cradle available as an accessory. In addition, it features wireless transmission via WLAN and is used through the RFIDControl program.

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3. Device characteristics

3.1. IUT-HH41-FR* and IUT-HH43-FR* Keyboard Overview

IUT-HH41-FR* and IUT-HH43-FR*	
⏻	On/Off button;
ok	OK/Enter; open menu
del	DEL/Back; back; delete input
tab	TAB
esc	ESC/Cancel; exit menu
▢	Open/Hide on-screen keyboard
✧	Navigation buttons
F	Function key
123	Switch to numbers
abc	Switch to lowercase and uppercase letters
alt	Alt
⬆	Shift

Table 1. Keyboard overview

3.2. IUT-HH42-FR* Keyboard Overview

IUT-HH41-FR* and IUT-HH43-FR*	
	On/Off button
	OK/Enter; open menu
	DEL/Back; back; delete input
	TAB/ALT
	ESC/Cancel; exit menu
	Open/Hide on-screen keyboard
	Navigation buttons
	Function key
	Switch to numbers

Table 2. Keyboard overview

3.3. Field Alignment

IUT-HH41-FR*
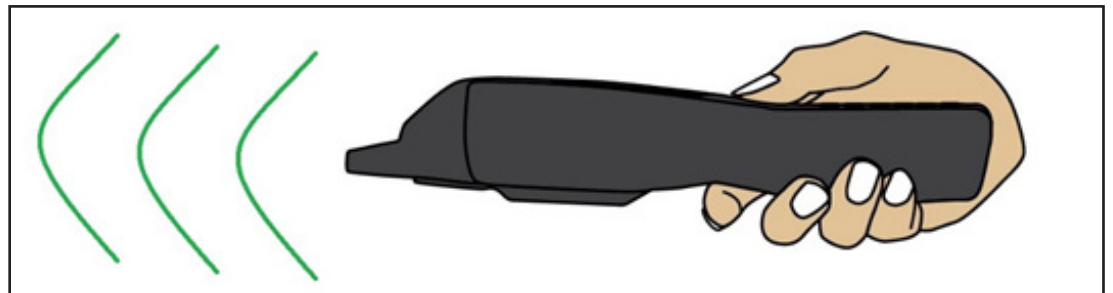
Figure 1. Field alignment

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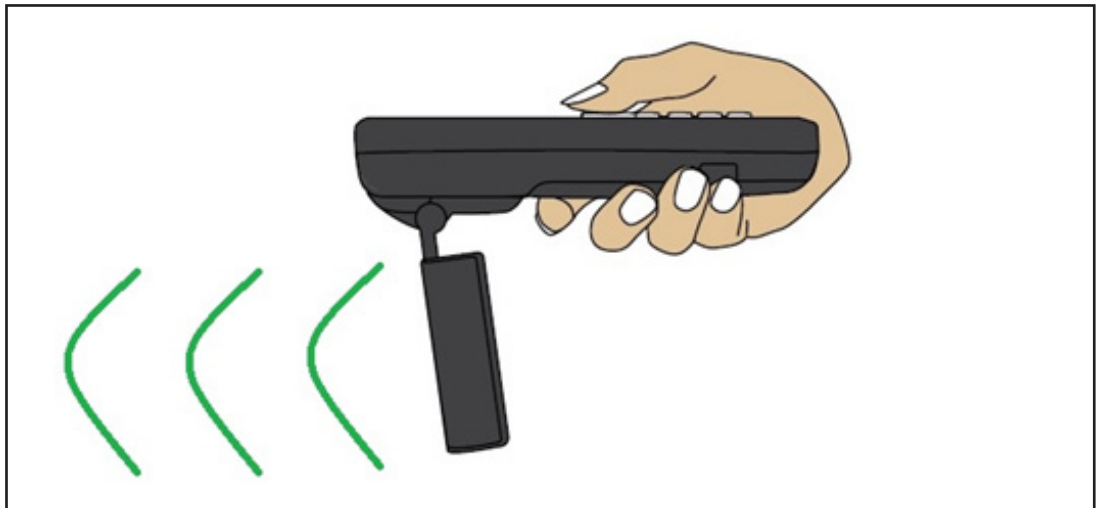
IUT-HH42-FR*

Figure 2. Field alignment

Fold the antenna out before use!

IUT-HH43-FR*
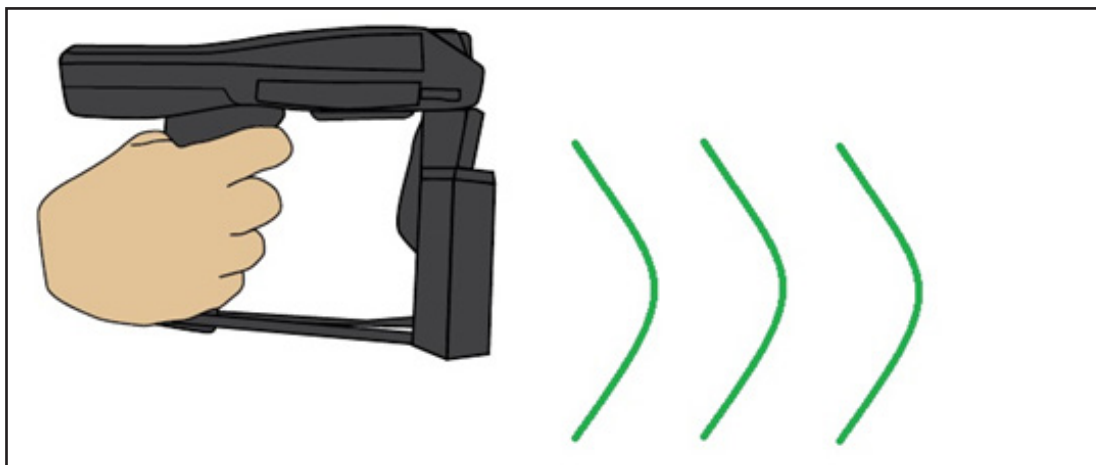
Figure 3. Field alignment

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3.4. Switching On and Off

Use the ⏻ or ⊚ buttons to switch the IUT-HH41-FR* and IUT-HH43-FR* or IUT-HH42-FR* devices on or off.

Switching Off:
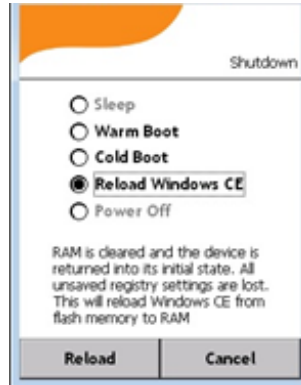
To switch off, briefly press the corresponding button. Once you release the button the adjacent dialog box will appear. From this dialog box, select Power Off and confirm by pressing Power Off in the bottom left area of the menu.

Option	Description
Sleep	The device switches to the Suspend status. Press the On/Off button again to come out of the Suspend status and the device switches to On. The last active menu will be displayed. Switching to the Suspend status can extend the battery life of the device. Sleep mode is only available when operating the device away from the charger. When using the device from the charger, the device cannot be switched to the Suspend status.
Warm Boot	The Windows CE operating system is restarted. The RFIDControl user program needs to be restarted manually. The data displayed within the RFIDControl program remains unchanged.
Cold Boot	The Windows CE operating system is restarted. The RFIDControl user program needs to be restarted manually. The data previously displayed within the RFIDControl program will be deleted.
Reload Windows CE	The device reloads Windows CE from the flash memory to the RAM. The parameters last saved by the registry (e.g., transmitting power) will be used.
Power Off	Completely switches off the device. This option is not available when operating the device from the charger. The device must be taken off the charger to completely turn it off.

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Switching On:

Briefly press the On/Off button to enable the device. The operating system will start up. This process takes several seconds. The devices are ready for use when the left-hand menu window appears. Click on RFIDControl to start the user program.

3.5. Inserting the Battery

Inserting the battery into the IUT-HH41-FR*

1.   Turn the device on to its back

2.   Loosen the retaining strap and unscrew the fastening screw

3.   Take the retaining strap out of the bracket and remove the battery cover

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4.   Insert the battery

5.   Press the battery down
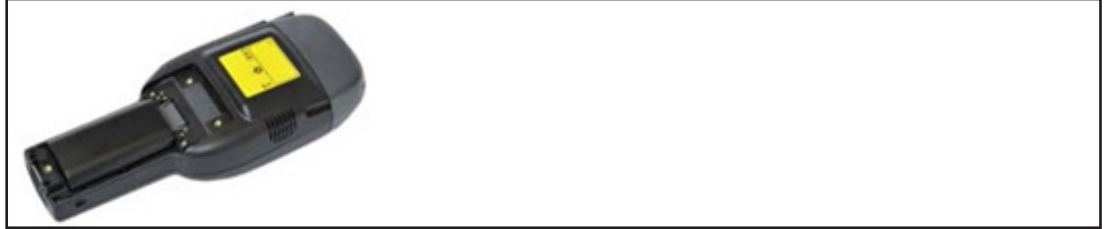
6.   Close the battery cover

> **Inserting the battery into the IUT-HH43-FR***

1.   Turn the device on to its back and insert the battery

2.   Use the pistol grip to push the battery cover diagonally forward

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3. Press the battery cover down and screw in the fastening screw

> **Inserting the battery into the IUT-HH42-FR***

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1. Fold the RFID antenna forwards and turn the clasp 90° to the left
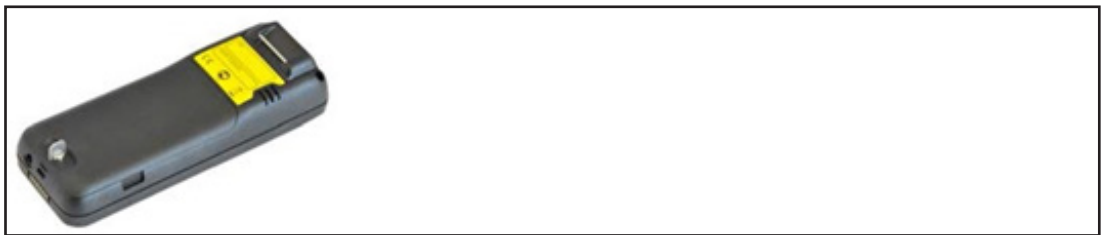
2. Lift the battery cover

3. Insert the battery and press the battery down

4. Press the locking bar on to the battery. Pull the safety catch back until it locks into place

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5.   Replace the battery cover

6.   Close the battery cover. Turn the clasp 90° to the right
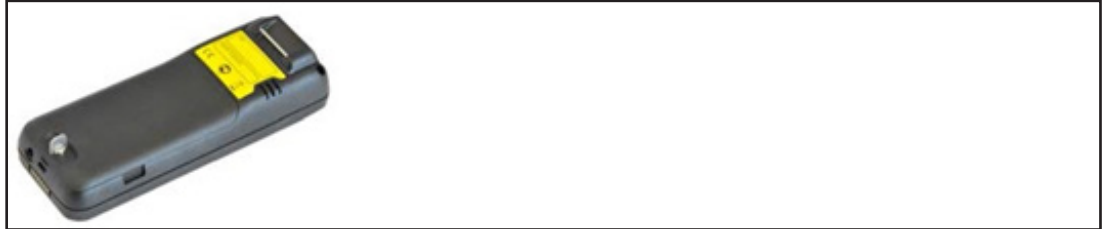
3.6. Charging the Battery

The battery of the IUT-HH41-FR* and IUT-HH43-FR* is charged via the IUZ-HH41/43-CHARGER-* charger. Several chargers are available depending on the electricity supply system in the country of use.

IUZ-HH41/43-CHARGER-EU   European Union

IUZ-HH41/43-CHARGER-CN   China

IUZ-HH41/43-CHARGER-US   USA

> **Charging IUT-HH41-FR* and IUT-HH43-FR* via the docking station**

1.   Put the power supply unit together

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2. Plug the power supply output into the connector for the supply voltage

3. Place the IUT-HH41-FR* or the IUT-HH43-FR* in the charger. The device locking mechanism can be loosened using the side buttons

Charging the spare battery

You can charge the spare battery IUZ-HH41/HH43-BAT away from the handheld reader too. To do so, place the spare battery in the recess provided on the back of the IUZ-HH41/43-CHARGER-* charger.

1. Remove the battery from the IUT-HH41-FR* or IUT-HH43-FR* or use the spare battery

2. Insert the battery into the bracket on the back of the docking station

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The charge level of the battery is indicated by an LED on the device itself or on the docking station.

LED display (top left) on the IUT-HH41-FR* or IUT-HH43-FR* when charging via the docking station

Green: 100 %

Orange: >90 %

Red: <90 %

LED display on the docking station when charging the spare battery

Green: 100 %

Orange: >90 %

Rot: <90 %

Charging the Battery of the IUT-HH42-FR*

There are several ways to charge the IUT-HH42-FR*:

- Directly connecting the power supply to the IUT-HH42-FR*
- Charge the IUT-HH42-FR* via the IUZ-HH42-CHARGER docking station
- Charge the spare battery via the IUZ-HH42-CHARGER docking station

The power supply unit needed to charge the device is included within the scope of delivery for the IUT-HH42-FR* device.

Connecting the power supply unit directly to the IUT-HH42-FR*

1.   Choose the appropriate style of power plug

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2. Insert the plug into the power supply unit. Push the plug as far as it will go until it snaps into place

3. Connect the power supply unit directly to the IUT-HH42-

> ## Charging the IUT-HH4-FR2* via the docking station

1. Connect the power supply unit to the back of the docking station

2. Place the IUT-HH42-FR* in the docking station. When doing so tilt the handheld forward. Push the handheld into the rear position

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Charging the spare battery via the docking station

1. Remove the battery from the IUT-HH42-FR* or use the spare battery
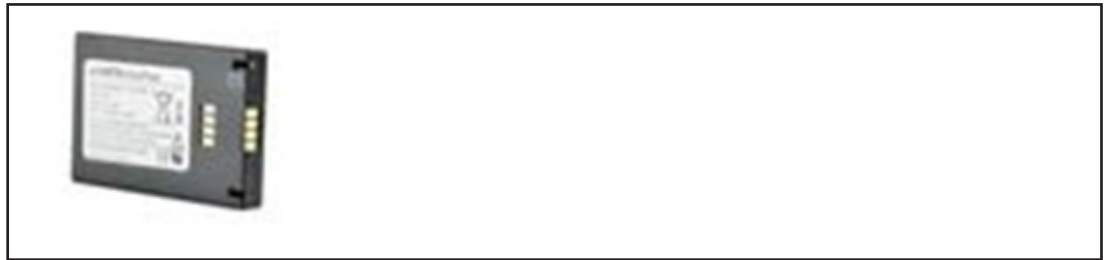
2. Insert the battery into the bracket on the back of the docking station

The charge level of the battery is indicated by an LED on the device itself or on the docking station.

● 100 %

● > 80 %

● < 80 %

Display on the IUT-HH42-FR2 when charging directly and charging via the docking station

Green:	100 %
Orange:	>80 %
Rot:	<80 %

Display on the docking station when charging the spare battery

Green:	100 %
Red:	<90 %

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3.7. Ports on the IUZ-HH41/43-CHARGER-* Docking Station

The IUZ-HH41/43-CHARGER-* docking station has three ports on the back.

Left   Power supply

Center   Ethernet

Right   USB

The USB connection cable and the power supply unit are included in the scope of delivery of the IUZ-HH41/43-CHARGER-* docking station. An Ethernet connection is provided via an RJ45 plug. An Ethernet connection cable is not included in the scope of delivery.

3.8. Ports on the IUZ-HH42 CHARGER Docking Station

The IUZ-HH42-CHARGER docking station has three ports on the back.

Left   Power supply

Center   Ethernet

Right   USB

The USB connection cable is included in the scope of delivery of the IUZ-HH42-CHARGER docking station. An Ethernet connection is provided via an RJ45 plug. An Ethernet connection cable is not included in the scope of delivery.

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4. Basic Setting for Windows CE Operating System

You can use the Windows CE operating system control panel to carry out various basic device settings.

4.1. Accessing the Control Panel

Start menu (below left) ⇒ Settings ⇒ Control Panel
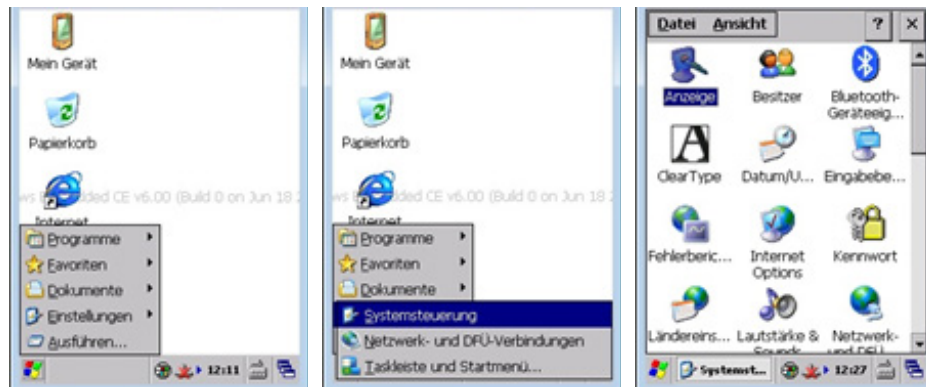
4.2. Desktop Background

You can use the Display menu to change the desktop background. This allows you to use a customer-specific background.

Display ⇒ Background ⇒ Assign new background ⇒ OK

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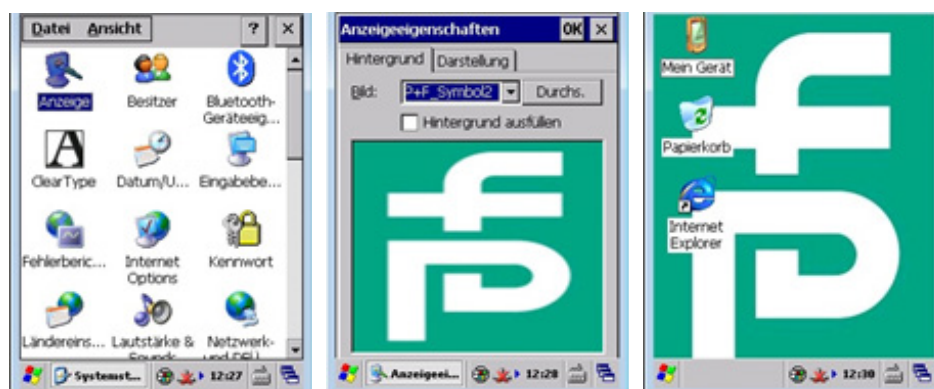
4.3. Date/Time

Depending on the place of use, it may be necessary to readjust the date or time.

Date/Time ⇒ Date, Time, and Time Zone Setting ⇒ OK

4.4. Country Settings

You can set the device or device display to the regional settings using the country settings (for example, the time and number display format). In addition, you can change the language used.
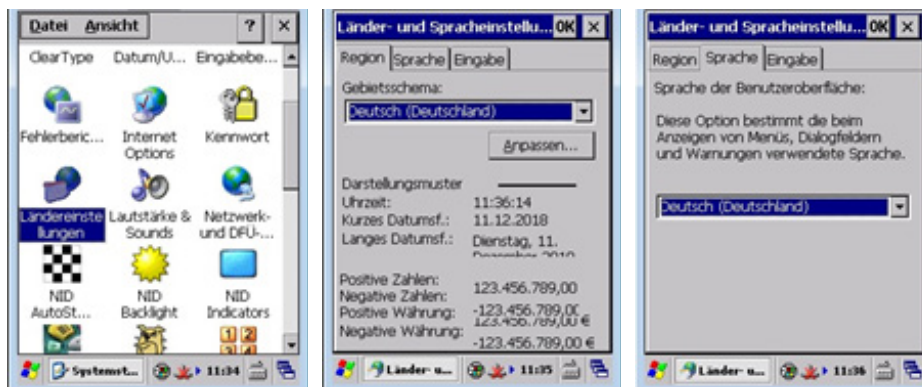
4.5. Volume Control

You can use the Volume & Sounds menu to control the signal tones of the devices.

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4.6. Backlight

The backlight of the display or buttons can be adjusted via the **NID Backlight** menu.
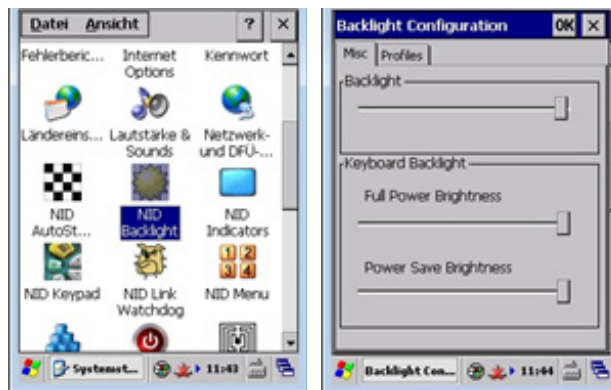
4.7. Battery Charge Status Display

The charge status of the battery can be shown on the display. The NID Indicator menu can be used to enable this function.

NID Indicators ⇒ Battery Level ⇒ OK

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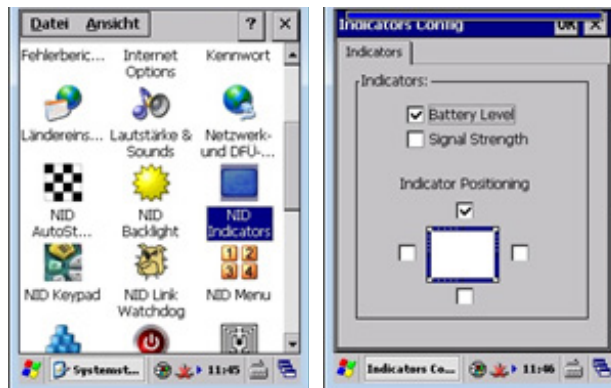
4.8. Adjusting the RFID Antenna

The NID RFID reader menu can be used to adjust the UHF reader module settings. These are all parameters that impact the function of the reader on the air interface. The most important parameter is the transmitting power that you are able to adjust here. You can also adjust the transmitting power within the RFIDControl user program.
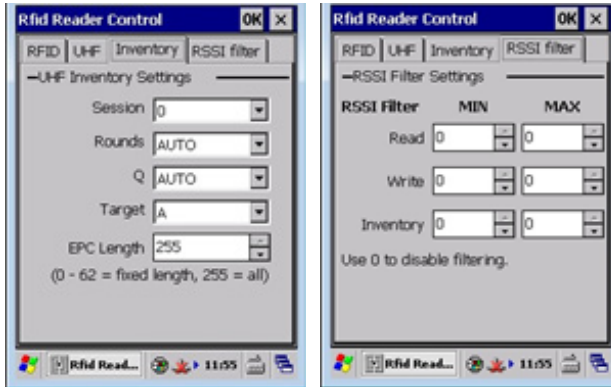
4.9. Power Options

You can use the Power Control menu to tailor the power options to how the device is being used. You can control the length of time before the device goes into Suspend Mode, for example.
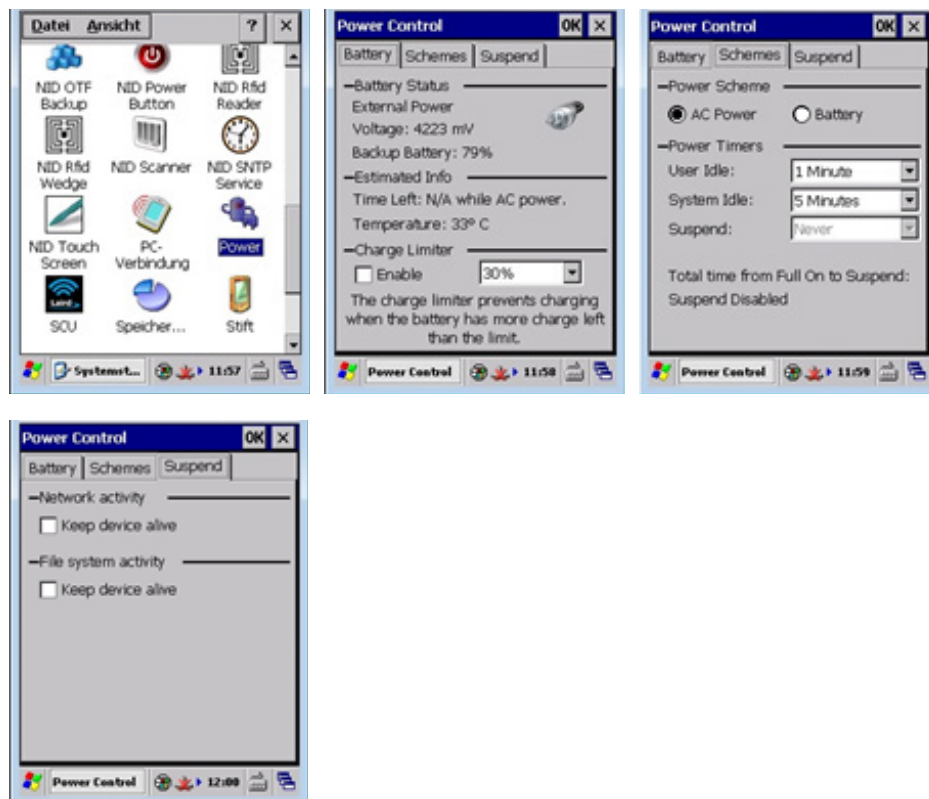
Power Options Factory Settings

Energy status	Network operation	Battery operation (portable)
User Idle	1 minute	1 minute
System Idle	5 minutes	2 minutes
Suspend	never	5 minutes
Off	never	manual

Table 1.

The IUT-HH41-FR* or IUT-HH32-FR* and IUT-HH42 devices have 5 energy statuses:

- On
- Display dimmed (User Idle)
- Energy-save mode (System Idle)
- Standby (Suspend)
- Off

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On

This energy status is enabled when the device is in use. In this mode the screen is turned on and is turned up to maximum brightness. This status means energy consumption is at its highest. When the device is no longer in use, once the "User Idle" time has expired, it switches to the "User Idle" energy status.

User Idle

Switching to this energy status reduces energy consumption. This will reduce the brightness of the display. Touching the screen or pressing a button causes the status to switch back to "On." Once the "System Idle" time has expired, it switches to the "System Idle" energy status.

System Idle

The display of the device is switched off when the device has an energy status of "System Idle." This reduces energy consumption even further. Touching the display or pressing a button causes the device to switch back to energy status "On." Once the "Suspend" time has expired, the device switches to energy status "Suspend." This will be indicated by a signal tone.

Suspend/Standby

This status consumes the lowest amount of energy. The display is switched off and does not respond to touch. You need to press the "On/Off" button to switch to the "On" status. It takes approx. 5 seconds to switch over.

Off

The device can only be completely switched off if it is not connected to the charger or power supply. You need to press the "On/Off" button for approx. 5 seconds to switch the device off. The device can subsequently be turned off completely by pressing "Power Off."

4.10. Saving Settings via Registry

Any changes made in the system control panel must be saved via a **Registry Back-up**. This is the only way the changes can be permanently saved even after a device reboot.

Start menu (bottom left) ⇒ Programs ⇒ NordicID ⇒ Registry Backup

Start the process to save the registry by selecting **Backup Registry** and pressing the **Backup** button.

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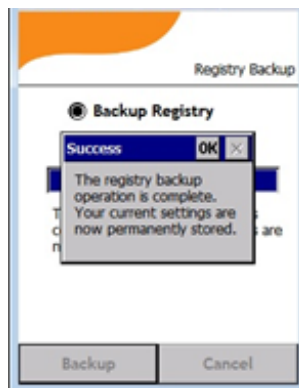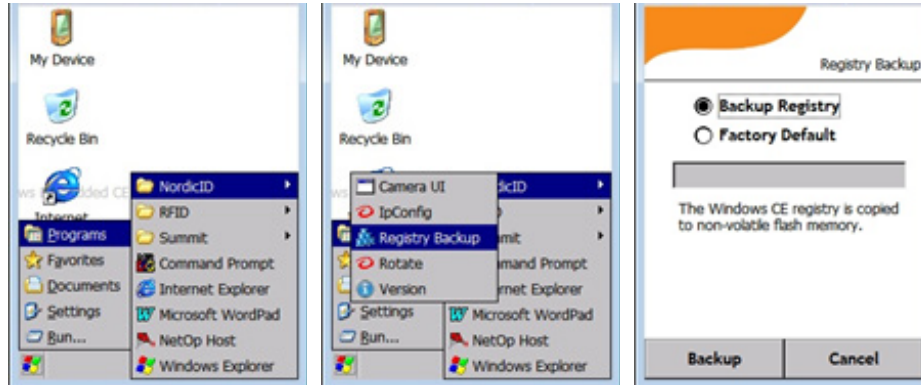
4.11. Using the Device

The IUT-HH41-FR* or IUT-HH43-FR* and IUT-HH42-FR* devices include a stylus within the scope of delivery. You can use the stylus to input information on the display. Likewise, you can use an item with a rounded tip to input information on the display.

In addition, you can use the device keyboard to input information.

The devices provide the option of opening an on-screen keyboard. This means you can use this keyboard and a stylus to input alphanumeric information.

Use the ⬚ button on the display to open the on-screen keyboard for the IUT-HH41-FR1* and IUT-HH43-FR3* devices. Press this button again to hide this feature.
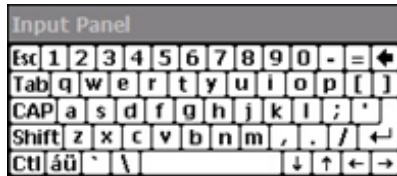
Press (F) + ⬤ together to open the on-screen keyboard on the IUT-HH42-FR* device.

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5. RFIDControl User Program

The IUT-HH41-FR* or IUT-HH43-FR* and IUT-HH42-FR* devices use the RFIDControl user program to access UHF read/write tags. The user program is the same for all device versions and provides the following standard functions:

- Read or write EPC/UII (Electronic Product Code/Unique Item Identifier)
- Read or write user data (User Memory)
- Read TID (Tag Identifier)
- Present data in different data formats
- Adjust transmitting power
- Generate log files
- Transfer data via USB, LAN, and WLAN

The program is not preinstalled on delivery for the IUT-HH41-FR* or IUT-HH43-FR* and IUT-HH42-FR* devices. The current version of the program is available for download free of charge from the Pepperl+Fuchs website. The user program is transferred to the device via the charger using a USB connection to a PC.

You will need the Software Windows Mobile Device Center to connect the devices to a PC via the USB interface.

5.1. Windows Mobile Device Center

The current version of the Windows Mobile Device Center (WMDC) can be obtained from the Microsoft website. The WMDC is used to easily connect mobile devices to a PC using a Windows operating system.

The program was originally written for Windows XP and Vista, but it is also suitable for current operating systems such as Windows 7 or 10.

After downloading the program, follow the installation instructions.

Once successfully installed, the device will automatically be detected by the PC as soon as the device is switched on and connected to the PC via the USB. The adjacent window will automatically appear.

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5.2. Download RFIDControl Program

The current version of the RFIDControl program for the portable IUT-HH4* UHF hand-held readers is available via the website.

https://www.pepperl-fuchs.com/
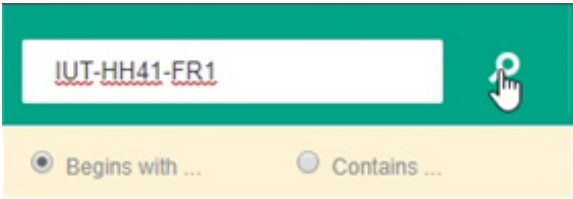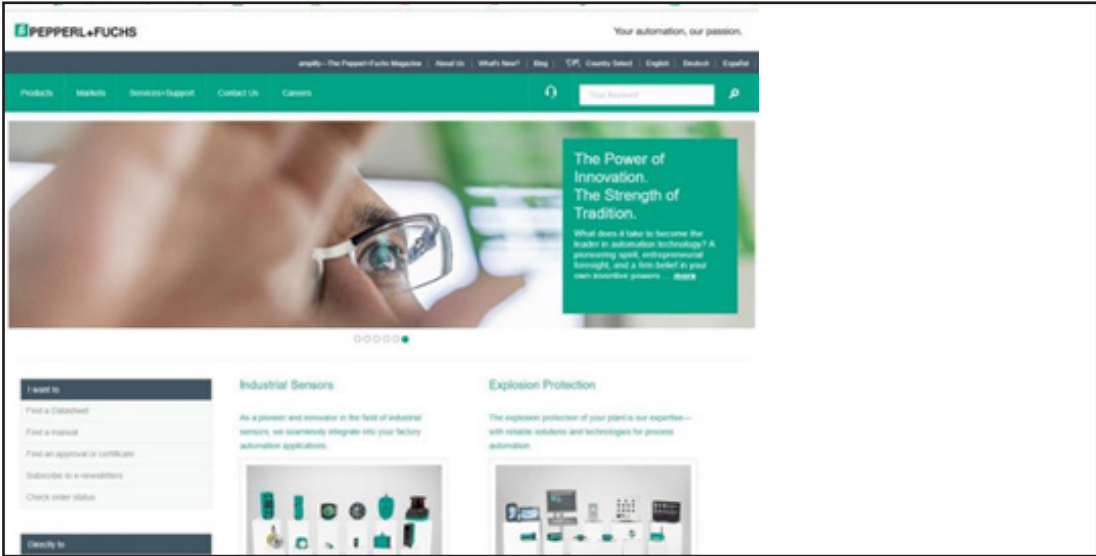
Enter the product name (e.g., IUT-HH41-FR1) or the item number into the search field on the website.
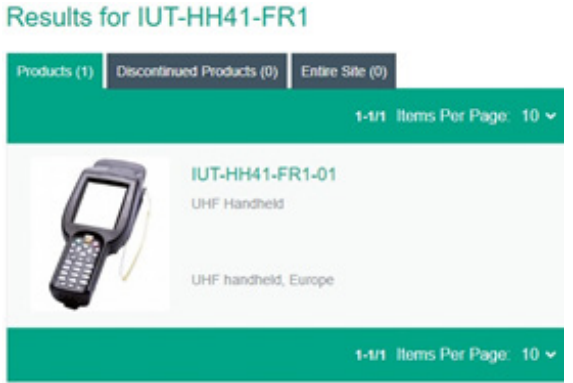
Select the corresponding device from the device overview (e.g., IUT-HH41-FR1-01).

The download file is located in the Software area. The RFIDControl user program can be loaded from there. This will be a "pak" file.

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5.3. RFIDControl Program Installation

A Flash folder can be found on the handheld readers. This folder contains files that are permanently stored in the devices.
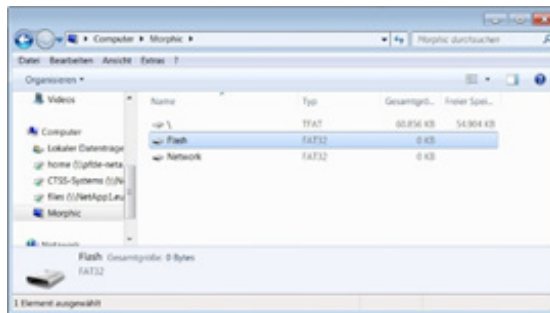
Transfer the ".pak" file (i.e., RFIDControl user program) to the Flash folder.
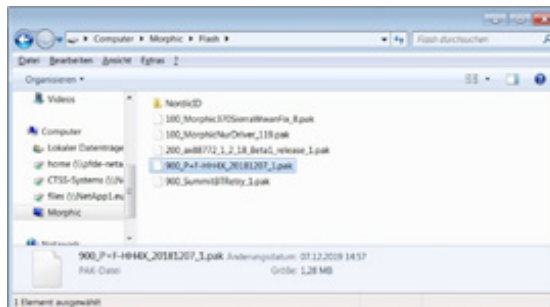
Installation will be performed automatically when Windows CE is reloaded. To do this, press the power button until the adjacent dialog appears.

Start installation by selecting **Reload Windows CE** and pressing **Reload**.
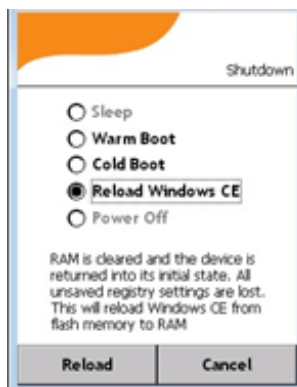
The installation process takes several seconds. Once successfully carried out, the RFIDControl icon will appear on the desktop interface.

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Start the program by double-clicking on the RFIDControl icon.

5.4. RFIDControl Program

Once the user program has been launched, the main menu will appear together with the following sub-menus.
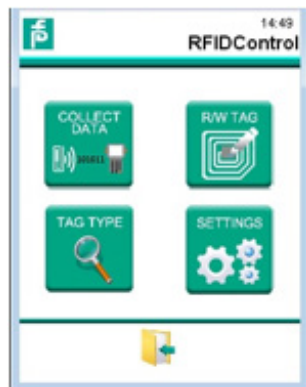
- ■ Collect Data ⇒ Capture read/write tags, save list of the tags in a file as required
- ■ R/W Tag ⇒ Read, edit, write read/write tags
- ■ Tag Type ⇒ Check read/write tag to see which chip is installed
- ■ Settings ⇒ Perform device settings

5.4.1 Collect Data—Capture Read/Write Tag

The Collect Data menu allows you to capture multiple read/write tags. During this process, the various memory banks of the read/write tags are scanned and displayed on the screen. You can customize how the memory banks are displayed. This menu does not provide a write operation to a read/write tag.

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Tag Data Tab

Start the read operation by clicking on the SCAN button. Cancel the read operation by clicking the STOP button. The contents of the memory banks of the read/write tags identified during the scanning operation will be displayed on the screen.
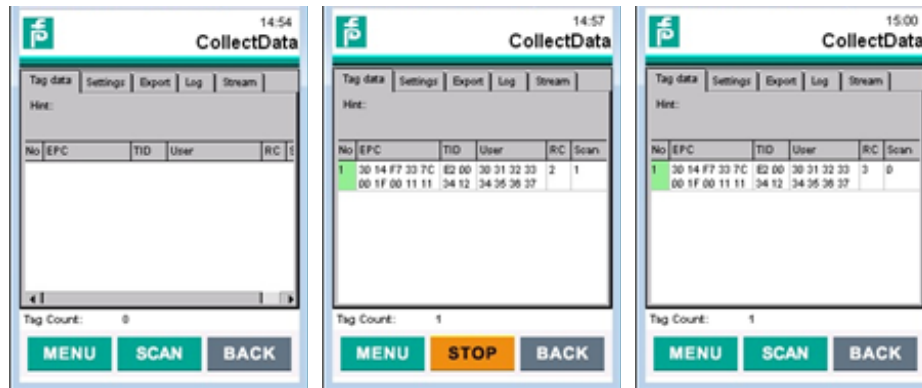
The columns in the display are to be interpreted as follows:

No.   List number of the identified read/write tag; when multiple read/write tags are identified, they will be numbered consecutively

EPC   Displays the EPC; the EPC is usually 12 bytes long, but may be a different length

TID   Displays the Tag Identifier; the TID is 12 bytes long; the TID begins with the value 16#E0; the number of bytes displayed can be adjusted

User   Displays the user data; the length of the user data depends on the tag type used; the number of bytes displayed can be adjusted

RC   Read access counter; it displays how often this read/write tag has been read within one scanning operation

Scan   Displays whether this read/write tag is currently located within the sensing range; 0 = outside of the sensing range, 1 = within the sensing range

Note:

- The width of the columns can be changed. To do so, drag the dividing line between the columns in the desired direction.
- The content of the cells can be displayed in full if required. To do so, double click the corresponding cell entry and a window containing the selected cell content will appear.
- The read data can be deleted via the Clear Window menu item

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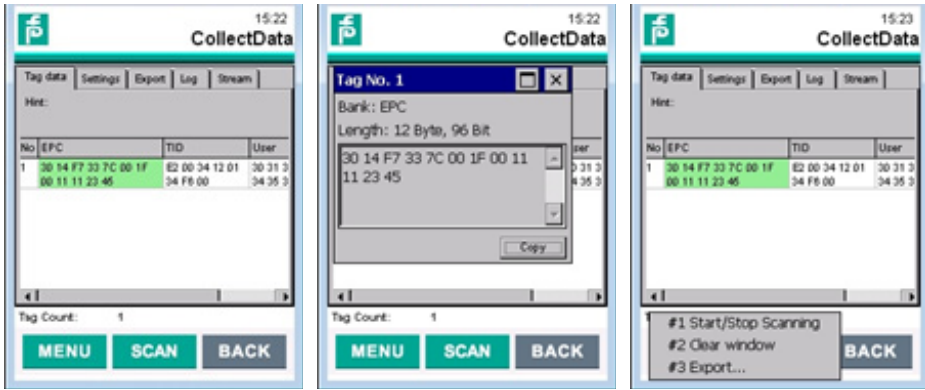
Settings Tab

You can use the Settings tab to customize how the memory banks are displayed. This will allow you to specify which memory banks are to be displayed. In addition, you can adjust the data format of the display. Here you can choose between hexadecimal, ASCII, and decimal format. In addition, you have the option to scan the memory bank in its entirety or just parts of it. Click the SAVE button to save your settings.
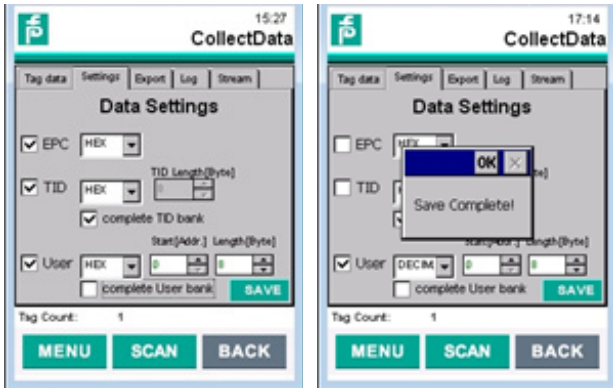
Example display:

- HEX   30 31 32 33 34 35 36 37
- ASCII   01234567
- DEC   048 049 050 051 052 053 054 055
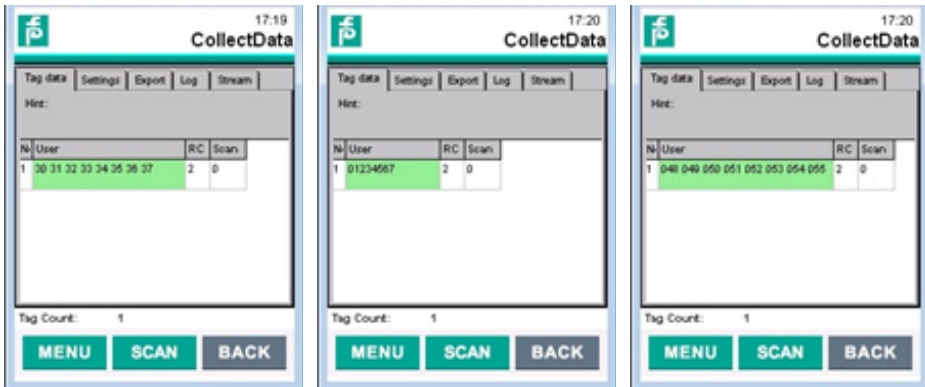
Export Tab

You can use the Export tab to configure how you store the scanned data in a .csv file. To do so, you must first specify a file name and storage location. The default setting is to store in the "Flash" directory. Data is not stored continuously, just as required. You need to click the SAVE button each time you need to save data.
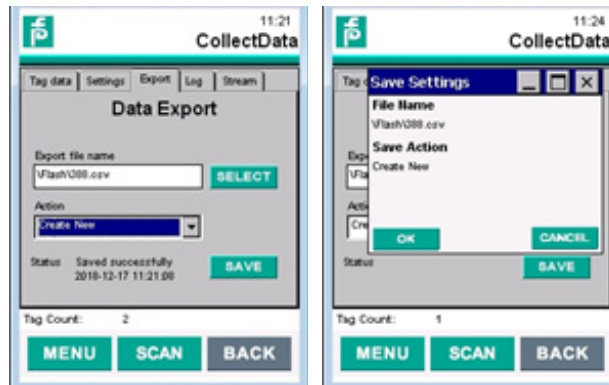
You have the following options when it comes to storing data:

- Create New   a new file is generated every time you save
- Append   the new data is appended to the existing CSV file
- Replace   the data content of the existing CSV file is replaced

The CSV file generated through the Export function is located in the "Flash" folder. From there you can copy it to a PC e.g., via a USB connection (Windows Mobile Device Center).
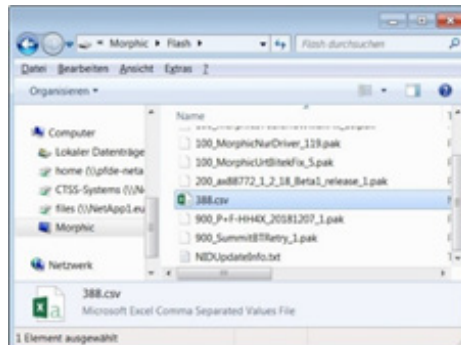
The scanned data is stored in the same data format as it appears in the display. The following figure shows the structure of the export file in the HEX data format.

No.   List number of the data set

Date&Time   Date and time of identification

EPC   EPC code; length can be adjusted

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TID	Tag Identifier; length can be adjusted
User Memory	User data; length can be adjusted
Uploaded	Data set transferred
Read Count	Number of read operations

Log Tab

You can use the **Log** tab to specify whether a log file should be created as well as where and under which name it should be stored. When this option is enabled, the data will be automatically stored in this file each time the SCAN menu is opened. The default setting is to store in the "Flash" directory. Enable store data by checking **Log Inventory result to file**.
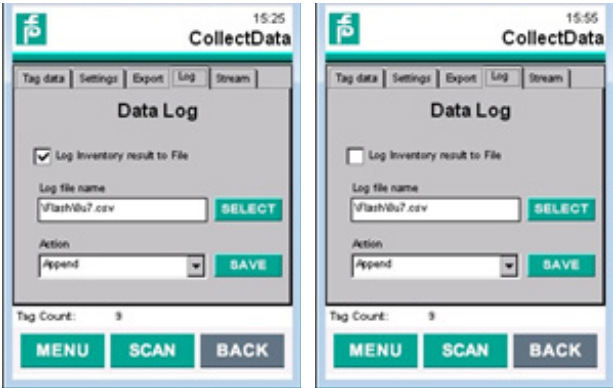
You have the following options when it comes to storing data:

- Create New — a new file is generated after each scan operation
- Append — the new data is appended to the existing file after the scan operation
- Replace — the existing file is replaced after each scan operation

Choose the Append option to continuously record data in a file.

Stream Tab

The Stream tab can be used to configure a data transfer to another end device. As part of this process the data can be transferred via LAN or WLAN. To enable this function you need to select Check Box Upstream Data. In addition you need to supply the IP address for the communication partner, the remote port, and the device name.
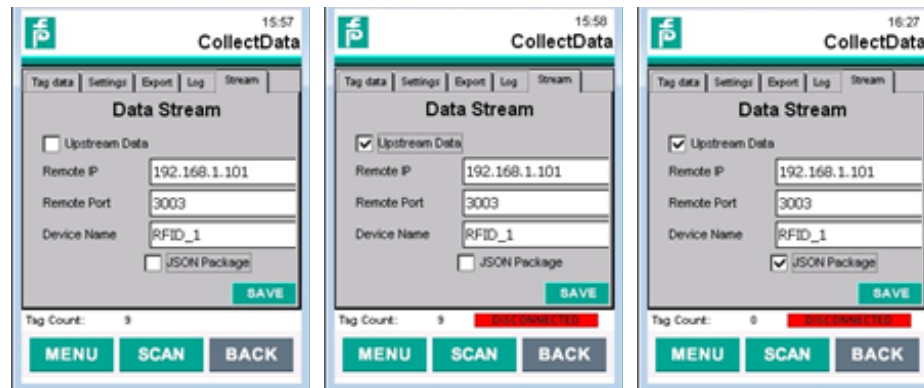
Once you have enabled the **Upstream Data** function, the connection status will be displayed in the bottom right area. If no connection is established, the display will show "Disconnected" against a red background. As soon as a connection is available, the display will show "Connected" against a green background.

You can choose between two different transfer methods. If you enable the **JSON Package**, the data will be transferred in a JSON data format. If this option is disabled, the data will be transferred using a handshake process. This method is used to connect to a PLC. Separate documentation that covers commissioning is available for this from the P+F Support Team.

5.4.2 R/W Tag/TagWriter—Reading and Writing Read/Write Tags

The **R/W Tag** menu can be used to carry out a selective read or write operation on a read/write tag. This operation can also be performed when there are multiple read/write tags within the sensing range.

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Start the read operation in the **Tag List** tab by clicking the SCAN button. The EPC codes for the scanned read/write tags will be listed within the "EPC" window. End the read operation by clicking the STOP button. Next, select the desired read/write tag. This will automatically be highlighted in blue.
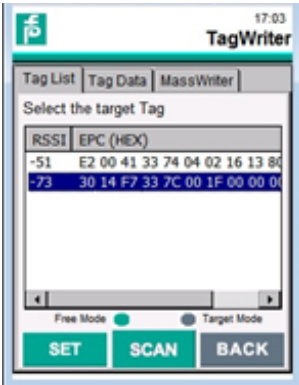
Click the SET button to select this read/write tag as the destination for the successive write and read accesses. The display will change to "Target Mode."
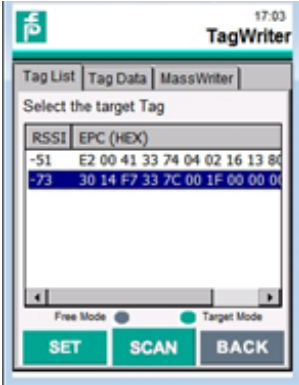
To perform a write or read access to the selected read/write tag, switch to the **Tag Data** tab. Only the previously assigned read/write tag can be addressed.
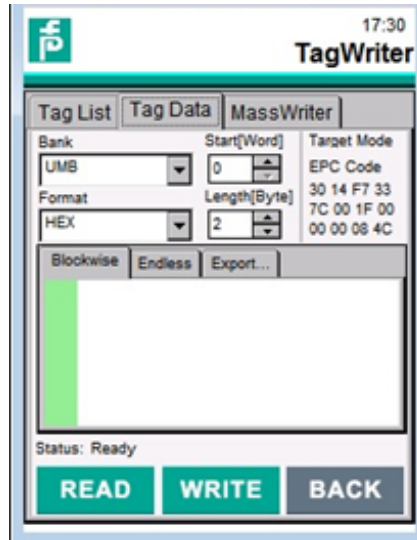
Bank	To select the memory bank
	UMB = User Memory Bank (user data)
	EPC = EPC Bank (Electronic Product Code)
Format	To select the display format
	HEX = hexadecimal format
	ASCII = character format
	Decimal = decimal format
Start	Start address for data access in the memory bank; addresses in relation to Word data type
Length	Number of bytes to be accessed
EPC Code	EPC code for the selected read/write tag

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Example 1: Reading User Data
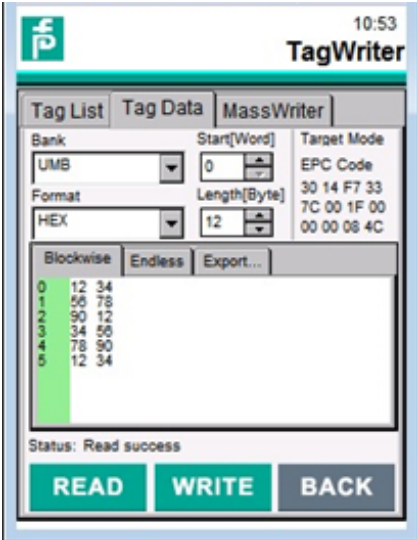
Bank   UMB (access to the user data)

Format   HEX (displayed in hexadecimal number format)

Start   0 (beginning from the start of the memory bank)

Length   12 (access to 12 bytes)

Click the READ button to scan the data. The scanned data is displayed in the lower part of the display. The "Read success" message indicates that the read access has been successful.

Example 2: Displaying the Data
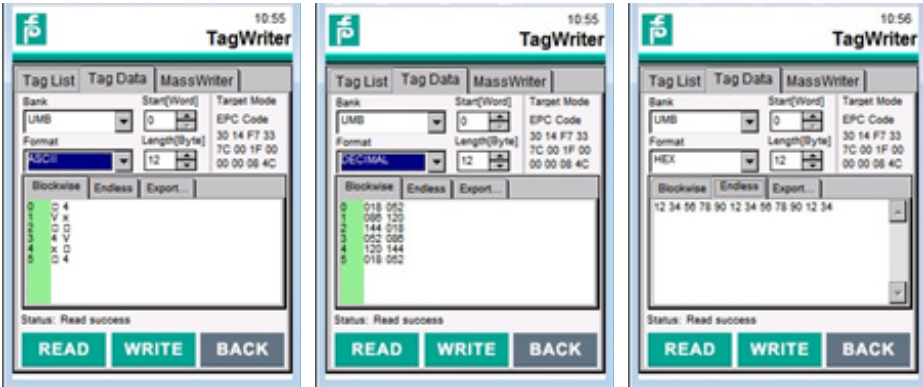
The data can be displayed in hexadecimal, ASCII, and decimal format. The data can be displayed block-by-block and in a consecutive sequence.

Example 3: Exporting the Data

You can use the Export tab to export the data shown to a text file. To do this, you first need to specify a file name (e.g., export.txt), and select a storage path.
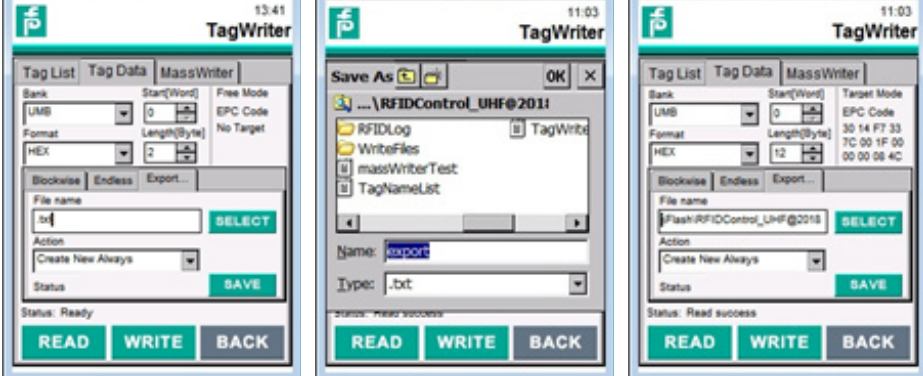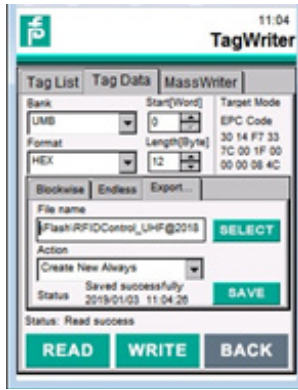
.

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You have the following options when it comes to storing data:

- Create New   a new file is generated every time you save,
e.g., export1.txt; export2.txt
- Append   the new data is appended to the existing CSV file
- Replace   the data content of the existing CSV file is replaced

Click the SAVE button to save the data. You will receive a message to say that the data has been saved successfully.

The following filing structure is applied to the data stored within the text file:
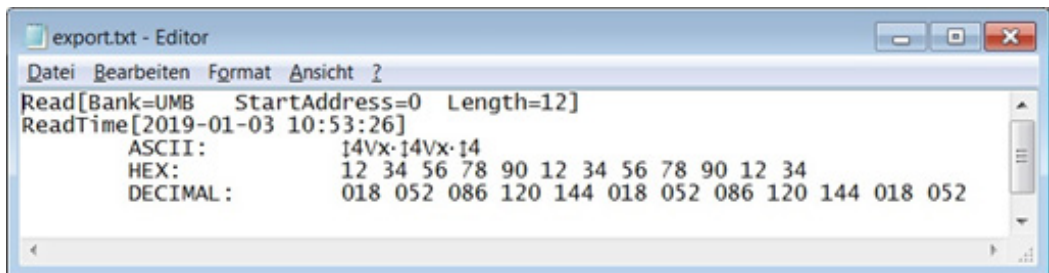
The following information is saved:

- Memory bank
- Start address
- Length
- Date and time
- Data in ASCII, HEX, and DEC data format

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Example 4: Reading the EPC
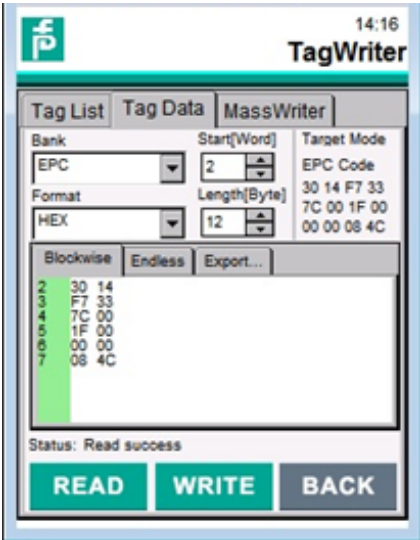
Bank	EPC (access to EPC memory bank)
Format	HEX (displayed in hexadecimal number format)
Start	2 (from the beginning of the EPC code)
Length	2 (access to 12 bytes)

Click the READ button to scan the EPC code. The EPC code will be displayed in the lower part of the screen. A "Read success" message will indicate that the read access has been successful.

The address must show a value of 2 to access the EPC code within the memory bank. The EPC is usually 12 bytes long. However, this length can change depending on how the EPC has been programmed.

You need to modify the address to show the value of 0 to access the full EPC memory bank. Increase the length specification to scan the EPC Bank in full. The checksum for the EPC code is located in the first word. The second word contains the Protocol Control Word (PC Word). If the length used has a value that is greater than the length of the EPC Bank, a corresponding error message will be displayed.
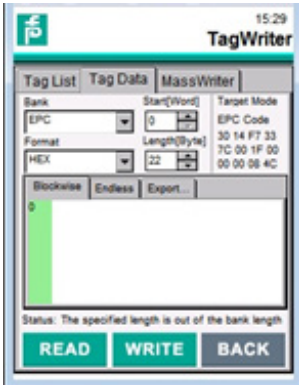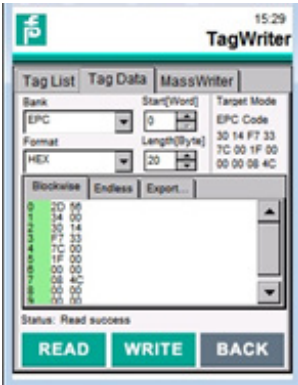
Example 5: Writing User Data
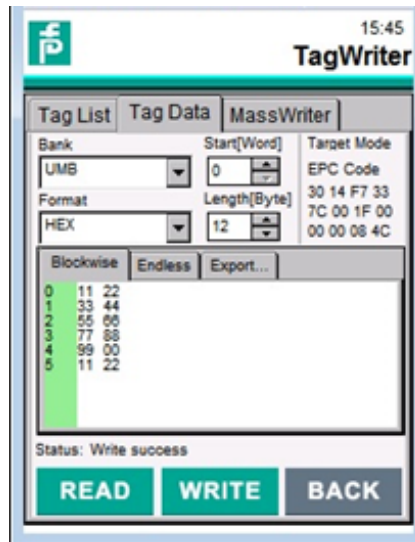
Bank   UMB (access to the user data)

Format   HEX (displayed in hexadecimal number format)

Start   0 (beginning from the start of the memory bank)

Length   12 (access to 12 bytes)

If you wish to write user data to the memory area you will first need to input the data to be written in the lower half of the dialog box. It may help when doing so to first scan the data and modify the scanned data accordingly. Opening the on-screen keyboard makes it easier to input the data.

Click the WRITE button to write the data. A "Write success" message will indicate that the write operation has been successful.

Data areas that have changed in comparison to the state they were in before the write operation will be highlighted in red. A status message will indicate whether the assigned read/write tag cannot be found within the sensing range during write access or if the data is not able to be written.

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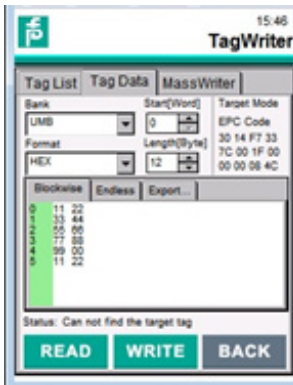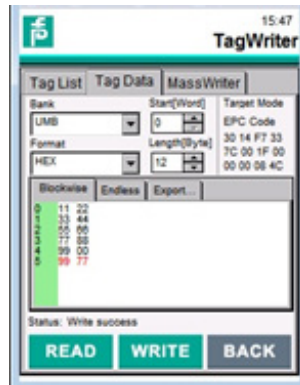
Example 6: Writing the EPC Code
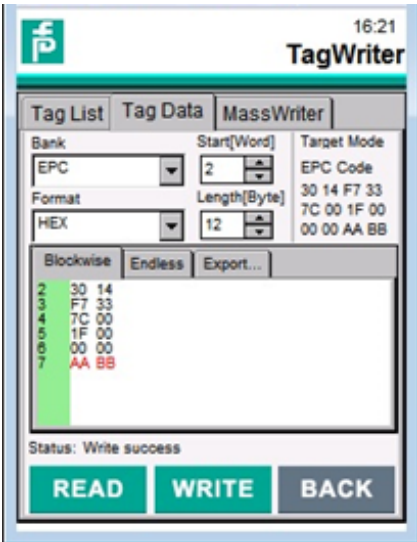
Bank — EPC (access to the EPC Bank)

Format — HEX (displayed in hexadecimal number format)

Start — 2 (from the beginning of the EPC code)

Length — 12 (write EPC code 12 bytes long)

If you wish to amend the EPC code you will first need to input the data to be written in the lower half of the dialog box. It may help when doing so to first scan the old EPC code and modify the scanned code accordingly. Opening the on-screen keyboard makes it easier to input the data.

Click the WRITE button to write the new EPC code. A "Write success" message will indicate that the write operation has been successful. The assigned EPC code for the read/write tag (Target Mode, top right in the window) will automatically be changed.

MassWriter Tab

The **MassWriter** function allows multiple read/write tags to be programmed one after the other using different data sets. As part of this process, the data sets are not only specified by the user via the display, but are located in a text file that has been created beforehand. This allows you to easily put together and program large data sets.

Use the LOAD button to select the text file that has been created beforehand. An example is available in the form of the "massWriterTest.txt" file in the folder structure of the RFIDControl program.
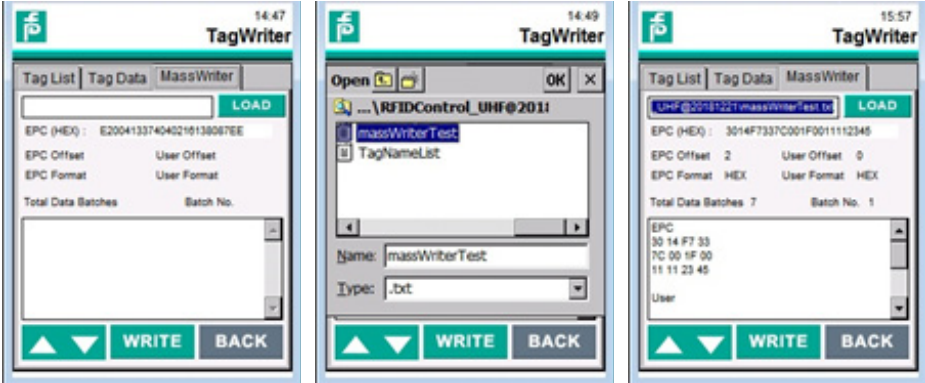
EPC (HEX)	Displays the EPC code of the read/write tag located within the sensing range
EPC Offset	Starting location for EPC code programming in the EPC memory bank
EPC Format	Data format of the displayed EPC code: HEX, DEC, or ASCII
User Offset	Start address for programming the user data in the memory bank for the user data
User Format	Data format of the displayed user data: HEX, DEC, and ASCII
Total Data Batches	Total number of data sets
Batch No.	Number of the current data set to be programmed

The data specified for programming purposes is displayed in the lower half of the dialog box and is split into EPC code and user data.
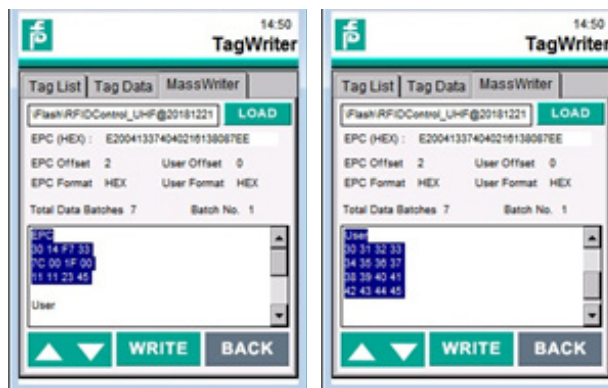
Click the WRITE button to carry out the write operation. Once successfully carried out, the number of the current data set is increased and the new data to be written from the text file is imported. The arrow buttons can be used to reprogram or skip a data set.

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The data sets within the "MassWriter" file have the given structure:
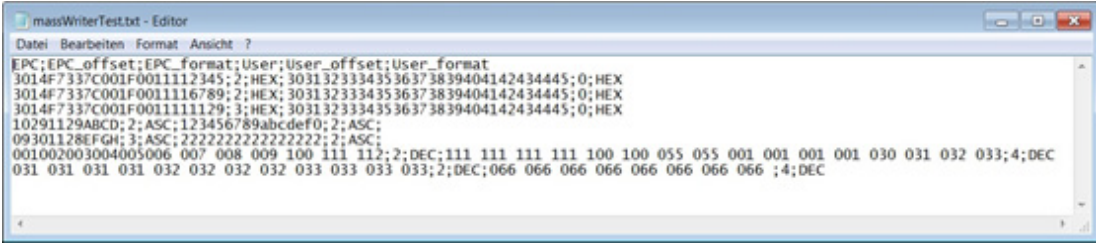
EPC;EPC_offset;EPC_format;User;User_offset;User_format

12 byte EPC code; Address 2, hexadecimal; User data (length can be adjusted); Address 0; hexadecimal

3014F7337C001F0011112345;2;HEX;303132333435363738394041424344 45;0;HEX

3014F7337C001F0011116789;2;HEX;303132333435363738394041424344 45;0;HEX

12 byte EPC code; Address 3, hexadecimal; User data (length can be adjusted); Address 0; hexadecimal

3014F7337C001F0011111129;3;HEX;303132333435363738394041424344 45;0;HEX

12 byte EPC code; Address 2; ASCII; User data (length can be adjusted); Address 2; ASCII

10291129ABCD;2;ASC;123456789abcdef0;2;ASC;

12 byte EPC code; Address 3; ASCII; User data (length can be adjusted); Address 2; ASCII

09301128EFGH;3;ASC;2222222222222222;2;ASC;

12 byte EPC code; Address 2; decimal; User data (length can be adjusted); Address 4; decimal

001002003004005006007008009100111112;2;DEC; 111111111111100100055055001001001001030031032033;4;DEC

031031031032032032032033033033033;2; DEC;066066066066066066066066;4;DEC

In addition, it is possible just to access user data without having to change the EPC code. The data sets have the following structure for this purpose:
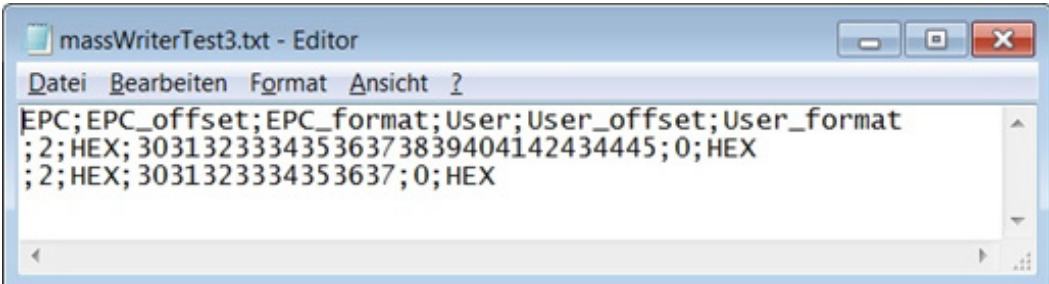
EPC;EPC_offset;EPC_format;User;User_offset;User_format

No data; Address 2; hexadecimal; User data (length can be adjusted); Address 0; hexadecimal

;2;HEX;303132333435363738394041424344 45;0;HEX

;2;HEX;3031323334353637;0;HEX

5.4.3 Tag Type—How to Determine Unknown Tags

The Tag Type menu can be used to scan all memory banks of a read/write tag. This means the type of chip of the identified read/write tag can be established. Only one read/write tag can be located within the sensing range for this purpose.

Click the SCAN button to start the read operation. The scanning operation will be carried until a read/write tag can be identified. The chip type and the various memory banks will be displayed as part of this process
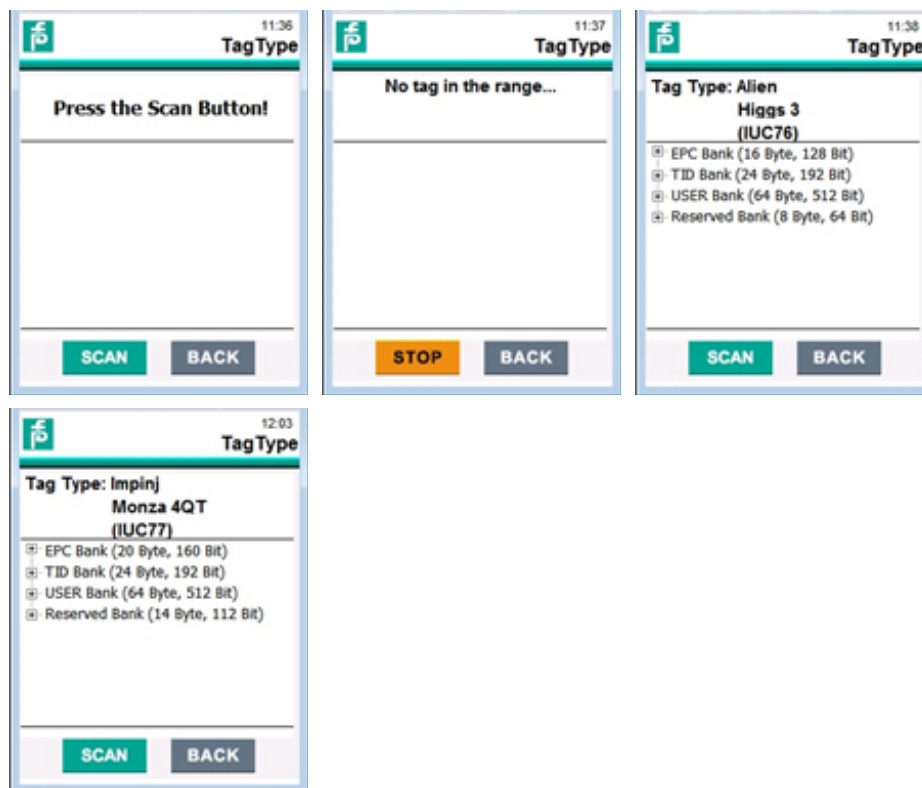
Tag Type	Displays the chip type (e.g., Alien Higgs 3; Impinj Monza 4QT) along with the Pepperl+Fuchs-specific name (e.g., IUC76; IUC77)
EPC Bank	Displays the EPC memory bank; specifies the length of the memory bank
TID Bank	Displays the TID memory bank; specifies the length of the memory bank
User Bank	Displays the memory bank for the user data; specifies the length of the user data
Reserved Bank	Displays the memory bank for passwords

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Example 1: EPC Bank Alien Higgs 3 (IUC76)
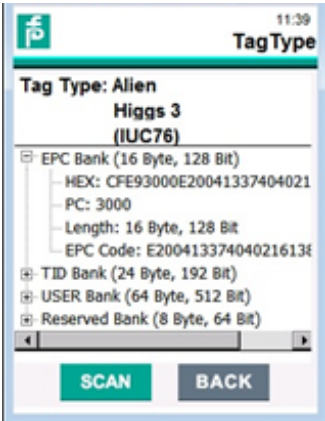
HEX	CFE93000E20041337404021613808 7EE Full representation of the content of the EPC Bank in hexadecimal number format 16 bytes long; the first 2 bytes here CFE9 represent the CRC checksum
PC	3000; Protocol Control Word; 2 bytes long
EPC Code	E20041337404021613808 7EE; 12 bytes long

The displayed length of the EPC Bank (here: 16 bytes) can be found by adding the sum of the length of the EPC formatted for this read/write tag (here: 12 bytes), the length of the PC Word (2 bytes), and the CRC sum (2 bytes).

Example 2: TID Bank Alien Higgs 3 (IUC76)
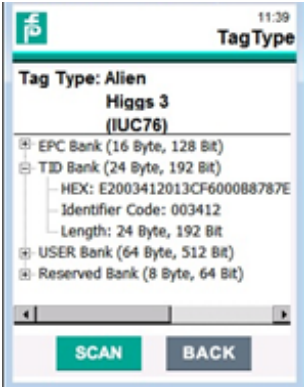
HEX		E2003412013CF6000B8787E0A12012B 30055FFBFFFFDC50 E2 is EPCglobal Allocation Class Indicator; device marking for UHF read/write tag
Identifier Code	003	Chip manufacturer code (003 = Alien)
	412	Model series (412 = Higgs 3)
Serial number		013CF6000B8787ED
Configuration		0A12012B30055FFBFFFFDC50

RFIDControl transfers a portion of the TID Bank as read-only code. This read-only code is 12 bytes long and includes the EPCglobal Allocation Class Indicator "E2"(1 byte), the Identifier Code (3 bytes), and the serial number (8 bytes).

Example 3: User Bank Alien Higgs 3 (IUC76)
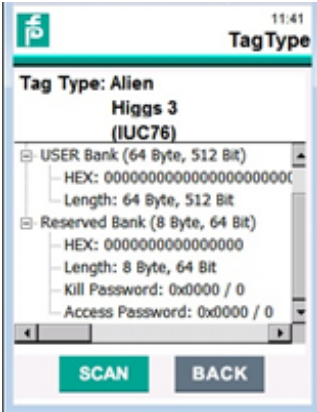
HEX   000000000000…

The user memory is 64 bytes long. The passwords for accessing the read/write tags can be found in the Reserved Bank. These are not supported.

If no read/write tags are identified as part of the scanning operation, the operation will abort after a few seconds. A timeout error message will indicate that this has happened.

5.4.4   Settings

The **Settings** menu can be used to perform various settings for the device. For example, you can adjust the transmitting power of the RFDI reader to set the identification range. In addition, you can set the tones that indicate a read/write tag has been accessed successfully. Furthermore, the contact details for the service and information about the device version can be found in this menu.
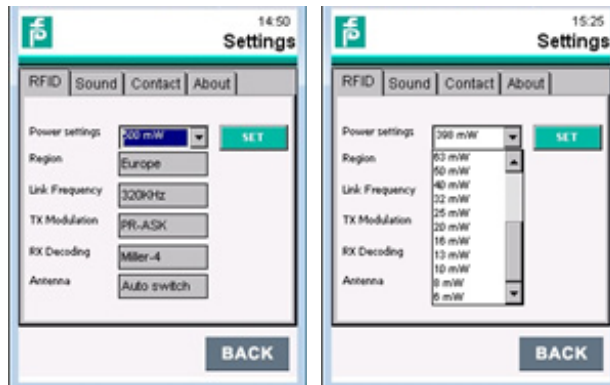
The **RFID** tab can be used to adjust the transmitting power of the integrated UHF antenna. The transmitting power can be adjusted, choosing a setting between 6 mW and 500 mW. The available power settings are specified by a selection menu. Click the SET button to save your settings.
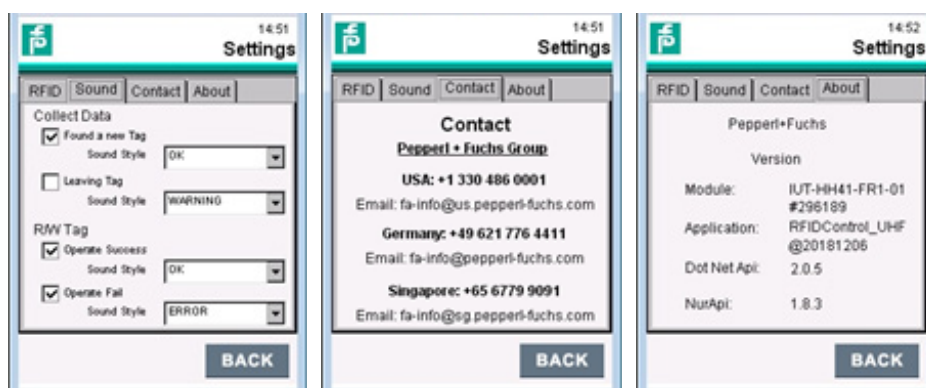
The **Sound** tab can be used to assign the various signal tones. The **Collect Data** function can be used to generate a signal tone as soon as a read/write tag is detected again or when a read/write tag leaves the sensing range. The **R/W Tag** function can be used to generate a signal tone when read/write tag access has been successful   .

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or unsuccessful. For the signal tones, you can choose between the profiles for "OK," "Error," "Question," and "Warning."

The contact details in case of a service request can be found in the **Contact** tab.

The **About** tab provides information about the used device and the version of the RFIDControl program. The information will vary depending on the device used.

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6. Data Transfer

The IUT-HH4* devices can send scanned data independently to a communication partner. A communication partner can be a PC or a control panel.

The data transfer can take place via the following interfaces:

- LAN
- USB
- WLAN
- Bluetooth

Two protocol variants are available for the purposes of transfer:

- JSON format
- PF format

When the JSON format is used, the scanned data is sent as soon as a connection to the communication partner has been established. This protocol is used when the devices are connected to a PC.

The PF format is used to connect to a control panel. Ready-to-use functional modules are available to simplify implementation into the PLC. Contact the Pepperl+Fuchs Support team for help with this.

The interfaces for LAN and USB are located on the back of the charger. These interfaces can only be used one at a time, i.e., if the USB connection cable is plugged in when a LAN connection is active, for example, the LAN interface automatically switches off.

6.1. Scanning Data from RFID Read/Write Tags

The read/write tag data is accessed via the Collect Data menu. This menu allows full read access to the EPC (Electronic Product Code), TID (Tag Identifier), and user data memory banks. You can enter relevant settings in the Settings tab. As part of this process the display format and the data length can be adjusted. More detailed information about the functionality of Collect Data can be found in Section 5.4.2 of this manual.

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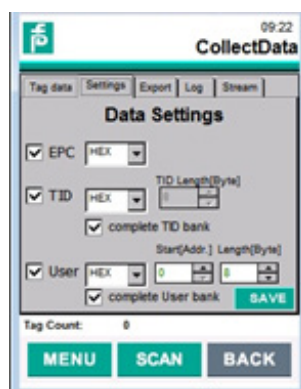
You can use the **Settings** tab to generally control what data is provided for data transfer purposes. Thus, for example, you can focus on just transferring the EPC or just a certain part of the user data. It is also possible to combine the memory banks. Use the settings options to ensure unnecessary data is not transmitted. The display format has no impact on the data formatting within the transmission protocol. The formatting within the protocol is always the same and is in hexadecimal format.

In the configuration shown in the figures, all memory banks are scanned in full. The information is displayed in hexadecimal format.

Start read access to the read/write tag by clicking the SCAN button. The scanned data will be displayed in the corresponding columns. Clicking on the STOP button stops the read access.
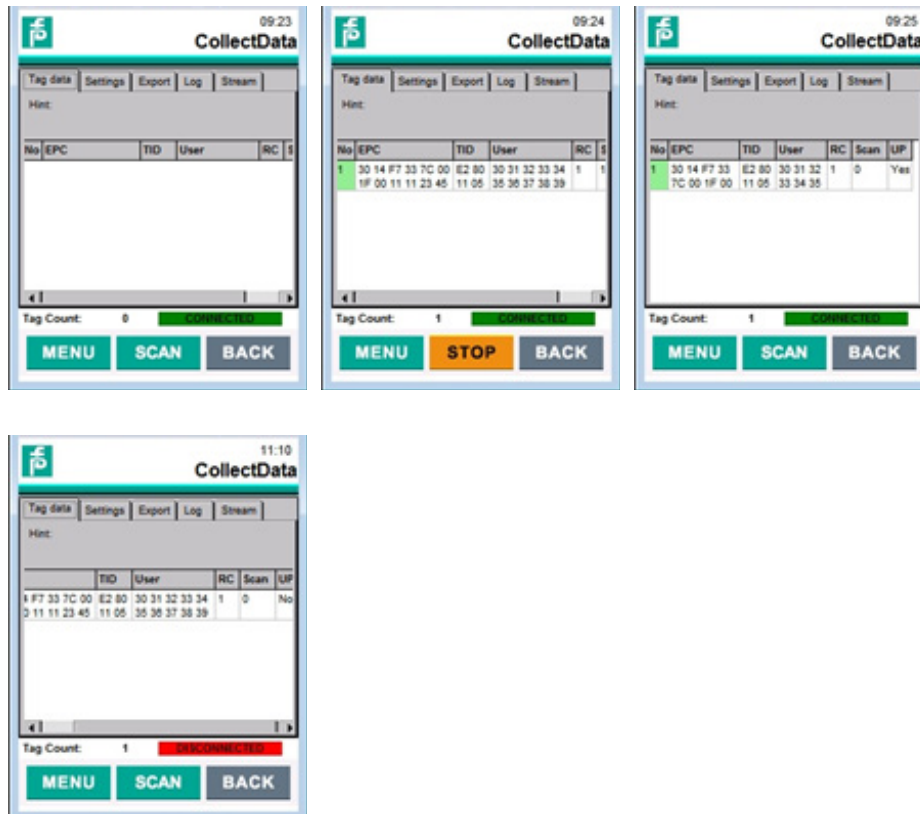
Configure the interface to your communication partner in the **Stream** tab. The exact process is explained in detail in the following sections. The "Connected" icon in the bottom right of the display shows that a functional connection to a communication partner has been established. When the desired memory banks are scanned in full in accordance with the settings and the "Connected" icon appears, the data will be sent to the communication partner. A successful transfer is indicated by a "Yes" in the "UP" (Upload) column. If the indicator shows "Disconnected," the connection to the communication partner has been interrupted. In this case, data will not be transferred and the data will be cached. Only when the connection between the devices is reestablished will the data automatically be transferred.

6.2. Data Transfer via LAN

The following example illustrates the data transfer between the devices via LAN with TCP/IP communication. The handheld reader is connected to a PC using a point-to-point connection for this purpose. Both devices use a fixed IP address. The data is transferred via the JSON protocol. The transferred data is displayed on the receiver side (PC) through the free "Node-Red" development tool. An example of how this can be implemented is available from the Pepperl+Fuchs Support team.

Setting the Network Parameters on the PC

To set the parameters, open Network and Sharing Center ⇒ Local Area Connection ⇒ Properties ⇒ Internet Protocol Version 4 (TCP/IPv4)
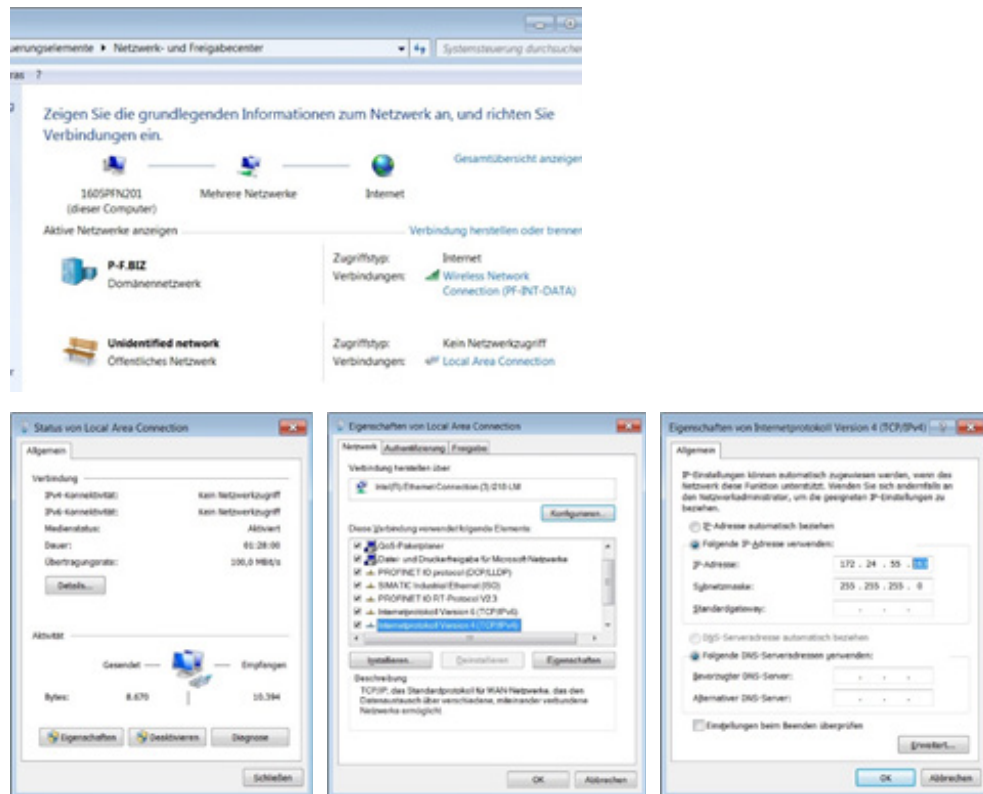
In this example, the PC has been assigned IP address 172.24.55.163 and subnet mask 255.255.255.0. The settings for these parameters depend on the available network and may vary.

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Setting the Network Parameters on the Handheld Reader

To set the parameters, open Start ⇒ Settings ⇒ Network and Dial-up Connections ⇒ AX887721
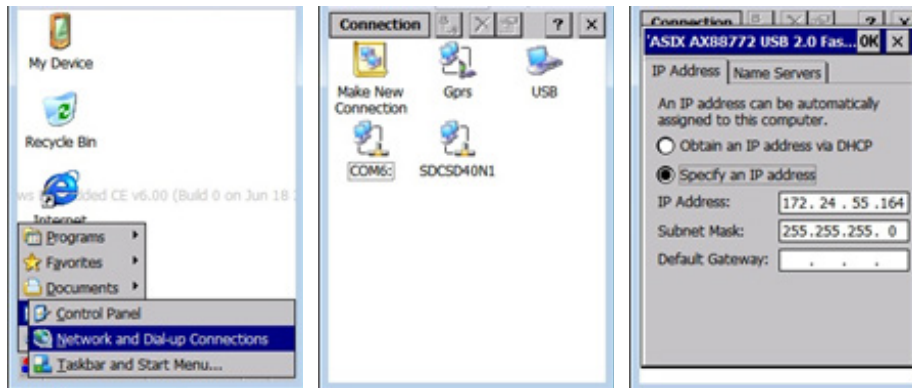
The network parameters are set using the "AX887721" icon image. The handheld reader IUT-HH4* has been assigned the fixed IP address 172.24.55.164 and subnet mask 255.255.255.0. The settings for these parameters depend on the available network and may vary. The changed setting must be saved permanently using a "Registry Backup" (see Section 4.1.10).

Remote Settings in the "RFIDControl" Program:

The data transfer is activated within the RFIDControl program in the **Stream** tab. To do so, check **Upstream Data**. Use the "Remote IP" field to set the IP address of the recipient, in this case the PC with IP address 172.24.55.163. Communication takes place via Port 3003. Input this number in the "Remote Port" field. Another value can also be used for the port number. The "Device Name" field can be used to give a name to the sent data set. This allows you to distinguish between the data sets of several handheld readers within a network. The data transfer takes place via the JSON format. Click the "JSON package" option to do so. Click the SAVE button to save your settings.

The transferred data is shown as follows within Node-Red:

Data telegram:

{"DevID":"RFID_1","EPC":"30 14 F7 33 7C 00 1F 00 11 11 23 45","TID":"E2 80 11 05 20 00 58 D4 E8 20 02 71 00 00 00 00 00 00 00 00 00 00 00 00","UMB":"30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 01 01 01 01 1E 1F 20 21 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00","UpdateDate":"2019-01-15 14:43:28:958","Attribute":"Message"}

Heartbeat telegram:

{"Attribute":"HeartBeat","UpdateDate":"2019-01-15 14:43:51:000"}

6.3. Data Transfer via USB

The following example describes the data transfer between devices via USB communication. The handheld reader is connected to a PC using a point-to-point connection for this purpose. The data is transferred via the JSON protocol. The transferred data is displayed on the receiver side (PC) through the free "Node-Red" development tool. An example of how this can be implemented can be obtained from the Pepperl+Fuchs Support team.

The IUT-HH4* handheld reader is automatically detected by the PC. To allow this to happen, you just need to connect the charger USB cable to the PC and place the IUT-HH4* in the charger.

To set the network parameters on the handheld reader, open Start ⇒ Settings ⇒ Network and Dial-up Connections ⇒ COM6

The USB interface is set using the "COM6" icon image. The handheld reader IUT-HH4* has been assigned the fixed IP address 192.168.55.101 and subnet mask 255.255.255.0. The gateway address is 192.168.55.100. These settings must be retained.

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Remote Settings in the "RFIDControl" Program:

The data transfer is activated within the RFIDControl program in the Stream tab. To do so, check Upstream Data. The "Remote IP" field is not applicable when transferring data via USB. The input IP address is ignored. Communication takes place via Port 3003. Input this number in the "Remote Port" field. Another value can also be used for the port number. The "Device Name" field can be used to give a name to the sent data set. This allows you to distinguish between the data sets of several handheld readers within a network. The data transfer takes place via the JSON format. Click the "JSON package" option to do so. Click the SAVE button to save your settings.

Representation of two read/write tags within Node-Red:

Read/write tag data telegram 1:

{"DevID":"RFID_1","EPC":"30 14 F7 33 7C 00 1F 00 11 11 67 89","TID":"E2 00 34 12 01 3C F6 00 0B 87 87 ED 0A 12 01 25 30 05 5F FB FF FF DC 50","UMB":"30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00","UpdateDate":"2019-01-17 13:53:49:598","Attribute":"Message"}

Read/write tag data telegram 2:

"{"DevID":"RFID_1","EPC":"30 14 F7 33 7C 00 1F 00 11 11 23 45","TID":"E2 80 11 05 20 00 53 14 E7 F6 02 71 00 00 00 00 00 00 00 00 00 00 00 00 00 00","UMB":"30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 32 32 32 32 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00","UpdateDate":"2019-01-17 13:53:49:106","Attribute":"Message"}"

6.4. Data Transfer via WLAN

The IUT-HH4* devices have an integrated WLAN interface. This means that the data can be transferred wirelessly in the same way as via LAN or USB interface. The following example illustrates data transfer between the handheld reader and a PC via WLAN communication. In this case, the handheld reader is connected to a PC using a point-to-point connection. In this example, the PC is connected via a WLAN access point (TP-Link; TL-902AC); and a USB Fast Ethernet Adapter (LogiLink; UA0144A). The data is transferred via the JSON protocol. The data to be transferred is displayed on the receiving side through the "Node-Red" program. An example of how this can be implemented is available from the Pepperl+Fuchs Support team.

All devices (IUT-HH4*; WLAN Access Point; USB Ethernet Adapter) are located on the same subnet. To set up the WLAN interface for the IUT-HH4* handheld reader, open Start ⇒ Programs ⇒ Summit ⇒ scu
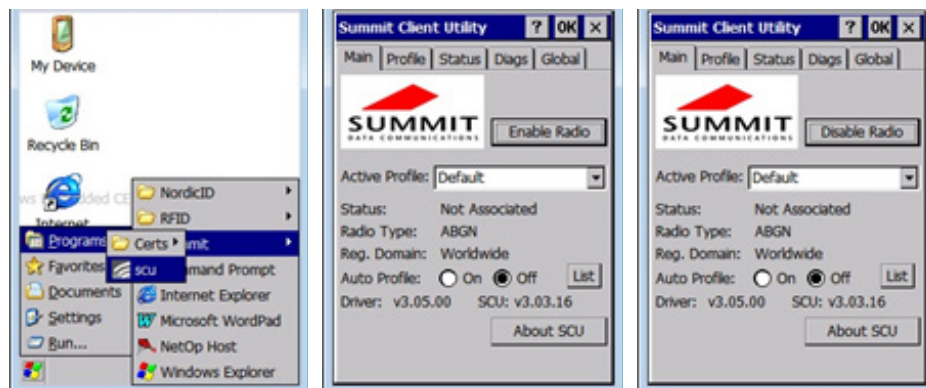
This path opens the Summit Client Utility. You can use this dialog to configure the WLAN interface. You first need to enable the WLAN interface by clicking on the Enable Radio button. Subsequently, on the Profile tab scan for nearby WLAN networks by clicking the Scan button. Once the scan is complete, a list of the located networks is displayed. This is where you select the desired network (in this example, TP-Link_75F0). Click the Configure button to accept the selection. Now the selected network is created as a profile. Click "Yes" to confirm. You will subsequently need to input the WLAN password. To make input easier we advise you open the on-screen keyboard.

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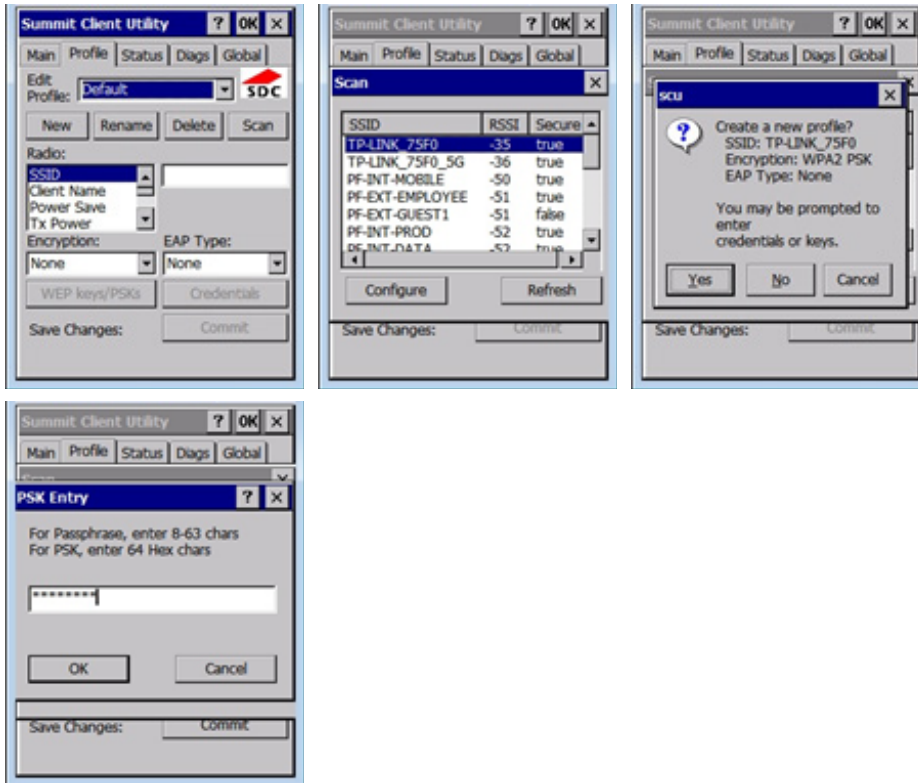
The selected WLAN network will appear on the Profile tab if the configuration has been successfully completed. You now just need to select "TP-Link_75F0" as the active profile on the Main tab.
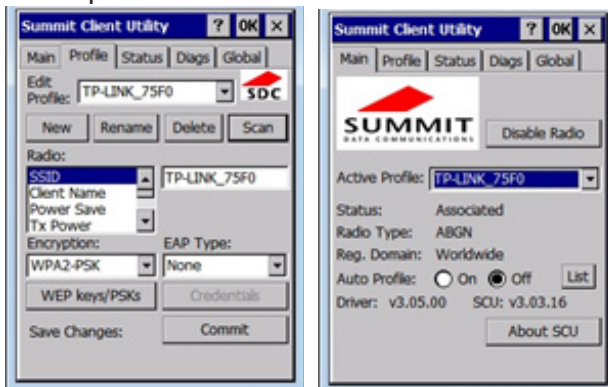
Finally, the network parameters just need to be assigned to the WLAN adapter of the IUT-HH4* device. To do so, open Start ⇒ Settings ⇒ Network and Dial-up Connections ⇒ SDCSD40

The IP address of the IUT-HH4* in this example is 192.168.0.102 and the subnet mask is 255.255.255.0.
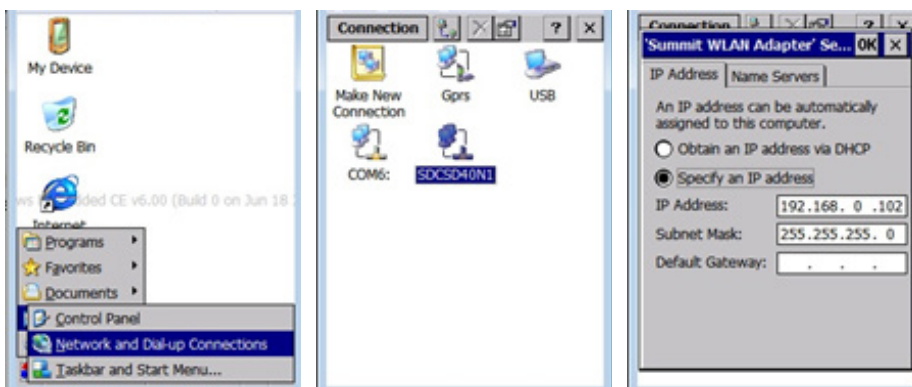
Setting the Network Parameters on the PC

A WLAN Access Port and a USB Fast Ethernet Converter is used to transfer data to the PC via WLAN This converter appears as a second network card in the Network and Sharing Center on your PC. To set the parameters, open Network and Sharing Center ⇒ Local Area Connection 2 ⇒ Properties ⇒ Internet Protocol Version 4 (TCP/IPv4)
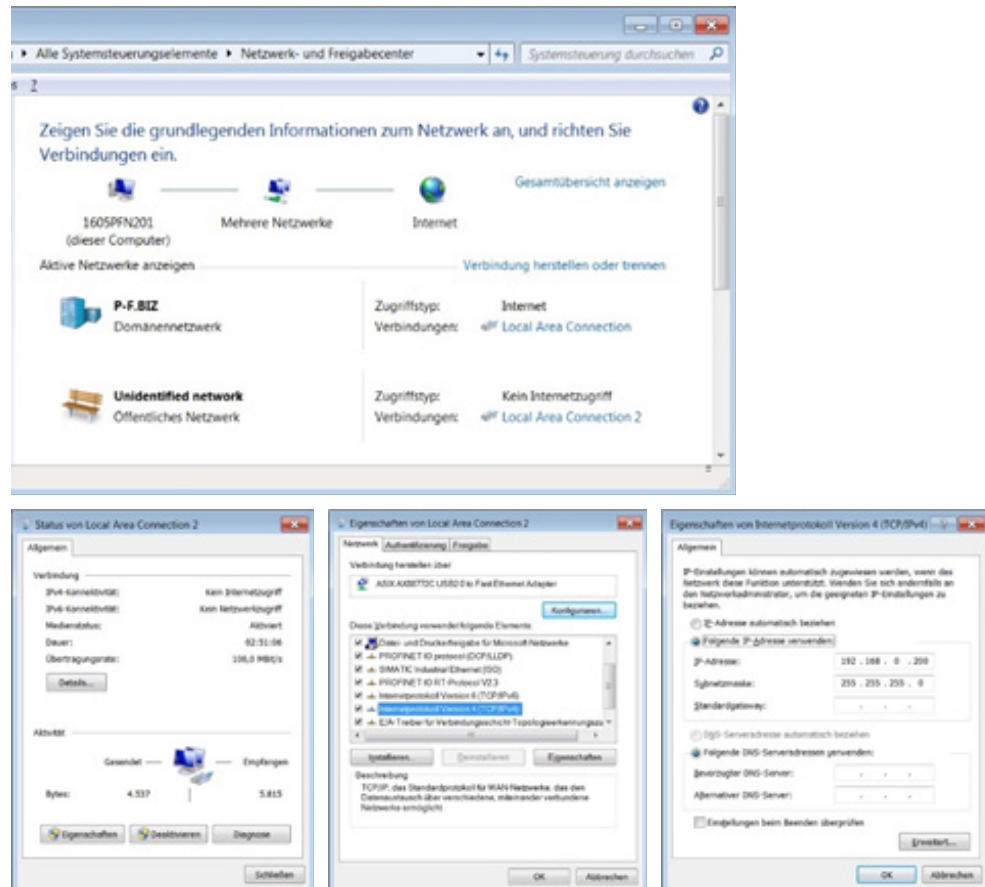
The IP address of the PC or the USB Ethernet adapter is 192.168.0.200, the subnet mask is 255.255.255.0.

Remote Settings in the "RFIDControl" Program:

The data transfer is activated within the RFIDControl program in the Stream tab. To do so, check Upstream Data. Use the "Remote IP" field to set the IP address of the recipient, in this case the PC with IP address 192.168.0.200. Communication takes place via Port 3003. Input this number in the "Remote Port" field. Another value can also be used for the port number. The "Device Name" field can be used to give a name to the sent data set. This allows you to distinguish between the data sets of several handheld readers within a network. The data transfer takes place via the JSON format. Click the "JSON Package" option to do so. Click the SAVE button to save your settings.

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The transferred data is shown as follows within Node-Red:

Data telegram:

{"DevID":"RFID_1","EPC":"30 14 F7 33 7C 00 1F 00 00 00 08 5B","TID":"E2 80 11 05 20 00 53 94 E7 F6 02 71 00 00 00 00 00 00 00 00 00 00 00 00","UMB":"00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00","UpdateDate":"2019-01-22 14:01:28:434","Attribute":"Message"}

6.5. Data Transfer in JSON Format

When transferring data in JSON format, a distinction is made between a message telegram and a heartbeat telegram. The scanned RFID data is located within the message telegram. The heartbeat telegram is sent cyclically every 22 seconds to verify the connection to the communication partner.

Each point within the telegram is to be interpreted as ASCII characters. A dial tone will likewise be interpreted as ASCII characters.

Message Telegram:

{"DevID":"RFID_1","EPC":"30 14 F7 33 7C 00 1F 00 11 11 23 45","TID":"E2 80 11 05 20 00 58 D4 E8 20 02 71 00 00 00 00 00 00 00 00 00 00 00 00","UMB":"30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 01 01 01 01 1E 1F 20 21 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00","UpdateDate":"2019-01-15 15:08:53:098","Attribute":"Message"}

Start of data set	{
Device ID	"DevID":"RFID_1",
Data set source	
EPC Bank	"EPC":"30 14 F7 33 7C 00 1F 00 11 11 23 45",
TID Bank	"TID":"E2 80 11 05 20 00 58 D4 E8 20 02 71 00 00 00 00 00 00 00 00 00 00 00 00",
User Memory Bank	"UMB":"30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 01 01 01 01 1E 1F 20 21 0000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0000 00 00 00 00 00 00 00 00 00 00",
Timestamp	"UpdateDate":"2019-01-15 15:08:53:098",
Telegram type	"Attribute":"Message" Type "Message"
End of data set	}

Hexadecimal Representation (Excerpt):

[0 … 9]

0: 0x7b 1: 0x22 2: 0x44 3: 0x65 4: 0x76 5: 0x49 6: 0x44 7: 0x22 8: 0x3a 9: 0x22

[10 … 19]

10: 0x52 11: 0x46 12: 0x49 13: 0x44 14: 0x5f 15: 0x31 16: 0x22 17: 0x2c 18: 0x22 19: 0x45

Heartbeat telegram:

{"Attribute":"HeartBeat","UpdateDate":"2019-01-15 16:29:26:000"}

Start of data set	{
Message type	"Attribute":"HeartBeat", Type "HeartBeat"
Timestamp	"UpdateDate":"2019-01-15 16:29:26:000",
End of data set	}

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Hexadecimal Representation (Excerpt):

[0 … 9]

0: 0x7b 1: 0x22 2: 0x41 3: 0x74 4: 0x74 5: 0x72 6: 0x69 7: 0x62 8: 0x75 9: 0x74

[10 … 19]

10: 0x65 11: 0x22 12: 0x3a 13: 0x22 14: 0x48 15: 0x65 16: 0x61 17: 0x72 18: 0x74 19: 0x42

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7. Optical Scanner

The IUT-HH4* handheld readers feature an integrated optical scanner. This scanner is able to read different 1-D (barcode) and 2-D (e.g., data matrix) codes. To this end, the devices include a preinstalled test program. This allows you to scan the various codes. To start the application, open the Start menu (in the lower left corner of the task bar) ⇒ Settings ⇒ System Control Panel ⇒ NID Scanner

The Codes tab can be used to adjust the types of code that are allowed to be captured. We recommend choosing "Enable all" as this will allow you to identify all supported codes. You can use the "Scan timeout" parameter in the Misc tab to configure the time period available for the scanning operation.
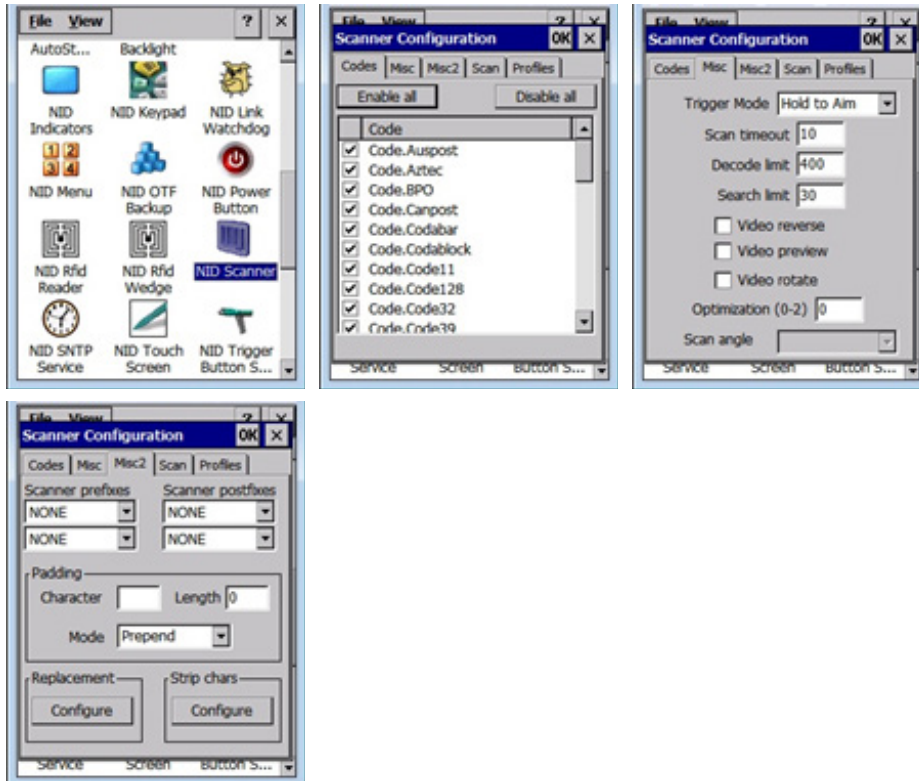
Click the Scan button to start the scanning operation. An acoustic signal will indicate that read access to a code has taken place successfully. The scanned code information will be displayed within the "Result String" field. If the code type is known this information will be displayed (e.g., Code 128).

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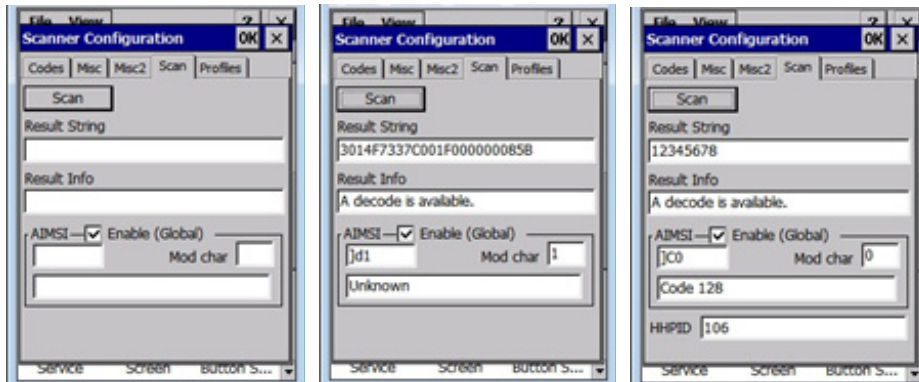
8. RFID Read/Write Tag Sensing Range

The RFID read/write tags can be identified over different distances. The sensing range in this regard depends on:

- Where the read/write tag is installed (e.g., on metal or plastic)
- Dimensions of the read/write tag (e.g., large antenna for larger detection ranges)
- If the read/write tag has been adapted (e.g., if it has been adapted for mounting on metal or plastic)
- Frequency response of the read/write tag (e.g., global or for a specific frequency range)
- Reflections of the electromagnetic field on the physical environment (e.g., on metal surfaces)
- Whether the reader's transmitting power has been adjusted

Transmitting Power

You can adjust the transmitting power of the IUT-HH41-FR* and IUT-HH42-FR* devices within a range of 6 mW up to a maximum of 500 mW. The IUT-HH43-FR* devices can transmit using a maximum of 1000 mW. You should make sure that you work using the lowest possible level of transmitting power. This means you avoid unintentionally identifying adjacent read/write tags.

Using low transmitting power allows a limited sensing range to form in the immediate vicinity of the antenna. This sensing range is almost homogeneous and there are no areas in which it is not possible to read a read/write tag. If you increase the transmitting power, the sensing range or field increases. In the more remote areas of the sensing range the electromagnetic field is no longer homogeneous and areas form in which it is no longer possible to read a read/write tag. These areas are referred to as reading gaps and these gaps increase with increasing distance and transmitting power.

Reflections

The IUT-HH4* handheld readers emit a continuous electromagnetic field during a scanning operation. As part of this process this field is reflected by metallic objects in the vicinity of the handheld reader. This results in an increase of the potential sensing range for the read/write tag. Consequently, read/write tags that are more remote could unintentionally be detected. In addition, the reflections impact the sensing range and reading gaps can form. A reduction in transmitting power can help counteract this effect.

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Read/Write Tag Frequency Response

Read/write tags for the UHF range are aligned to a defined working frequency. This involves differentiating between global alignment (indicated by "-GBL") and alignment to the FR1 (indicated by "-FR1"; 865 – 868 MHz; Europe) and FR2 (indicated by "-FR2"; 900 – 928 MHz; USA; China) frequency ranges. With global alignment, the read/write tag is adjusted in such a way that it achieves around the same detection range in both frequency bands (FR1 and FR2).

Aligning the Read/Write Tag to the Mounting Surface

The material of the mounting surface can have a very significant impact on the properties of the tag, including on the sensing range. This impact can be reduced by selecting read/write tags that are aligned to the mounting surface. Here, a distinction is made between mounting on metal or a conductive surface (indicated by "-M") and mounting on plastic or a non-conductive surface. If a read/write tag that has been optimized for mounting on a metal surface is mounted on a plastic surface, the sensing range will reduce very significantly in comparison to if it had been mounted on metal. As a result, the sensing range will likewise reduce very significantly or it might not even be possible to access the read/write tag at all.

The sensing range alters depending on the surface and this must be taken into account when selecting the tag.

Dimension of the Read/Write Tag

A read/write tag will contain an antenna. The size of the antenna impacts the detection range of the tag. In simple terms, it can be assumed that a bigger tag has a greater sensing range.

Read/write tag	Transmitting power	IUT-HH41-FR1-01	IUT-HH42-FR1-01
IUC76-23L50-M-FR1	10 mW	0.25 m	0.42 m
	20 mW	0.39 m	0.50 m
	50 mW	0.62 m	0.89 m
	100 mW	0.77 m	1.31 m
	200 mW	0.82 m	1.41 m
	500 mW	0.65 m	1.21 m
IUC76-28L90-M-FR1	10 mW	0.13 m	0.21 m
	20 mW	0.25 m	0.26 m
	50 mW	0.45 m	0.35 m
	100 mW	0.48 m	0.48 m
	200 mW	0.72 m	0.49 m
	500 mW	0.91 m	0.76 m

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Read/write tag	Transmitting power	IUT-HH41-FR1-01	IUT-HH42-FR1-01
IUC76-34-M-FR1	10 mW	0.09 m	0.18 m
	20 mW	0.10 m	0.21 m
	50 mW	0.15 m	0.25 m
	100 mW	0.24 m	0.36 m
	200 mW	0.32 m	0.41 m
	500 mW	0.28 m	0.58 m
IUC76-50-FR1	10 mW	0.95 m	0.67 m
	20 mW	1.47 m	0.82 m
	50 mW	1.50 m	1.13 m
	100 mW	2.57 m	1.60 m
	200 mW	2.90 m	1.68 m
	500 mW	2.57 m	1.69 m
IUC76-83L25-GBL	10 mW	0.69 m	0.54 m
	20 mW	1.28 m	0.70 m
	50 mW	1.59 m	1.39 m
	100 mW	1.71 m	1.46 m
	200 mW	1.82 m	1.69 m
	500 mW	1.70 m	1.78 m
IUC76-F157-M-FR1	10 mW	0.91 m	0.56 m
	20 mW	1.03 m	0.93 m
	50 mW	2.01 m	1.92 m
	100 mW	2.27 m	2.01 m
	200 mW	2.04 m	2.34 m
	500 mW	2.50 m	2.35 m
IUC76-F203-M-FR1	10 mW	0.43 m	0.40 m
	20 mW	0.85 m	0.44 m
	50 mW	1.16 m	0.83 m
	100 mW	1.24 m	0.94 m
	200 mW	1.84 m	1.34 m
	500 mW	1.53 m	1.50 m

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Read/write tag	Transmitting power	IUT-HH41-FR1-01	IUT-HH42-FR1-01
IUC76-F204-M-FR1	10 mW	0.29 m	0.26 m
	20 mW	0.40 m	0.37 m
	50 mW	0.52 m	0.54 m
	100 mW	0.63 m	0.53 m
	200 mW	0.78 m	0.57 m
	500 mW	0.53 m	0.66 m
IUC76-F205-M-FR1	10 mW	0.35 m	0.33 m
	20 mW	0.48 m	0.46 m
	50 mW	0.52 m	0.83 m
	100 mW	0.62 m	0.87 m
	200 mW	0.94 m	1.30 m
	500 mW	0.71 m	0.97 m
IUC76-F208-M-FR1	10 mW	0.61 m	0.49 m
	20 mW	0.97 m	0.57 m
	50 mW	1.26 m	1.10 m
	100 mW	1.83 m	1.61 m
	200 mW	2.17 m	2.11 m
	500 mW	2.02 m	2.08 m
IUC76-F209-M-FR1	10 mW	0.07 m	0.13 m
	20 mW	0.14 m	0.19 m
	50 mW	0.15 m	0.23 m
	100 mW	0.18 m	0.24 m
	200 mW	0.29 m	0.31 m
	500 mW	0.40 m	0.41 m
IUC76-F290-M-FR1	10 mW	0.65 m	0.57 m
	20 mW	1.21 m	0.90 m
	50 mW	1.14 m	1.11 m
	100 mW	2.07 m	1.60 m
	200 mW	2.17 m	2.11 m
	500 mW	2.06 m	2.02 m

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Read/write tag	Transmitting power	IUT-HH41-FR1-01	IUT-HH42-FR1-01
IUC77-25L110-GBL	10 mW	1.41 m	0.62 m
	20 mW	1.55 m	1.37 m
	50 mW	2.87 m	2.3 m
	100 mW	3.29 m	3.2 m
	200 mW	3.50 m	3.2 m
	500 mW	3.50 m	3.2 m
IUC77-F151-M-GBL	10 mW	0.42 m	0.26 m
	20 mW	0.90 m	0.31 m
	50 mW	1.04 m	0.48 m
	100 mW	1.05 m	0.55 m
	200 mW	1.36 m	0.58 m
	500 mW	1.09 m	0.65 m

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