LF-RFID Kit Introduction

Atmel® offers several design and evaluation kits for a fast and easy way to test the LF-RFID technology but also developing the final product. The most important one is the Atmel ATA2270-EK1. It provides a complete self-contained tool to begin using RFID systems, even for users who are short on RFID experience. It supplies an LCD and control buttons to enable interaction with the RFID system. This stand-alone but also PC-GUI based system supports many of Atmel's RFID tag chips.

The second group of kits is based on two readers supplied by an external company. One of them is working at 125kHz (Atmel ATARFID-EK1) the other one at 134.2kHz (Atmel ATARFID-EK2) targeting access control applications and animal ID applications.

The next Atmel kit ATA5505-EK1 is a kit in USB memory stick format and is based on the Atmel 8-bit AVR® microcontroller ATA5505 with the reader-peripheral on board. This kit shows how small a reader can be designed. In stand-alone mode it is just reading two modes. Starting the PC GUI allows to use more modes.

1. Atmel ATA2270-EK1

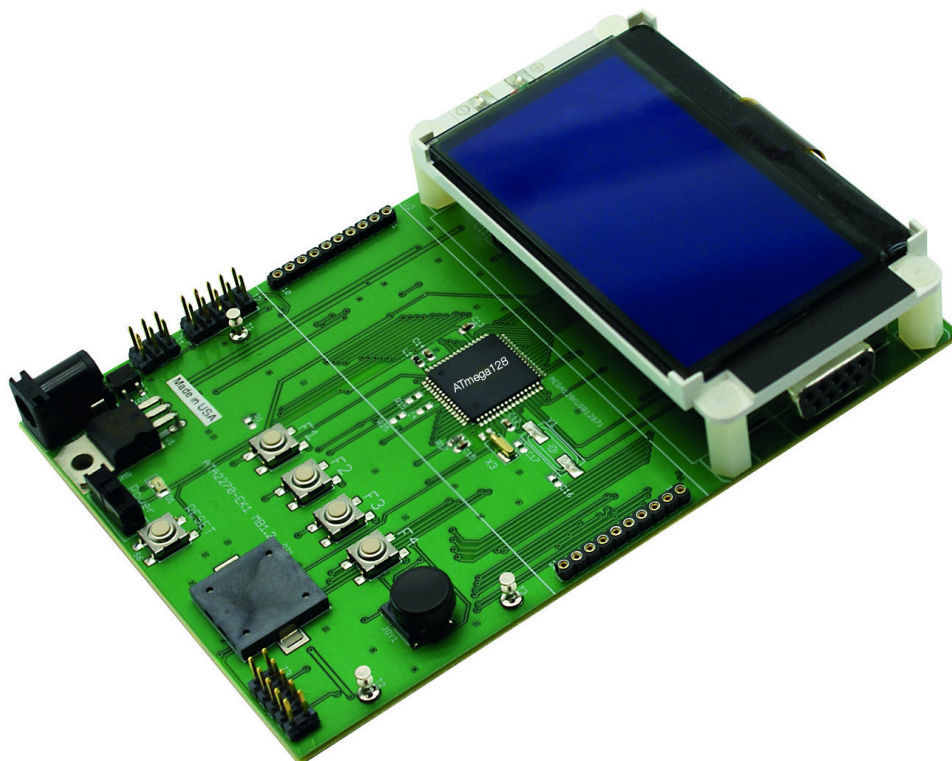The Atmel® ATA2270-EK1 is an evaluation kit that supports a limited number of configurations in stand-alone mode. Support during the entire development phase is provided by the PC interface and the application software. Both tools enable full control of the tag configuration. This kit is AVR® ATmega128-based and provides all necessary source and object codes. Code and layout data enable the quick and easy design of individual RFID readers. An API (Advanced Programming Interface) allows control of the kit by user-written software. Registered kit users have access to an Atmel FTP server for firmware and software upgrades and also layout data in Gerber format with BOMs.

Figure 1-1. Atmel ATA2270-EK1 Content

Figure 1-2.   Atmel ATA2270-EK1 Main Board

Figure 1-3.   Atmel ATA2270-EK1 Reader Daughter Board
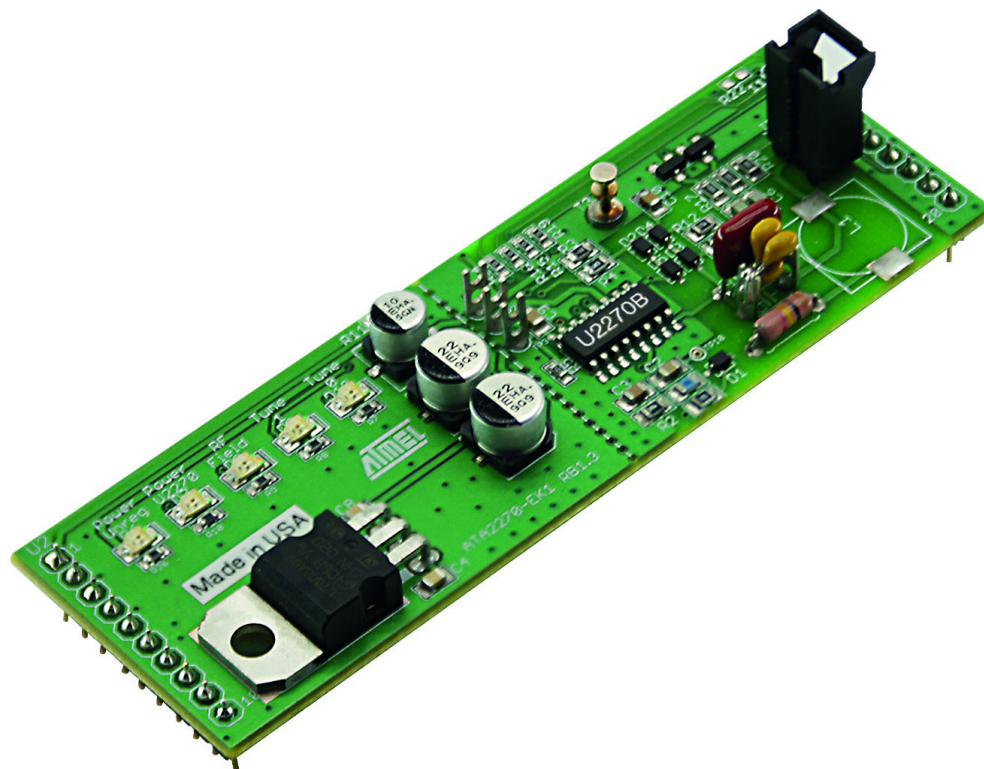
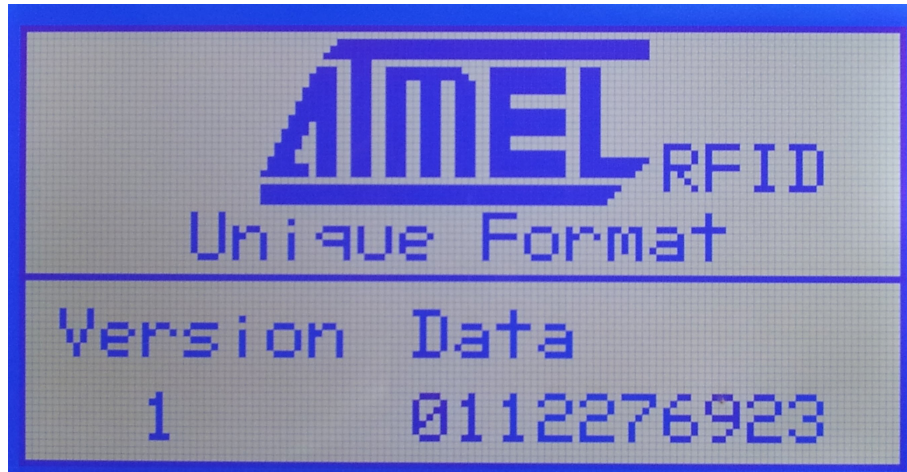**Figure 1-4. LCD Display with Unique Format Read Selection in Stand-alone Mode**

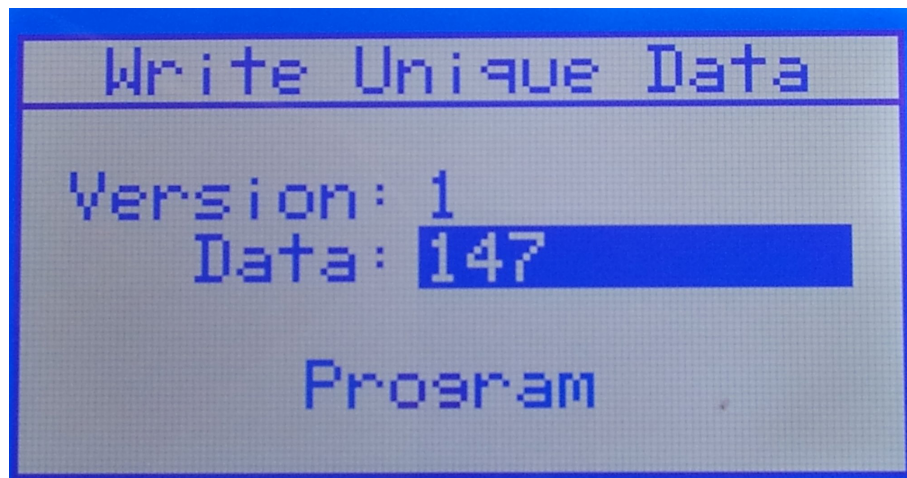**Figure 1-5. LCD Display with Unique Format Write Selection in Stand-alone Mode**

Figure 1-6. LCD Display with Animal ID Read Selection in Stand-alone Mode

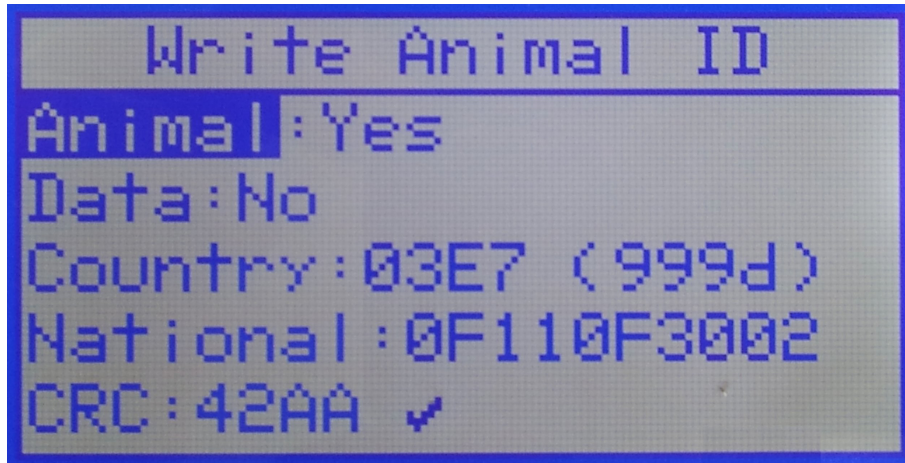**Figure 1-7.   LCD Display with Animal ID Write Selection in Stand-alone Mode**

Figure 1-8.   Atmel ATA2270-EK1 Graphical User Interface, Example for Atmel ATA5577
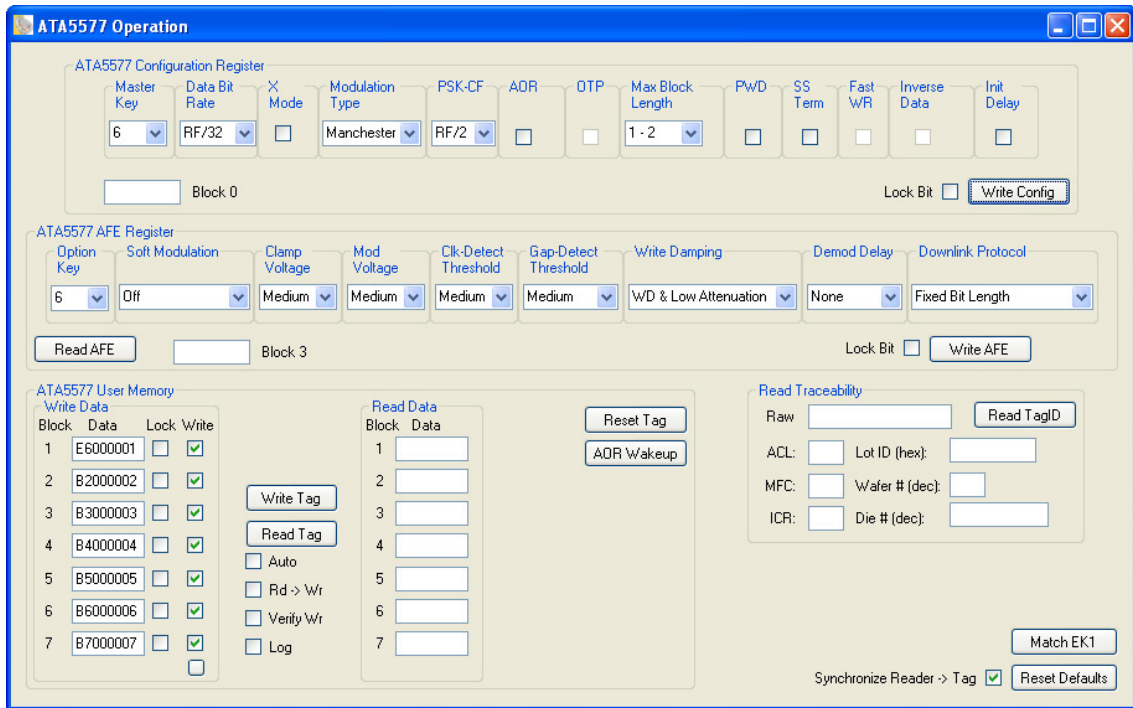
Figure 1-9.   Atmel ATA2270-EK1 Graphical User Interface, Unique-ID Specific

Figure 1-10. Atmel ATA2270-EK1 Graphical User Interface, Animal ID Application Specific

2. Atmel ATARFID-EK1 and Atmel ATARFID-EK2

The Atmel® kits ATARFID-EK1 and ATARFID-EK2 are based on a commercial reader/programmer supplied by the company GIS. The first version in the EK1 kit operates at 125kHz. It is best suited for access control, industrial, and any kind of consumer applications. This kit supports the very common Manchester and Biphase data coding but also FSK data coding. The EK2 kit operates at 134.2kHz according to the animal ID standards ISO 11784 and 11785 (FDX-A and FDX-B). Both kits allow the user to not only read the tags but also configure and program them. The readers have a USB connection and a PC-based user interface. Sample tags complete this kit. The PC software can be downloaded from the GIS website.
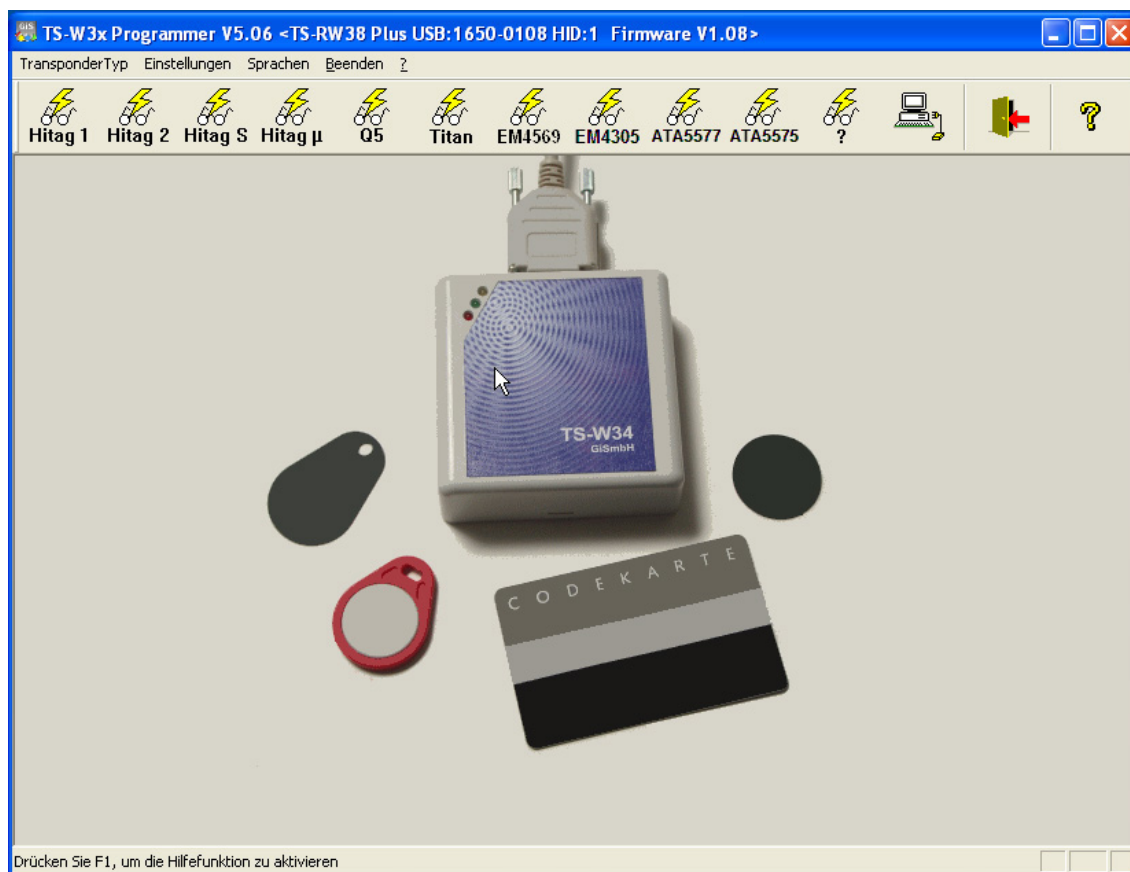
Figure 2-1. Content of the Atmel ATARFID-EK1: 125kHz Kit

Figure 2-2. Content of the Atmel ATARFID-EK2: 134.2kHz Kit

**Figure 2-3. GIS PC Software: Atmel ATARFID-EK1 and EK2 Main Menu**

3.   Atmel ATA5505-EK1

The Atmel® ATA5505-EK1 kit is a USB-LF-RFID reader in memory stick format based on the Atmel ATA5505 LF-Reader-AVR circuit. The kit operates at 125kHz and 134.2kHz and supports all previously mentioned LF applications. Just plug into a PC, the kit operates in stand-alone mode. After a successful read of a tag in UNIQUE format at 125kHz a red LED indicates the type detected. If the LED is green, an animal ID tag according to ISO 11784 and 11785 at 134.2kHz (FDX-B) was detected. The kit can also be controlled using the GUI used for the Atmel ATA2270-EK1. Several sample tags complete the kit.

Figure 3-1.   Atmel ATA5505-EK1 - Complete 125/134.2kHz Reader/Programmer in Stick Format with USB Supply

Figure 3-2.   Atmel ATA5505-EK1 Reader Board Open
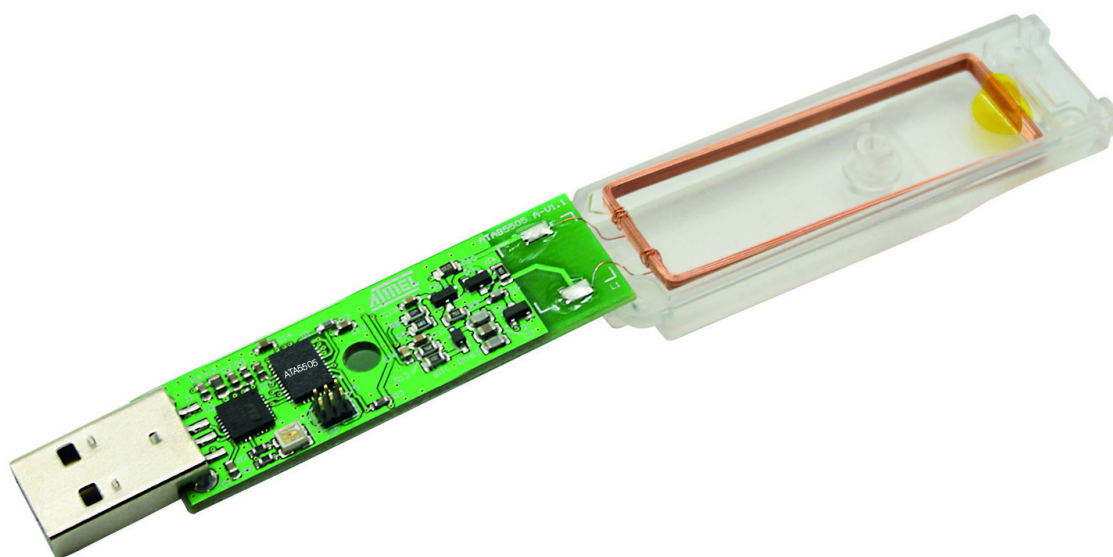
4.   LF-RFID Kit Overview

4.1   General Features

General	ATA2270-EK1	ATARFID-EK1	ATARFID-EK2	ATA5505-EK1
Evaluation kit	x	x	x	x
Commercial third-party device		x	x	
PC-controlled	x	x	x	x
Stand-alone	x[1]			x[2]
PC software	x	x	x	x
Serial interface (with USB converter option)	x			
USB interface	x[3]	x	x	X
Field frequency [kHz]	125 / 134.2	125	134.2	125 / 134.2
Data coding	Manchester/ Biphase	Manchester/ Biphase/ FSK	Manchester/ Biphase/ FSK	Manchester/ Biphase
LCD display	x			
LED indicator	x			x
Keys and joystick	x			
Buzzer	x			

Notes: 1.   One fixed mode

2.   Continuously checks for 125kHz unique tags or 134.2kHz animal tags and indicates them with an LED signal

3.   Planned

4.2   Kit Contents

Kit Contents	ATA2270-EK1	ATARFID-EK1	ATARFID-EK2	ATA5505-EK1
Main and interface board	x			
Reader antenna coil	x			
Compact reader		x	x	x
Power supply 120V to 240V	x			
USB serial dongle	x			
USB cable	[1]	x	x	

Note: 1.   Planned

4.3 Supported RFID ASSP Devices

Supported RFID ASSP Devices	ATA2270-EK1	ATARFID-EK1	ATARFID-EK2	ATA5505-EK1
Atmel T5551/TK5551	x			x
Atmel e5530/TK5530	x			x
Atmel T5554	x[1]			x[1]
Atmel T5555 – "Q5"		x	x	
ATA5558	x			
Atmel T5557 compatible	x[2]			x[2]
Atmel T5557 extended	x			x
Atmel ATA5567 compatible	x[2]			x[2]
Atmel ATA5567 extended	x			x
Atmel ATA5570	x			x
Atmel ATA5577	x	x	x	x
Atmel ATA5575M1 and ATA5575M2	x	x (M1)	x (M2)	x

Notes: 1. To use the Atmel T5554 select tag type T5551 in the software.

2. This mode is only supported in the PC application software. All tag modes are programmable in this tool.

4.4 Tag, Transponder, and IC Samples Supplied

Tag, Transponder, and IC Samples Contained in Kit	ATA2270-EK1	ATARFID-EK1	ATARFID-EK2	ATA5505-EK1
Atmel ATA5577 ISO card[1]	x	x		x
Atmel ATA5577 coin[1]	x	x		
Atmel ATA5577 fob[1]	x	x		x
Atmel ATA5577 ISO11784/85 tag[1]	x		x	
Atmel ATA5577 Transponder	3	3		3
Atmel ATA5577 NOA3 module	3			
Atmel ATA5575M1 ISO card[1]	x	x		x
Atmel ATA5575M1 fob[1]	x	x		x
Atmel ATA5575M2 ISO11784/85 tag[1]	x		x	x
Atmel ATA5577 125kHz glass transponder	x	x		x
Atmel ATA5575 134.2kHz glass transponder	x		x	
Atmel U2270-MFPG3Y	3			3
Atmel ATA5505-P3QW	3			3
Atmel TK5551M-PP	3	3		
Atmel ATAB5570 board	1			
Tag test coil	1			

Note: 1. Several suppliers

4.5 Supported Atmel RFID-Reader ASSPs

Supported Reader-RFID IC Devices	ATA2270-EK1	ATARFID-EK1	ATARFID-EK2	ATA5505-EK1
Atmel U2270B	x			
Atmel ATA5505				x

5. Revision History

Please note that the page numbers referred to in the following section refer to the specific revision mentioned, not to this document.

Revision No.	History
4980E-RFID-06/12	• Complete document update
4980D-RFID-03/11	• Section 1 "Description" on page 1 changed • Section 2 "LF-RFID Kit Comparison Chart - Table" on pages 2 to 3 changed
4980C-RFID-11/09	• Section 1 "Description" on page 1 changed • Section 2 "LF-RFID Kit Comparison Chart - Table" on pages 2 to 3 changed
4980B-RFID-12/08	• Section 1 "Description" on page 1 changed • Section 2 "LF-RFID Kit Comparison Chart - Table" on pages 2 to 3 changed

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