UHF RFID READER

User Manual & Developer Guide

Prerelease version

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This document is to serve as a guide on how to setup and work with Radiant Sensors **UHF RFID Reader**. It will provide useful information on how to install, connect, configure, operate and upgrade **UHF RFID Reader**. Read it carefully before and during using **UHF RFID Reader**. Keep this user manual handy for future use.

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Feedback from User

Thanks for using **UHF RFID Reader.** As always, our goal is to make your experience the best possible ever, and your constructive comments and feedback are highly appreciated. Share your thoughts, comments, suggestion and ideas with us. Tell us what you like or dislike about software, hardware and even the datasheet of **UHF RFID Reader**. You can contact us by any of the following ways, we look forward to hearing from you.

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- Damage caused by misuse, abuse, neglect, alteration, problems with electrical power, usage not in accordance with product instructions, acts of nature, or improper installation or repairs made by anyone other than Radians Sensors authorized third-party service provider is not covered under warranty.
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Intended Audience

This user manual includes useful information about software, hardware, installation, configuration and operational modes of **UHF RFID Reader**. It is for anyone in charge of setting up, configuring, troubleshooting and maintaining **UHF RFID Reader**. The user is supposed to have basic knowledge and experience of the following fields;

- Network connectivity
- Hardware system integration
- Software development

The user is also assumed to have a good command of RFID systems and basic knowledge of EPCglobal Gen 2 specifications.

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UHF RFID Reader

UHF RFID Reader is a fixed Gen 2 UHF RFID tag reader from Radiant Sensors that utilizes the latest RFID technology to provide connectivity between RFID tags and enterprise system software. With its powerful, intuitive and undemanding software and hardware, **UHF RFID Reader** helps you keep an eye on your retail floor, warehouse, home, office and any environment that need high levels of access control and monitoring.

Up to four adjustable UHF antennas, embedded RFID tag reader and removable Wi-Fi antenna cooperate to give **UHF RFID Reader** the means to read dozens of RFID tags simultaneously and send the data securely to a host via Internet or a local network or enable it to independently make decision and issue appropriate reactions. **UHF RFID Reader** shall be configured to send comprehensive reports of the scanned tags and their transactions to an IoT cloud.

Equipped with general purpose input output ports, **UHF RFID Reader** can get digital information from external devices for making more intelligent decisions. Relay interfaced output ports enable **UHF RFID Reader** to integrate with a broad range of devices resulting in more elaborate systems.

UHF RFID Reader affords you matchless, unsurpassed and unprecedented security, monitoring and convenience.

Features

- Reduced development time provided by powerful embedded software
- Highly versatile and flexible
- Ethernet and Wi-Fi network connectivity
- *Access Point* and *Client* mode support
- Orientation insensitive design resulting in faster and more accurate tag reads
- Fast read rate for demanding applications
- Region free application
- Best-in-class receive sensitivity
- Enhanced interference rejection
- Expansive read range settings
- Rugged yet compact and lightweight for effortless usage
- IP31 sealing for dust and water resistance
- Low cost for high volume deployment
- Low power usage
- Extensive data import/export capability allowing integration with other systems
- Two digital input ports

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- Four digital output ports
- Two pairs of relay interfaced output ports
- Four independent, bidirectional, full duplex TX/RX UHF antennas
- Built-in activity indicator buzzer
- Wi-Fi, input-output and power indicator LEDs
- Browser based intuitive setup software
- Configurable on *Reading* or *Anti-Theft* mode

Applications

- Retail
- Supply chain
- Manufacturing
- Mobile asset tracking
- Office/home security
- Personal identification
- Access control
- Access management
- Anti-forgery

And any applications requiring secure and controlled access to different environments.

Specifications

Table 1, UHF RFID Reader Specifications

Dimensions	(H x W x D) 7.5 x 6.9 x 1.2 in (19 x 17.5 x 3 cm)
Weight	1.5 lbs. (3 Kg)
Colour	Silver
Material	Aluminium
Storage Temperature	-10 °C to +70 °C
Humidity Operating Range	Up to 80% relative humidity
Ingress Protection	IP31
Input Voltage	12 VDC
Input Current	2A @ 12 VDC
Ethernet Connector	10/100 base-t
Wi-Fi Antenna Power	5 db
Communication Standards	• 2.4 GHz Wi-Fi® (IEEE 802.11b/g/n) • OPEN, WEP, WPA, WPA2 or WPA/WPA2 encryption • Transport Layer Security (TLS) version 1.1
Connectivity Options	• Wi-Fi access point mode • Wi-Fi client mode

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RFID Frequency Range	840-960 MHz
Supported Standards	EPC Gen 2
RFID Output Power	15-30 db

Included in the Package

Table 2, UHF RFID Reader Basic Parts

Part	Function
UHF RFID Reader	Main Part
DC Adaptor	Provides 12 VDC with 2 A power for UHF RFID Reader.
UHF Antenna	Transmits and receives data.

Closer View

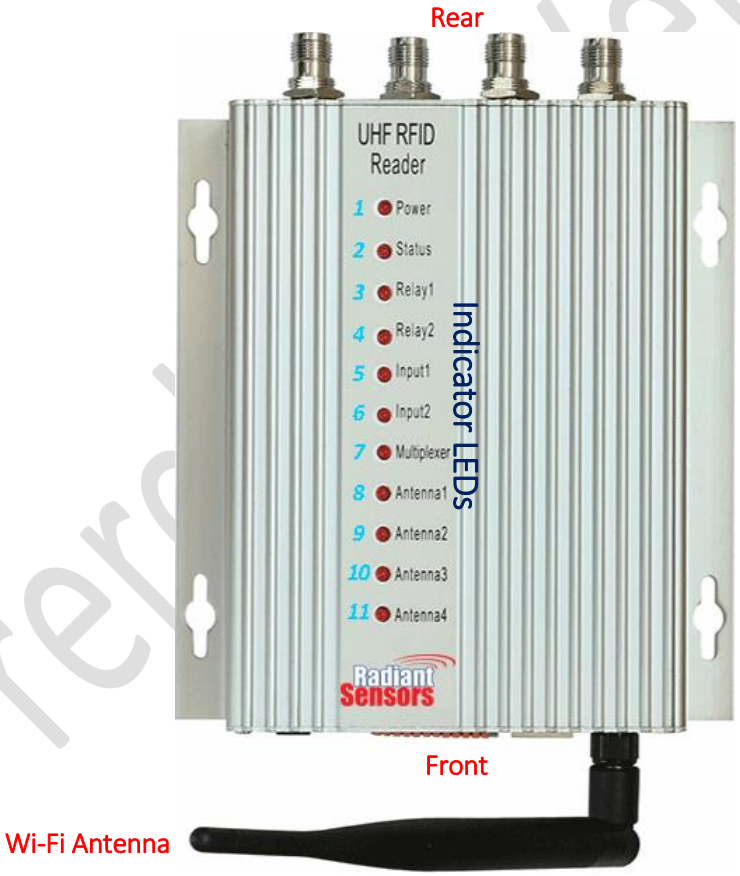

Figure 1, UHF RFID Reader Top Panel

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Indicator LEDs

Table 3, UHF RFID Reader Status LEDs

No.	Name	Status	Description
1	Power	Solid Light	Shows that power supply is connected.
2	Status	Solid Light	Solid light indicates that **UHF RFID Reader** is in a valid Wi-Fi network, in access point mode, or connected to a network via Ethernet port.
3	Relay 1	Solid Light	Turns on when Relay 1 is close.
4	Relay 2	Solid Light	Turns on when Relay 2 is close.
5	Input 1	Solid Light	Turns on when there is a digital logic 1 on Input 1.
6	Input 2	Solid Light	Turns on when there is a digital logic 1 on Input 2.
7	Multiplexer	Not applied for this device.	
8	Antenna 1	Blinking	Blinks when antenna 1 is reading tags.
9	Antenna 2	Blinking	Blinks when antenna 2 is reading tags.
10	Antenna 3	Blinking	Blinks when antenna 3 is reading tags.
11	Antenna 4	Blinking	Blinks when antenna 4 is reading tags.

Connector/ Ports

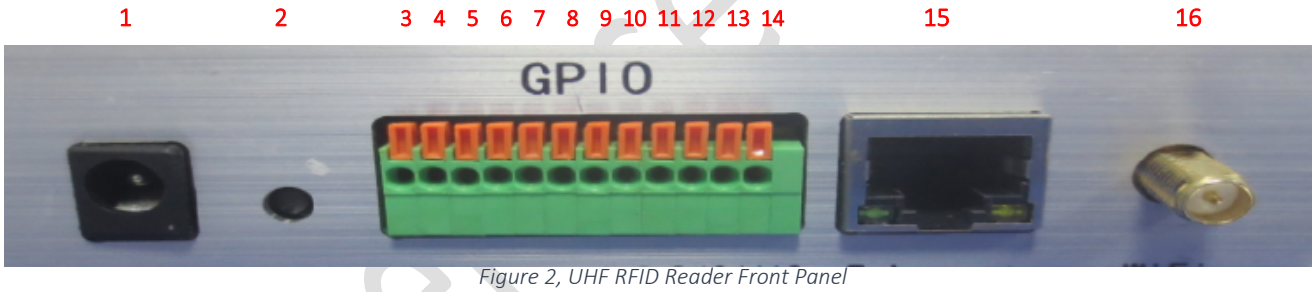

Figure 2, UHF RFID Reader Front Panel

Figure 3, UHF RFID Reader Rear Panel

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Table 4, UHF RFID Reader Ports/Connectors

Category	Position	No.	Name & Details	
Power	Front	1	2 A @ 12 Volts DC	
Reset	Front	2	Reset Device	
GPIO	Front	3	Out Relay 1	Output of Relay 1
		4	In Relay 1	Input of relay 1
		5	Out Relay 2	Output of Relay 2
		6	In Relay 2	Input of relay 2
		7	Input 1	Digital Input 1
		8	Input 2	Digital Input 2
		9	Ground	Provides Ground for external devices.
		10	VCC	Provides +5 Volts for external devices.
		11	Out 1	Digital Output 1.
		12	Out 2	Digital Output 2.
		13	Out 3	Digital Output 3.
		14	Out 4	Digital Output 4.
Ethernet	Front	15	Ethernet Connector; Provides capability of being connected to Ethernet.	
Wi-Fi	Front	16	Wi-Fi Antenna Connector; Provides capability of being connected to the Internet or local networks.	
UHF	Rear	17	UHF Antenna Connector; Transmits data between **UHF RFID Reader** and RFID Tags.	

Reset Button

Reset button has two functions; it is used to reboot the device or restore it to its default factory settings.

Reboot

To reboot **UHF RFID Reader**, keep the reset button down for 5 seconds. Release the button when you hear a single beep and **UHF RFID Reader** will reboot.

Factory Reset

Perform the following procedure to reconfigure **UHF RFID Reader** to its default settings.

1- Press and hold reset button. At the 5th second you will hear a single beep.
2- Keep holding the button down until you hear a triple beep at about the 10th second.
3- Release the button and **UHF RFID Reader** will be reinstated to its default settings;
   - Wi-Fi mode: *Access point*
   - Wi-Fi IP: *192.168.1.1*
   - User name: *admin*
   - Password: *admin*

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Set up

The following procedure outlines the steps to hook up **UHF RFID Reader.**

1- Connect UHF antennas, Ethernet Connector, 5 decibel Wi-Fi antenna and other input/output devices, if any, to their associate connectors on the reader.

> It is highly recommended that you get done with all hardware connections before powering **UHF RFID Reader** up. Failure to do so, your device may be damaged due to voltage fluctuations.

2- Plug in the DC adaptor to **UHF RFID Reader**'s power socket. It takes about 30 seconds for **UHF RFID Reader** to load completely. Meanwhile, all LEDs show a chasing effect, announcing that the device is booting.

3- When **UHF RFID Reader** loads completely, the *Power* LED changes to solid light and you will hear a double beep.

4- If the boot process fails due to any reasons, **UHF RFID Reader** makes 5 long beeps.

5- Restate **UHF RFID Reader** to its default factory settings.

6- After the device boots successfully, *Power* and *Status (Network)* LEDs illuminate. You will also hear a double beep.

7- If you hear 5 short beeps, there is definitely a hardware problem with the device or its connections. Check troubleshooting for more information.

> **UHF RFID Reader** is by default in *Access Point* mode with its SSID in this format: "RSWR-400_XXXXXX" and no password is needed.
>
> **UHF RFID Reader** is by default in *Access Point* mode, you can connect to it via Wi-Fi or Ethernet connection.

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Configuration

Below is the procedure that sketches out **UHF RFID Reader** configuration.

1- Open http://192.168.1.1 to proceed to the login page. If you can see the login page as per Figure 4, it means that you can connect to **UHF RFID Reader**, unless go to the troubleshooting section or contact Radiant Sensors support team.

2- Enter the following credentials to sign in to the settings page;
Username: admin
Password: admin

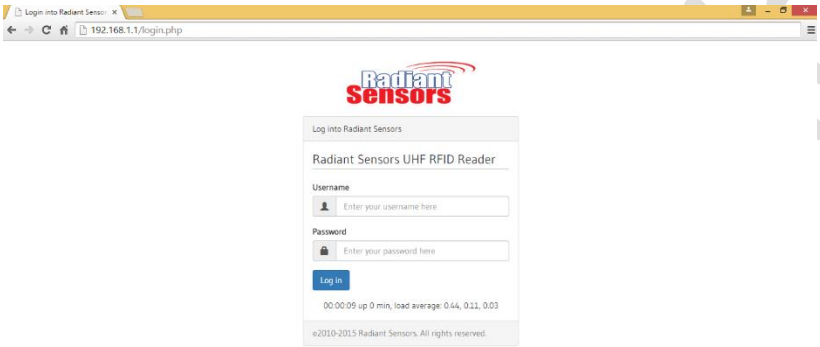

Figure 4, UHF RFID Reader Web Interface Login Page

3- If you see "*Diagnosis Failed!*" message, Figure 5, it means that there are some hardware problems with **UHF RFID Reader** or start-up process. In this case **UHF RFID Reader** makes 5 short beeps. Refer to the troubleshooting section or contact Radiant Sensors support team to figure out what the problem is.

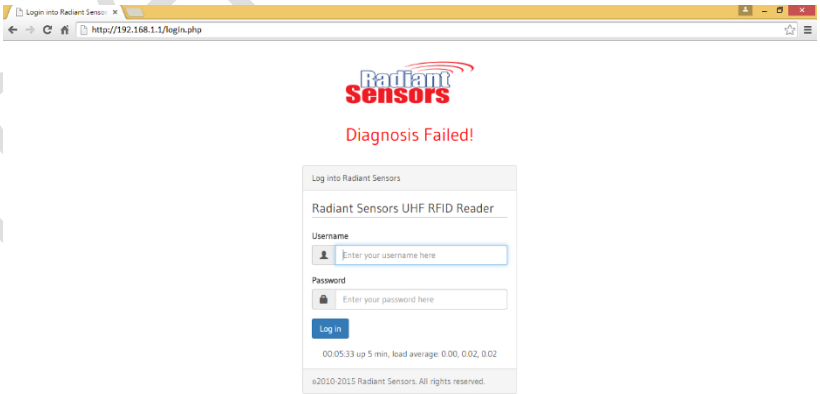

Figure 5, UHF RFID Reader Web Configuration Login Page (Connection Failed)

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4- After logging in the system, you enter **UHF RFID Reader**'s web interface. The web interface is used to configure the Reader's settings. In the next sections, we will explain the different menus of the web interface in more detail. Just click on each menu to see its content.

Home

In this page, you can see some information about **UHF RFID Reader**, Figure 6 and Table 5.

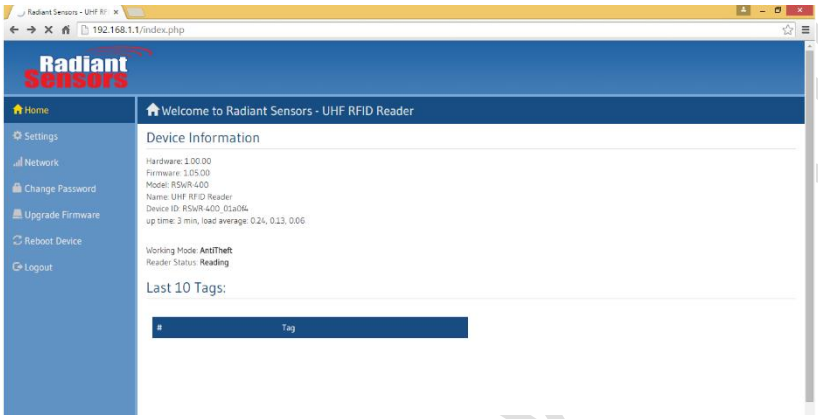

Figure 6, UHF RFID Reader Home Page

Table 5, Home page Fields

Field	Description
Hardware	Hardware Version
Firmware	Firmware Version
Model	Device Model
Name	Device Name
Device ID	Device ID
Up Time	The device's notion of passing of time from the moment of booting
Load Average	An indication of how much **UHF RFID Reader** is busy
Working Mode	• *Reader* • *Anti-Theft*
Reader Status	• *Initial*: UHF RFID Reader is working with its default settings. • *Reading*: UHF RFID Reader is already reading tags. • *Stopped*: clients have stopped asking **UHF RFID Reader** to read tags or connection is cut off.
Last 10 Tags	The EPC of 10 recently scanned tags
Connected Clients	IP of the connected clients

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Settings

In this page, user can set **UHF RFID Reader**'s time and working mode, Figure 7. **UHF RFID Reader** works in two different modes; *Reader* and *Anti-Theft*. Each mode has its own capabilities and thus specific configuration settings. We will delineate the specific features of each mode in this sections.

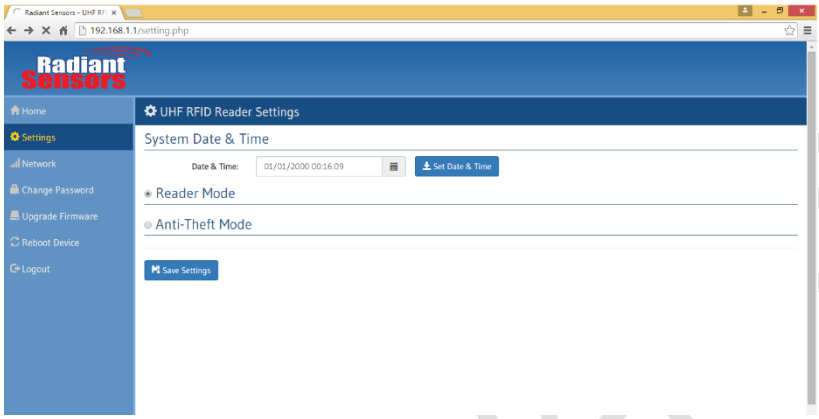

Figure 7, UHF RFID Reader Settings Page

Reader Mode

In this mode, **UHF RFID Reader** works like a server and waits for clients to connect to it. For example suppose that you have an inventory management software in your store which is already working with barcode. You may want to elevate your current system to work with RFID. To achieve this goal, your current software should connect to **UHF RFID Reader** as a client. **UHF RFID Reader** acts as a pathway between inventory software and RFID tags. In *Reader* mode, user should select one of the following options;

- LLRP
- Radiant Sensors API

LLRP Reading

In this mode **UHF RFID Reader** reads RFID tags and sends their EPC to a host as while as they are in-range. It means that EPC of a tag may be sent to the host over and over. The protocol used in this mode to exchange data between **UHF RFID Reader** and the host is LLRP. In *LLRP Reading* mode**, UHF RFID Reader** supports just one client at each time, excess clients are rejected automatically.

If you select *Save Bandwidth* checkbox, **UHF RFID Reader** will filter duplicate tags; in the other word, **UHF RFID Reader** sends duplicate RFID tags each 5 seconds by default. This leads to a drastic cut down in network traffic which in turn results in much more effective use of bandwidth.

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Radiant Sensors API

Radiant Sensors API mode entirely looks like LLRP Reading mode in its functionality. The difference is just in its implementation. In this mode communication occurs according to Radian Sensors protocol.

In *Radiant Sensors API* mode **UHF RFID Reader** supports up to 10 clients simultaneously, excess clients are rejected automatically.

Anti-Theft Mode

This mode, as the name implies, is used to prevent unauthorized removal of tagged items. **UHF RFID Reader** has three paradigms to approach the task. When selects Anti-Theft mode, user can see the following options, Figure 8;

- Anti-Theft
- Anti-Theft with stray tag filtering
- Anti-Theft with port 3 & 4 stray tag filtering

Anti-Theft

In this mode **UHF RFID Reader** makes an alarm whenever reads a tag. **UHF RFID Reader** is commonly installed at the exit to warn leaving of any items. Depending on the required reading rate and scan range, any combinations of four UHF antennas may be used in this mode.

Anti-Theft with Stray Tag Filtering

When boots completely, **UHF RFID Reader** starts appending all in-range tags to an *Ignore List* for 60 seconds, this time interval is called *Learning Time*. After the 60th second, two situations may arise;

1- Some tags show up in the read range of UHF antennas and stay there for more than 5 seconds, in this situation the tag is added to the ignore list.
2- Some tags show up in the read range of UHF antennas and leave it before the 5th second, in this situation **UHF RFID Reader** gives rise to an alarm.

Anti-Theft with Port 3 & 4 Stray Tag Filtering

In this mode UHF antennas are divided into two groups; 1, 2 and 3, 4. After booting, antennas 3 and 4 start appending all in-range tags to the *Ignore List* for 60 seconds (*Learning Time*). After the *Learning Time*, two situation may come up;

1. Some tags may leave the reading range of antennas 3 & 4 and remain out-of-range for more than *Ignore Time* (Refer to Action section). These tags are removed from *Ignore List*.
2. Some tags may leave the reading range of antennas 3 & 4, remain out-of-range for more than *Ignore Time* (Refer to Action section) and show up in the reading range of antenna 1 & 2. These tags are known as theft ones and bring about an alarm.

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Regardless of the selected mode, user has to set some parameters to put **UHF RFID Reader** in Anti-Theft mode.

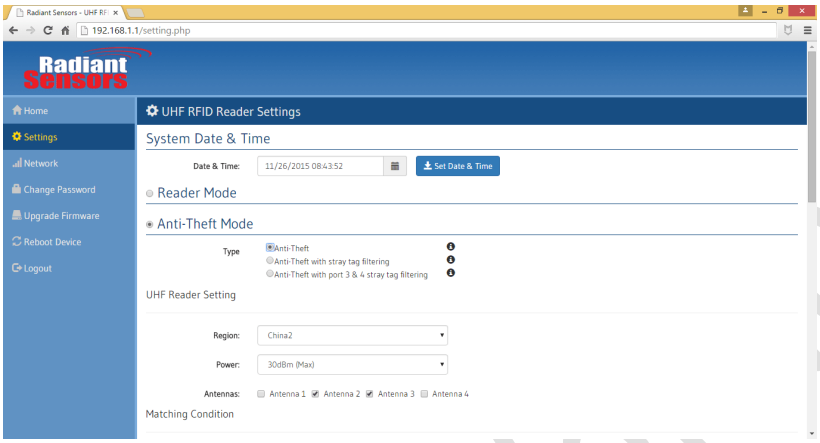

Figure 8, Configuring UHF RFID Reader in Reader or Anti-Theft Mode

UHF Reader Setting

Table 6, UHF Reader Settings

Field	Description
Region	Channel frequency of the workspace region
Power	Power of UHF Antenna
Antennas	Select which UHF antennas is connected to **UHF RFID Reader**.

The *Region* field must be filled in accordance with the country/region of operation to comply with local laws and regulations. The user is responsible to confirm operation with the correct RF settings and are solely responsible for any fines and other damages due to incorrect or non-compliant country/region settings on your Reader.

UHF RFID Reader may be damaged if you don't connect antenna to a port and try to send data to that port!

Matching Condition

As a preamble for this section, it is reminded that each code number on RFID tags is composed of 2 parts; 16 bits long PC and 96 bits long EPC, the abbreviation for Product Code and Electronic Product Code respectively, Figure 9. The code is represented in hex, and each group of digits act for something. For

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example the first 8 bits is called Header, incorporating the length, type, structure, version and generation of the EPC. For more information about RFID tags refer to Related Documents section.

Figure 9, RFID Code Number

It was mentioned earlier that the most prominent feature of Anti-Theft mode is that, in this mode the system can distinguish the sold items from unsold ones. To achieve this goal, the seller changes some bits of code number to a predefined pattern when they sell an item. At the exit, those bits are checked to match with the pattern. If not, the system alarms. A filter with three parameters is designed to check the leaving tags.

Filter Start Bit

This parameter determines index of the bit that the filter will start from. Actually we specify the bit position, which the seller starts changing from, when the item is sold. For example if you set this bit to 0, it begins from the first bit of PC, and if you set it to 16, it starts from the first bit of EPC (The 16th bit of the code), Figure 9.

Filter Length

Specifies the number of bits that the filter will use for pattern matching (64 bits at most). In fact we set out how many bits change when the item is sold.

Filter Pattern

In this field we determine the pattern that the filter bits must be compared with. When you set the filter length to 4 for example, a 4 bit pattern must be given to **UHF RFID Reader**. Hence, four boxes appear on the page to be filled. You can fill each box by 0, 1 or x. Note that the pattern must be completely different with tag's initial code number, unless unsold items are misrecognized as sold.

Examples are better than thousands of words! We end this section with some examples to give a better understanding of Anti-theft mode.

Example 1

Consider a filter with the following parameters:

Filter Start Bit	Filter Length	Filter Pattern
7	4	1001

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When items are sold, bits 7-10 of their tag number is changed to 1001. At the exit, bits 7, 8, 9 and 10 are checked to be 1, 0, 0 and 1 respectively. Unless, system alarms!

In the *Filter Pattern* field, x means *don't care*; it is compatible with either 0 or 1. In example 1, if the filter pattern is 100x, both 1000 and 1001 pass through the filter, i.e. they are allowed to exit!

Example 2

Consider the following filter:

Filter Start Bit	Filter Length	Filter Pattern
0	1	x

The starting bit of the leaving tags is tested to be either 1 or 0. If we configure the system to beep whenever an item exits, we hear a beep as each tag is read.

This example is an interesting application of using x in filter patterns, when we want to just make sure that the Reader is reading tags.

Example 3

As a more comprehensive example, suppose that you have 3 tags with their code as Table 7:

Table 7, Sample RFID Tag IDs

	PC	EPC
Tag 1	3000	8030a00829000000000950d2
Tag 2	31fa	8030a0082900000000092a42
Tag 3	3256	8030a00829000000000947c2

These numbers are in HEX. Their binary equivalent is provided in Table 8.

Table 8, Binary Equivalent of Sample RFID Tag IDs

No.	PC	EPC
Tag 1	0011,0000, 0000,0000	1000,0000,0011,0000,1010,0000,0000,1000,0010,1001,0000,0000, 0000,0000,0000,0000,0000,0000,0000,1001,0101,0000,1101,0010
Tag 2	0011,0001, 1111,1010	1000,0000,0011,0000,1010,0000,0000,1000,0010,1001,0000,0000, 0000,0000,0000,0000,0000,0000,0000,1001,0010,1010,0100,0010
Tag 3	0011,0010, 0101,0110	1000,0000,0011,0000,1010,0000,0000,1000,0010,1001,0000,0000, 0000,0000,0000,0000,0000,0000,0000,1001,0100,0111,1100,0010

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There are usually some common digits between codes, the filter is better to be selected from the most common digits. There are 16 common digits between these tags which can be selected as filter bits. The maximum length of this filter can be 64 bits (16 hex numbers).

For this example we can set these values:

Filter Start Bit	Filter Length	Filter Pattern
16	8	10011001

Bits 16-23 of the leaving tag is checked to comply with 10011001.

If we change the parameters as:

Filter Start Bit	Filter Length	Filter Pattern
7	3	101

Bits 7, 8, 9 of the code number are checked to be equal to 101.

Action

Action is about the reaction of **UHF RFID Reader** in Anti-theft mode, Table 9.

Table 9, Action Fields

Field	Description
Beep Mode	• *None*: UHF RFID Reader makes no alarm when theft occurs. • *Single*: UHF RFID Reader repeats single beeps when theft accrues. • *Double*: UHF RFID Reader repeats double beeps when theft accrues.
Relay Active Time	In Millisecond. The time duration in which the relay is kept close.
Display Ignore Time	The time interval which antennas 3, 4 ignore absence of an item before the item being detected by antennas 1, 2. For more details refer to Anti-theft with Port 3 & 4 Stray Tag Filtering section.

Cloud

UHF RFID Reader shall be configured to emit detailed reports of captured tags and their transactions to an IoT. If you select Enable in the *Cloud* section, you come across some fields as Table 10.

Table 10, Cloud Fields

Field	Description
Method	• GET, to get information from cloud. • POST, to post reports to cloud • PUT, to edit the reports sent to cloud
URL	URL of the IoT.
Headers	Header of the GET, POST or PUT request.

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Format	Body of the GET, POST or PUT request.

Network

UHF RFID Reader has two types of connection: Ethernet and Wi-Fi, Figure 10.

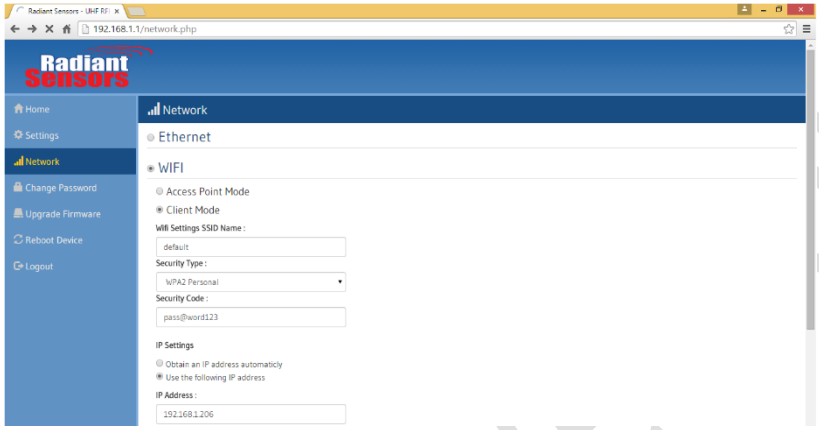

Figure 10, UHF RFID Reader Network Page

Ethernet

UHF RFID Reader can be connected to a local network via its Ethernet connector. It can be set to obtain an IP in two ways:

- Automatically, using network DHCP
- Manually, selecting "*Use the following IP address*" and then entering a static IP address, subnet mask and gateway.

Wi-Fi

Wi-Fi mode has two types: *Access Point Mode* and *Client Mode*

Access Point Mode

This mode is used when you use **UHF RFID Reader** as an access point. You must fill some fields to set the Reader on this mode, Table 11.

Table 11, Access Point Mode Fields

Field	*Description*
SSID Name	SSID name of your wireless network
Security Type	Security Type
Security Code	Password of your Wi-Fi network
Reader IP	IP of **UHF RFID Reader**
Subnet Mask	Subnet Mask

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Gateway	Gateway
Start IP	If you set the Start IP as 192.168.1.20 for example, **UHF RFID Reader** will randomly get an IP in the range of 192.168.1.20 to 192.168.1.255
Limit	Maximum number of clients that can connect to **UHF RFID Reader**

Client Mode

When **UHF RFID Reader** is supposed to be in a network as a client, this mode is activated. The fields are as per Table 12.

Table 12, Client Mode Fields

Field	*Description*
SSID Name	The SSID name of your wireless network
Security Type	The security protocol of your Wi-Fi network
Security Code	The Password of your Wi-Fi network

Change Password

In this page you can change the web interface password, Figure 11. If you forget your password, you can reset **UHF RFID Reader** to factory defaults (See Reset Button section).

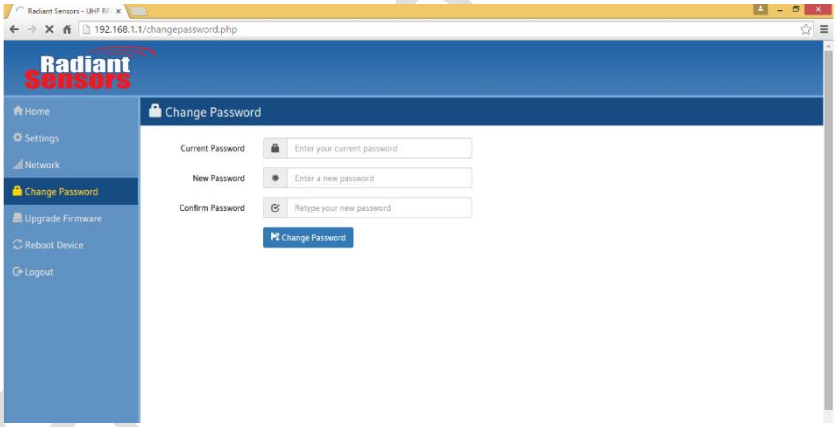

Figure 11, UHF RFID Reader Change Password Page

Upgrade Firmware

In order to upgrade **UHF RFID Reader**, you need to download the upgrading file from our website beforehand. Browse the upgrade file and then click OK. It takes some minutes for **UHF RFID Reader** to complete upgrading; meantime, you see the chasing effect on LEDs. As done with upgrading, **UHF RFID Reader** restarts twice.

Note that **UHF RFID Reader** is prone to damage if you misuse the upgrading option. There are some points that you must keep in mind before upgrading **UHF RFID Reader**:

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- ✓ Don't upgrade the device until it is really necessary.
- ✓ Always upgrade the device to a higher version.
- ✓ Don't power off the device while upgrading is in progress.

Reboot Device

In this page you can reboot **UHF RFID Reader**.

Logout

To exit from **UHF RFID Reader** web interface, just click logout!

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API

An outstanding feature of **UHF RFID Reader** is its capability to integrate with enterprise software, hardware and other components. **UHF RFID Reader** renders these components the connectivity with RFID tags. For the components to be able to connect, configure and command **UHF RFID Reader**, they must be able to exchange data with it in a standard format.

Radiant Sensors software team has provided developers with standardized formats to use all capabilities of **UHF RFID Reader**. The API expresses **UHF RFID Reader** in terms of its operations, inputs, outputs, and underlying types. RSUHF Reader Tester is an application that can connect to **UHF RFID Reader** and test its capabilities.

This section introduces RSUHF Tester and the generic usage of its methods. It gives software developers control over UHF RFID Reader. Using RSUHF Reader, developers can;

RSUHF Reader Tester application

Run "RSUHFReaderTester.exe" and you will see Figure 12.

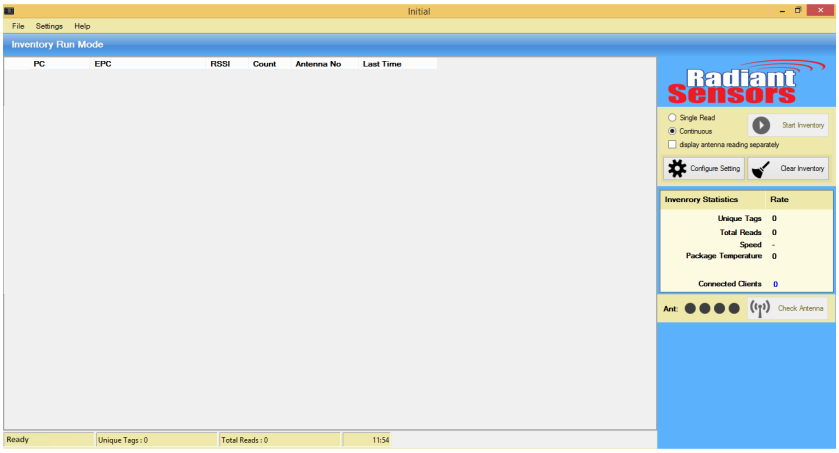

Figure 12, RSUHF Tester Application Main Page

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Table 13, RSUHF Main Page Fields

Category	Field	Description
Inventory Read Mode	Single Read	**UHF RFID Reader** reads a single tag in each step. User must click *Start Inventory* to read the next tag.
	Continuous Read	**UHF RFID Reader** reads all in-range tags continually.
	Clear Inventory	Clears the history of all scanned tags.
	Display antenna reading separately	If not selected, you will see the ID of the last antenna which has read the tag in *Antenna Number* field. Otherwise, each time a tag is read an entry is added to the *Inventory Run Mode*.
Configure Setting	Opens settings page, Figure 13.	
Inventory Run Mode	PC	PC of the scanned tags
	EPC	EPC of the scanned tags
	RSSI	RSSI of the scanned tags
	Count	Record of the times the tag has been scanned
	Antenna Number	ID of the antenna that has scanned the tag
	Last Time	The last time the tag has been scanned
Inventory Statistics	Unique Tags	Number of unique scanned tags
	Total Reads	Total number of scanned tags
	Speed	Number of scanned tags per second
	Package Temperature	The current temperature of **UHF RFID Reader**
	Connected Clients	Number of connected clients
Ant	Check Antenna	A visual indicator of connected antennas

Connection

In this page user should enter network connection settings Figure 13 and Table 14.

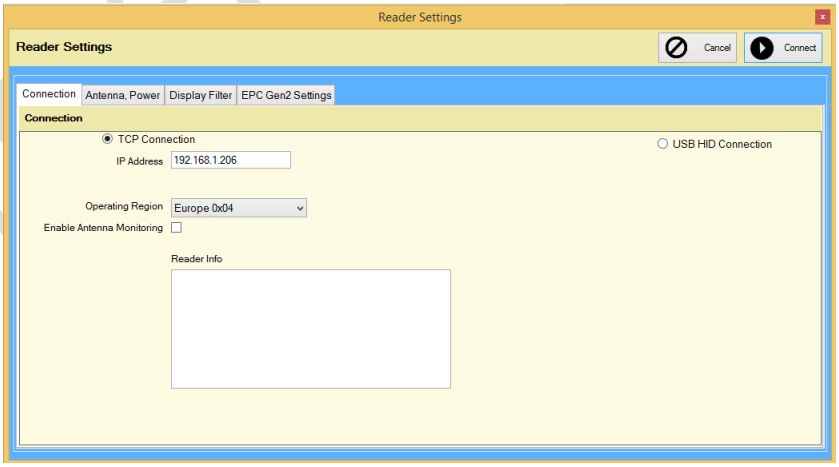

Figure 13, Configure Setting Page

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Table 14, UHF RFID Reader Network Connection Settings

Field	Description
IP Address	IP of **UHF RFID Reader**
Operating Region	Channel frequency of the workspace region
Enable Antenna Monitoring	If selected, the system consistently monitors status of UHF antennas and alarms if any of them disconnects.
Reader Info	Complementary information about network connection status of **UHF RFID Reader**

The *Region* field must be filled in accordance with the country/region of operation to comply with local laws and regulations. The user is responsible to confirm operation with the correct RF settings and are solely responsible for any fines and other damages due to incorrect or non-compliant country/region settings on your Reader.

Click Connect when you are done with settings in this section. If the application connects to **UHF RFID Reader** successfully, you will see a message as per Figure 14.

Figure 14, RSUHF Tester Application Successfully Connected to RSWR-400 UHF RFID Reader

Click OK and press *Start Inventory* button.

If you face error message as per Figure 15, follow the troubleshooting section.

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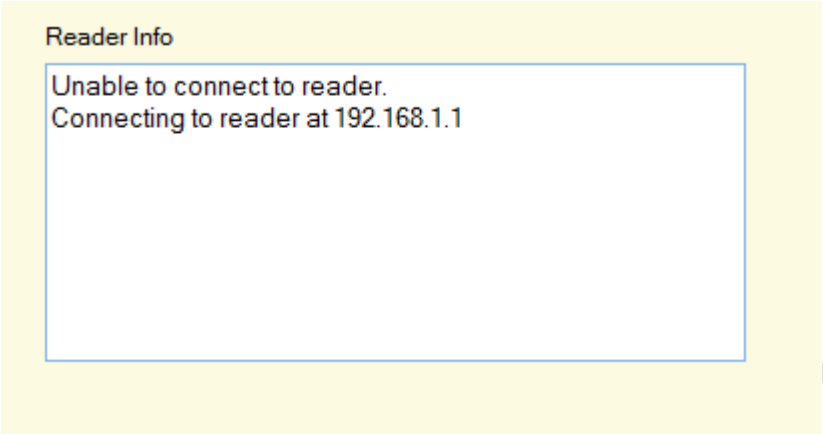

Figure 15, Connection to UHF RFID Reader Failed

Antenna, Power

In this page you can enable UHF antennas and set their power, Figure 16.

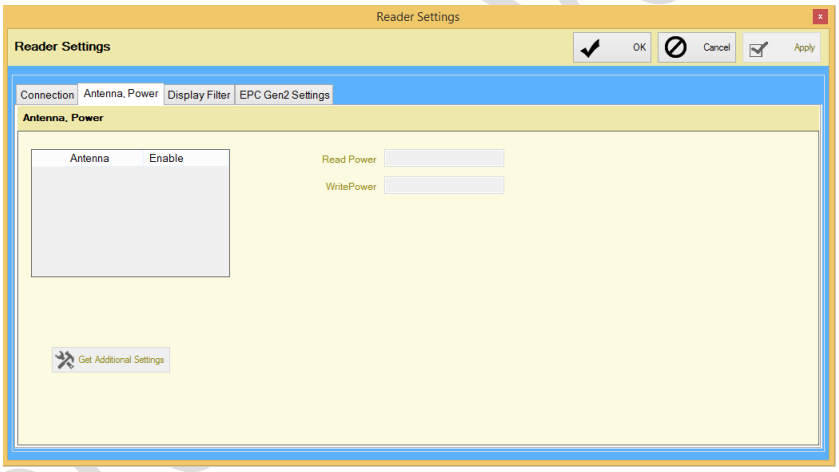

Figure 16, Setting Antenna Power in RSUHF Tester

Display Filter

You can configure **UHF RFID Reader** to filter tags based on their EPC. For example, the EPC of a particular product may start with 10011001. When auditing the inventory, user can prompt **UHF RFID Reader** to display items which their EPC starts with 10011001, Figure 17.

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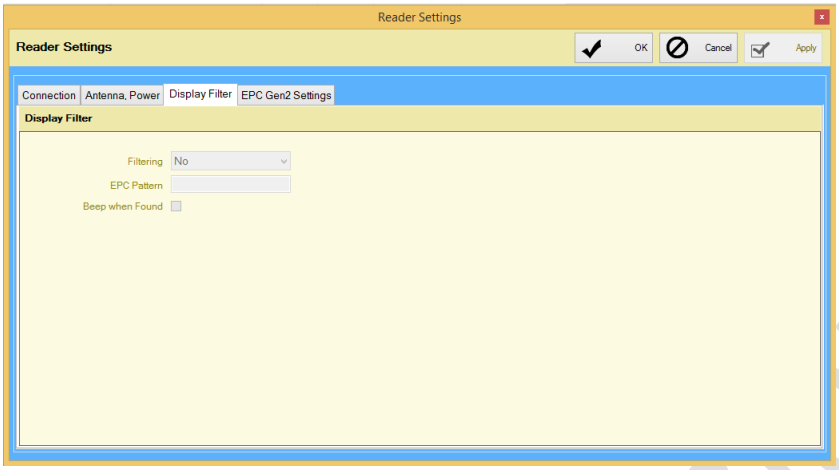

Figure 17, Setting Filter in RSUHF Tester

EPC Gen2 Settings

Read EPC Gen2 document for more information.

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Troubleshooting

Question: *I have connected UHF RFID Reader's power supply, but it doesn't turn on. What should I do?*

Answer: Please check the adaptor and your power socket, if you are sure that they are properly connected but the power LED is still off, please contact the Radiant Sensors support team.

Question: *I am connected to the Reader but it does not read any tag. Why?*

Answer: You should check some parameters:

If you are using Anti-theft mode, open the settings page and check *Region* and *Antenna* fields to see if they are properly configured, Figure 18. For example if you have connected three antennas to ports 1, 3 and 4, their associated boxes must be selected.

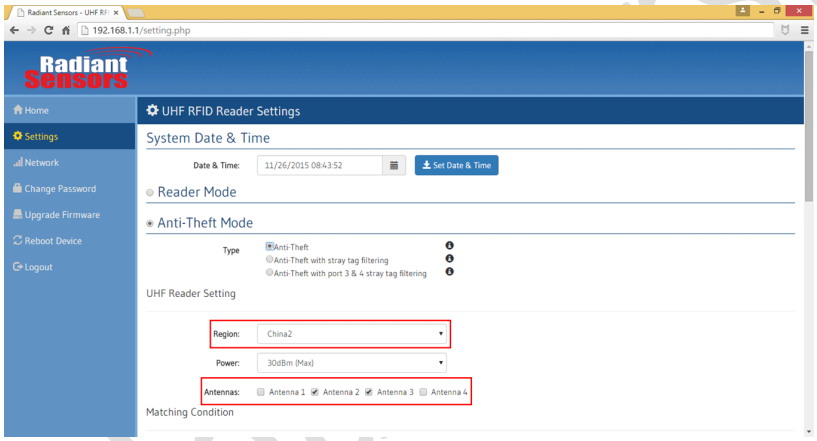

Figure 18, Checking Antenna and Power

If you are using RSUHF Reader Tester application, click *Configure Setting* button to go to connection tab and check *Operating Region*, Figure 19.

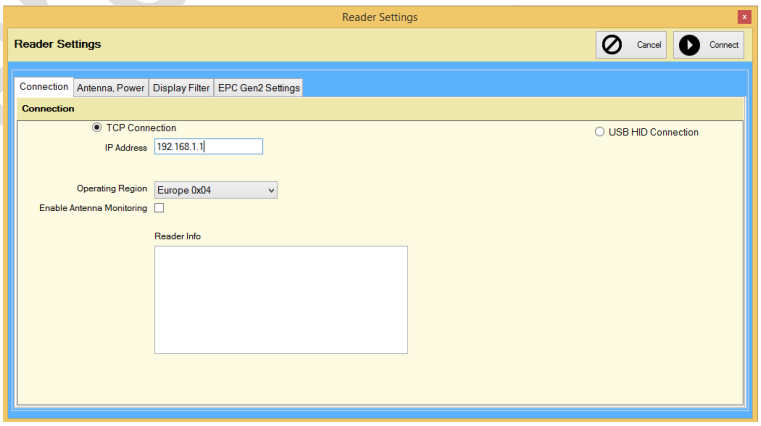

Figure 19, Checking Network and Operational Region

Then go to *Antenna Power* tab and check if you have selected the antenna correctly, Figure 20.

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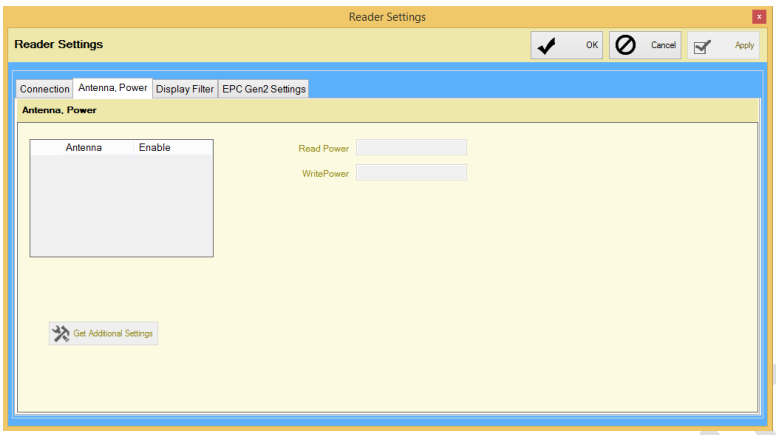

Figure 20, Checking Read/ Write Power of Antennas

Question: *I've forgotten my password, how I can login the device settings page then?*

Answer: Restore your device to factory settings. Refer to Reset Button for more explanation.

Question: *The Reader is turned on but I cannot connect to it, what is the problem?*

Answer: First of all, check to see if the Status (network) LED is illuminated. If so, it means that **UHF RFID Reader** is connected to your network or is on *Access Point* mode. You can ping your reader's IP using windows command prompt from c:\windows\system32\cmd.exe and type this command: ping <device IP or device ID>. If the Reader replies, it means that it is in connection with your computer. Otherwise check your firewall or antivirus.

If the status (network) LED is off, please restart the device to its factory setting. If **UHF RFID Reader** boots and makes double beep, search the Wi-Fi network with SSID name like "RSWR-400_XXXXXX" and connect to it.

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Records of Revision

This page keeps the records of changes to this document. The document was originally released as Revision A.

REV	NAME	DESCRIPTION OF REVISION	DATE
A	M. OSO	Initial Release	2015-06-27
B	R.PRS	Second Release	2015-11-26

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Radiant Sensors is addressing challenges of global intricacy in today's omnipresent digital devices, granting its customers to create novel experiences for end users.

Radiant Sensors designs, develops, and manufactures passive and active RFID hardware products as well as IOT sensor devices for short and long range wireless identification technology.

Radiant Sensors is positioned as a major player in the worldwide market for sub gigahertz UHF (Ultra-High Frequency) and Active radio-frequency identification (2.45 GHz) technologies. Our devices are field proven and have been in operation for many years throughout the world.

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FCC Statement

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

The distance between user and products should be no less than 25cm