FXR90

RFID Reader

Integration Guide

ZEBRA

MN-004924-07EN Rev A

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About This Guide

The FXR90 industrial fixed RFID readers provide real-time, seamless EPC-compliant tags processing for asset management in rugged industrial and enterprise environments.

The FXR90 supports Wi-Fi, Bluetooth, 1000BASE-T Ethernet, POE+ and optional 5G WAN, and offers 4-port, 8-port, and integral RFID antenna variants.

This Integration Guide provides information about installing, configuring, and using the FXR90 RFID reader and is intended for use by professional installers and system integrators.

Icon Conventions

The documentation set is designed to give the reader more visual clues. The following visual indicators are used throughout the documentation set.



NOTE: The text here indicates information that is supplemental for the user to know and that is not required to complete a task.



IMPORTANT: The text here indicates information that is important for the user to know.

CAUTION: If the precaution is not heeded, the user could receive a minor or moderate injury.



WARNING: If danger is not avoided, the user CAN be seriously injured or killed.

Service Information

If you have a problem with your equipment, contact Zebra Global Customer Support for your region. Contact information is available at: zebra.com/support.

When contacting support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software/firmware type and version number

Zebra responds to calls by email, telephone, or fax within the time limits set forth in support agreements.

If your problem cannot be solved by Zebra Customer Support, you may need to return your equipment for servicing and will be given specific directions. Zebra is not responsible for any damages incurred during

shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Zebra business product from a Zebra business partner, contact that business partner for support.

Getting Started

This section provides information on FXR90 fixed RFID reader features, parts, and LED indications.

Features

The FXR90 fixed industrial RFID readers are based on Zebra's fixed reader platform and are easy to use, deploy, and manage.

The reader offers real-time, seamless EPC-compliant tags processing for inventory management and asset tracking applications in large scale deployments. The reader offers a wide range of features that enable implementation of complete, high-performance, intelligent RFID solutions:

- Rugged construction for industrial markets such as manufacturing and transportation/logistics
- Suitable for indoor, outdoor, and vehicle-mounted use
- Wireless communication:
  - 5G WAN/GPS with CBRS support
  - WWAN
  - Wi-Fi 6
  - Bluetooth
- NFC tag for tap-to-pair
- Industrial M12 connectors
- IP65 and IP67 sealed
- Operating temperature of -40°C to +65°C
- 4 and 8 antenna port options
- Optional integrated antenna with 4-port configuration

FXR90 Parts

Figure 1 FXR90 Connections (Front Panel and Left Side)

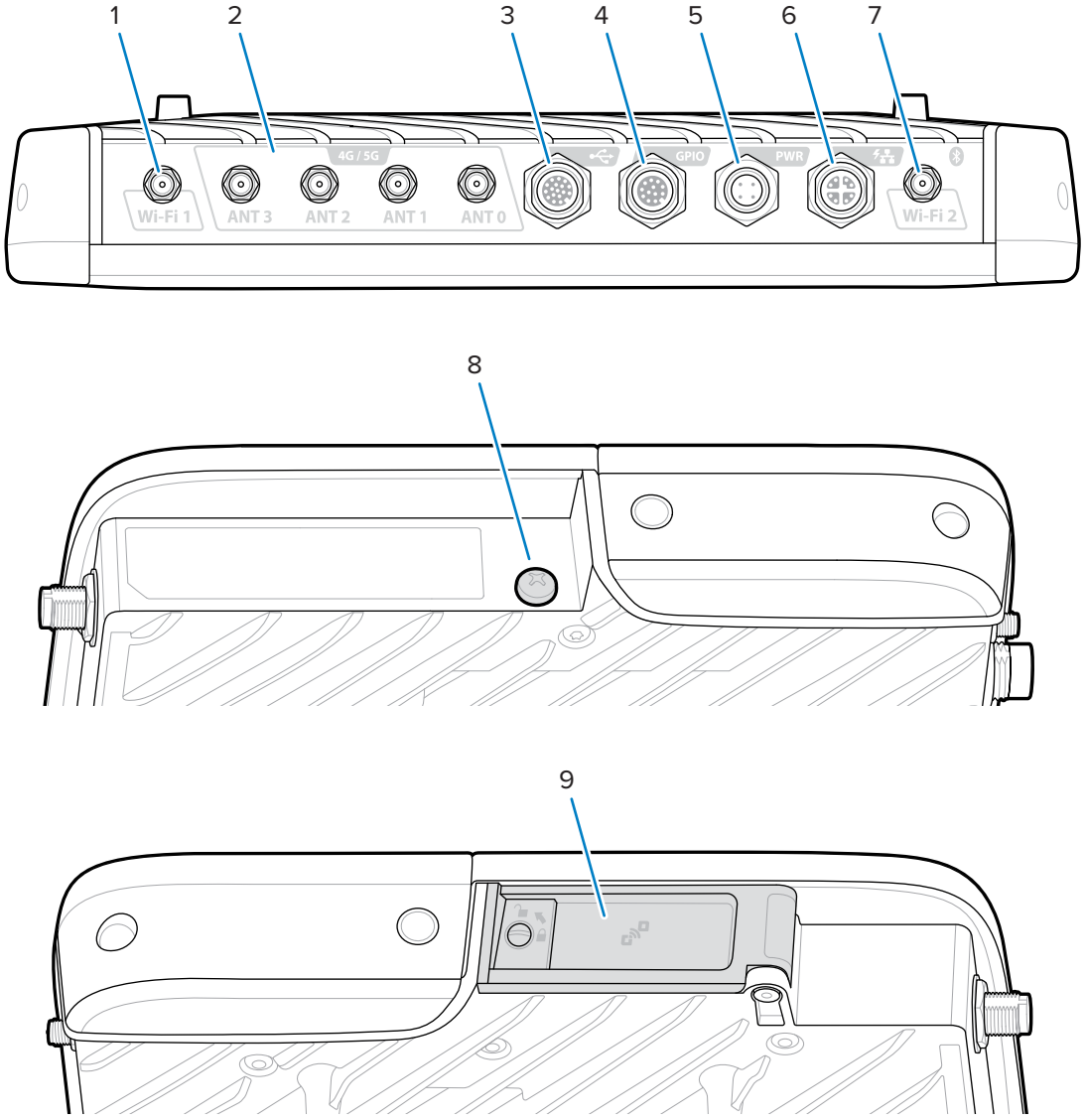


Table 1 FXR90 Connections

1	WLAN (WiFi) antenna port 1; RP-SMA
2	WWAN antenna (4G/5G/GPS) ports (4); SMA
3	USB (Host & Client) (M12 Connector)
4	General Purpose Input Output (GPIO) (M12 Connector)
5	DC Power Input (M12 Connector)
6	10/100/1000 Base-T Ethernet with POE+ (IEEE 802.3at compatible) (M12 Connector)

Table 1 FXR90 Connections (Continued)

7	WLAN (WiFi) / Bluetooth antenna port 2; RP-SMA
8	Grounding Screw
9	SIM Door

NOTE: Not pictured; protective connector caps are included with the device.

Figure 2 FXR90 SIM Tray and Reset

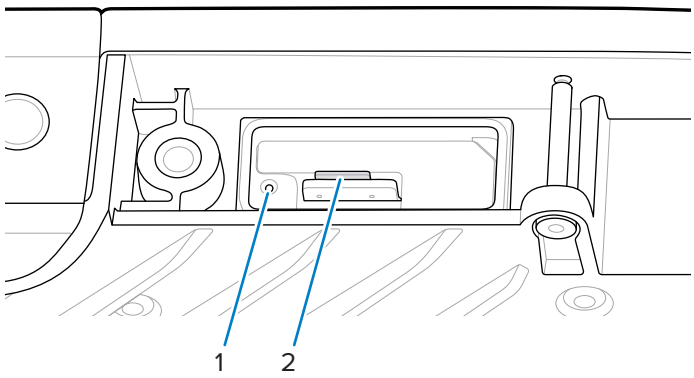


Table 2 FXR90 SIM Tray and Reset

1	Reset Button
2	SIM Tray (WAN models only)

NOTE: The SIM tray and reset button are shown without the door or Label Artwork for clarity.

Figure 3 FXR90 RFID Antennas

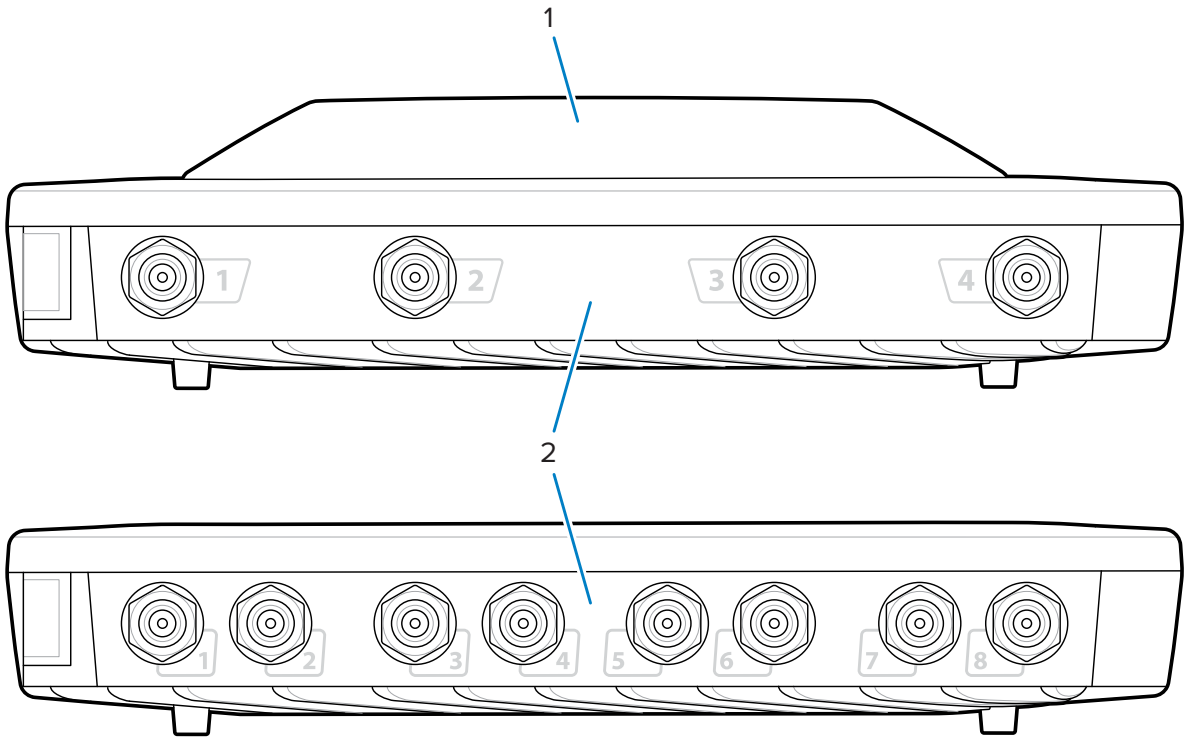


Table 3 FXR90 RFID Antennas

1	Integrated RFID antenna (optional)
2	RFID Antenna ports, RP-TNC (4 or 8)

FXR90 LEDs

The reader LEDs indicate reader status as described in the following table.

Figure 4 FXR90 LEDs

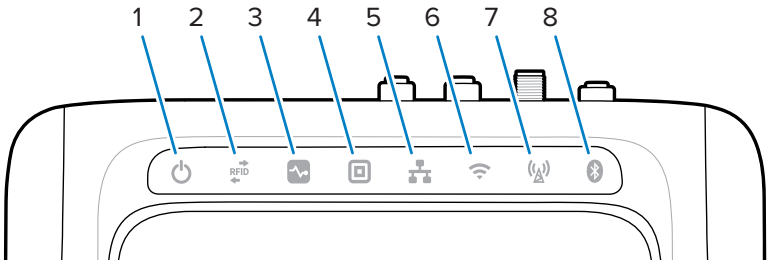


Table 4 FXR90 LED Indications

	Function	Color/Status
1	Power	Green = On Yellow = Application initialization/booting Red = Critical failure
2	Activity	Green flashing = Tag read Yellow flashing = Another tag operation Red flashing = Error in RF operation
3	Status	Green flashing = GPI event Yellow flashing = Firmware update Red = Firmware update failure
4	Application	Green, Yellow, and Red. Defined by Application.
5	Ethernet	Green blinking = 1 Gbps link detected Yellow blinking = 100 Mbps link detected No LED = Cable disconnected
6	WiFi	Green = Connected Green blinking = Connecting Red = Error/Lost connection No LED = Off
7	WAN (4G/5G)	Green = Online Yellow = Offline Yellow blinking = SIM Initializing/ SIM deregistered/searching/ attached/detached Red = SIM Failure/ No SIM Red blinking = SIM Locked/bad SIM No LED = SIM Switch/Operation unknown/WAN setting Off
8	Bluetooth	Blue = Bluetooth Module On Blue blinking = Initializing No LED= Bluetooth Module Off

Bootup LED Sequence

When the reader is turned on or rebooted, the LED sequence indicates a successful bootup.

If bootup is successful:

- Power LED turns yellow
- All LEDs flash once and turn off
- Power LED turns greens

If a reset bootup is unsuccessful:

- Power LED turns yellow
- Power LED turns red

IMPORTANT: If bootup is unsuccessful, contact Zebra Global Customer Support.

Installation and Communication

This section includes FXR90 RFID reader installation and communication procedures.

CAUTION: The FXR90 RFID reader must be professionally installed.

IMPORTANT: Only use Zebra-approved cable assemblies with the reader.

Unpacking the Reader

Remove the reader from the shipping container and inspect it for damage. Keep the shipping container; use the container if the reader needs to be returned for servicing.

Flush Mounting the Reader

The FXR90 comes standard with two mounting brackets installed on the reader that allow for flush mounting of the reader to a surface. These brackets require four #10 mounting screws.

NOTE: For drywall applications, use correctly sized toggle bolts or drywall anchors.

Pre-drill a rectangle measuring 310 mm by 100 mm (12.20 in. x 3.94 in.) into the mounting surface prior to using mounting screws.

WARNING:

The mounting surface must support the full device weight and the weight of any attached cables.

Go to Technical Specifications for device weight information.

Figure 5 FXR90 Mechanical Dimensions

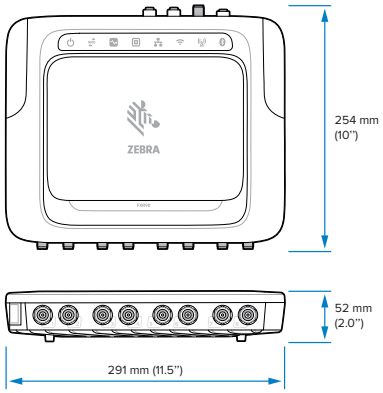


Figure 6 FXR90 Mechanical Dimensions with Brackets

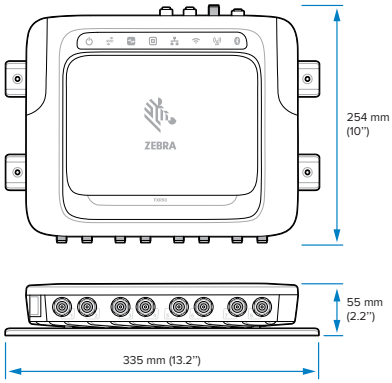


Figure 7 FXR90 Mechanical Dimensions with Antenna

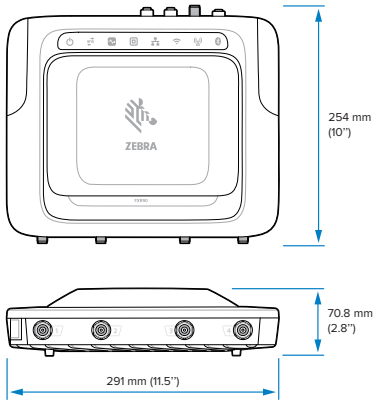
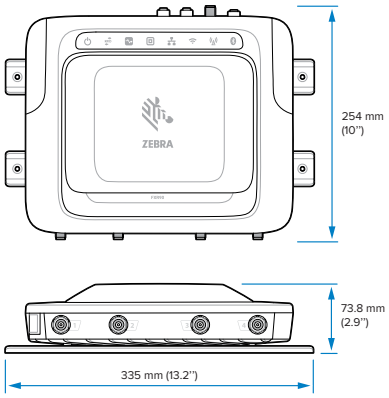
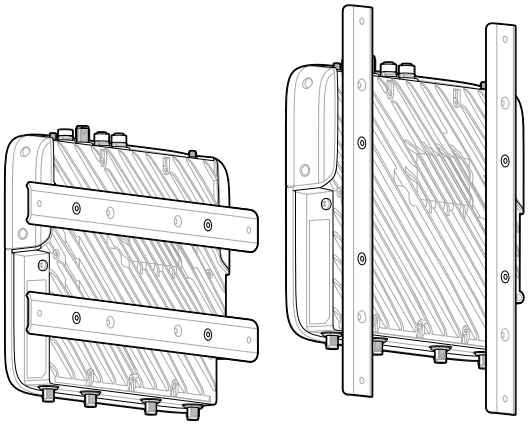


Figure 8 FXR90 Mechanical Dimensions with Antenna and Brackets



NOTE: The brackets can be rotated to support the reader's mounting in both vertical and horizontal orientations.

Figure 9 Bracket Orientations



Mounting Tips

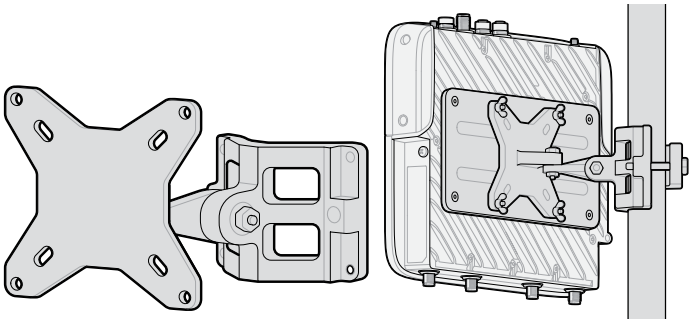
Mount the reader in any orientation. Consider the following before selecting a location for the reader.

- Mount the reader in an area free from electromagnetic interference. Sources of interference include generators, pumps, converters, non-interruptible power supplies, AC switching relays, light dimmers, and computer CRT terminals.
- Ensure that any cable losses between the reader and antenna are considered to ensure the desired level of system performance.
- Ensure that power can reach the reader.
- Ensure the reader is mounted in a location where it will not be easily disturbed, bumped, or damaged.
- Use a level for precise vertical or horizontal mounting.

VESA Mount

This section describes an external bracketing device that can be used to mount the FXR90 reader.

The VESA Mount (P/N: MNT-100100MM-01) is a heavy-duty articulating mounting bracket.



- The bracket can be used in both vertical and horizontal configurations.
- The bracket is suitable for indoor/outdoor use.
- The bracket is adjustable in both azimuth and elevation for the purpose of aiming the reader.
- The adaptor plate (P/N: ADP-200100MM-01) is assembled between the FXR90 and the VESA mounting bracket to adapt the FXR90's 200 mm x 100 mm hole pattern to the VESA mounting bracket's 100 mm x 100 mm hole pattern. Use the screws from the flush mount bracket to attach the adaptor plate. To complete the assembly, use the hardware provided with the VESA mount to attach it to the adaptor plate.

WAN Antenna Mounting Considerations

This section provides an overview of the WAN Antenna (P/N: ANT-4G5GGPS010-SMA), including frequency port mapping and mounting methods.

Figure 10 Antenna Mounting

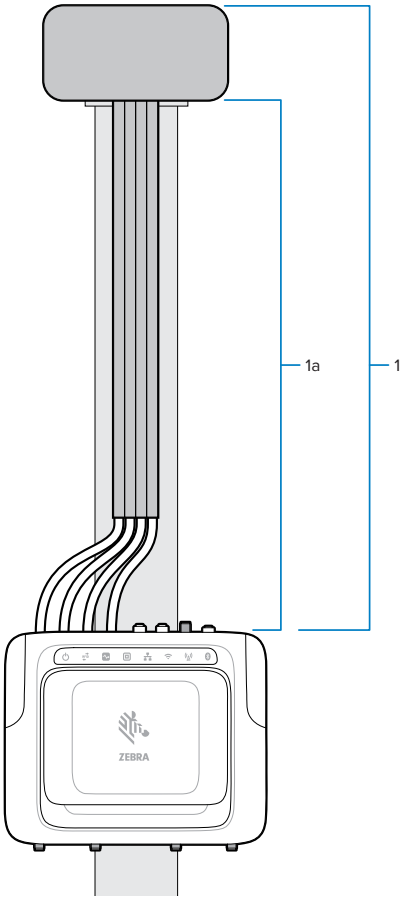


Table 5 Mounting

Part	Description	Worldwide P/N (excluding Japan)	Japan Only P/N
1	4G/5G/GPS Antenna, 4X SMA Male Connectors, Black	ANT-4G5GGPS010-SMA	ANT-4G5GGPS012-SMA
1a	RF Cable length	1 meter	2 meters

The antenna contains multiple antenna elements within the single antenna housing. It comes as a complete kit with mounting hardware and a sealing gasket. It has 4 cables attached. Each cable has a frequency label to connect it to the correct port on the FXR90, as shown below.

NOTE: Cables should be fully extended for maximum separation.

Table 6 WAN Antenna Frequency

Connector	Frequency
LMH (Ant0)	700-960 MHz, 1550-5000 MHz
*MH (Ant1)	1100-5000 MHz
LMH# (Ant3)	700-960 MHz, 1550-5000 MHz
MH (Ant2)	1100-5000 MHz

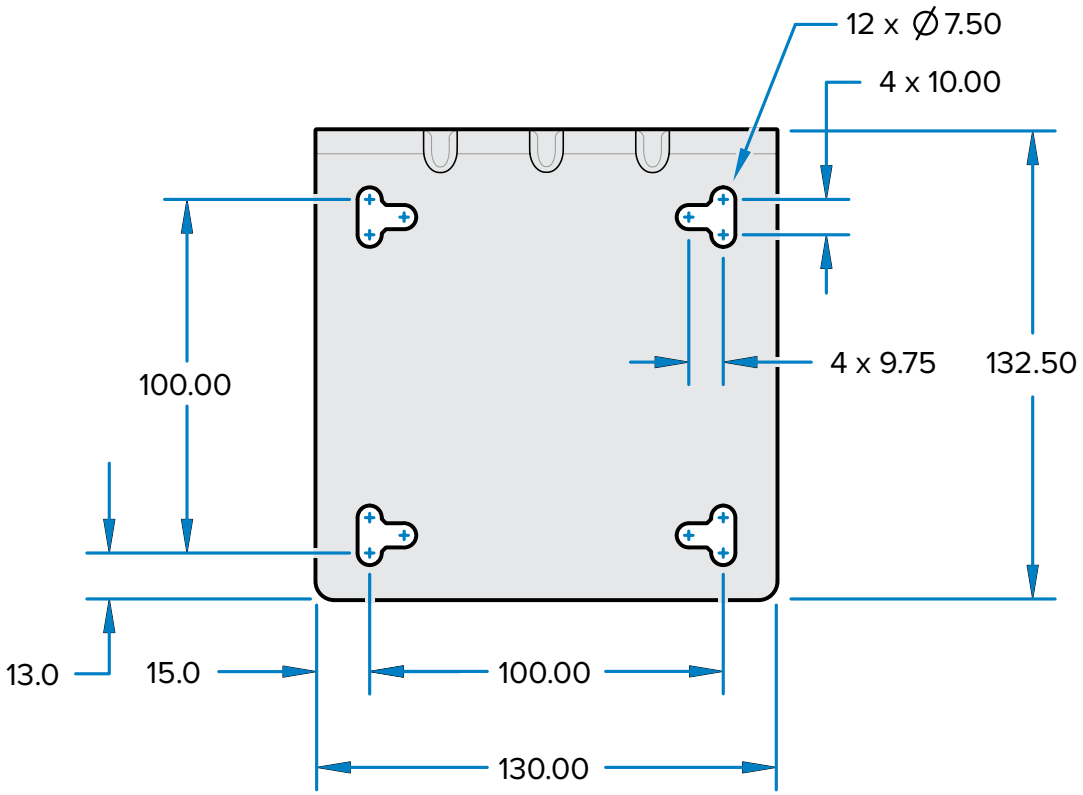
Mount the antenna to a flat surface/panel with the nut provided. Hand-tighten the nut. To pole-mount the device, use the mounting bracket.

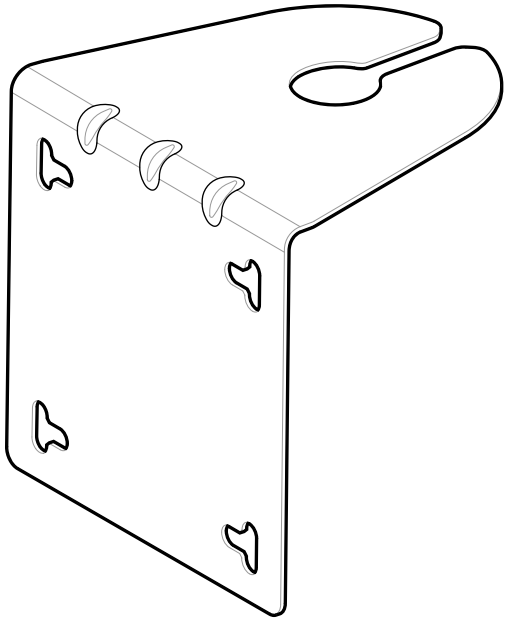
NOTE: For optimal performance, use the full cable length with the antenna box above the reader. Secure cables to the mounting surface.

The sides of the antenna box should have a minimum of 304.8 mm (12 in.) of clearance. The top of the antenna should have no obstruction above to maintain reliable WAN and/or GNSS performance.

WAN Antenna Bracket

The WAN Antenna Bracket (P/N: BRKT-000373-01) can be used to mount the WAN antenna next to a wall or panel. This section provides the mounting pattern for this bracket.





The mounting bracket has a 100 mm X 100 mm pattern that can be screwed into a wall or panel.

NOTE: The vertical and horizontal slots provided allow the use of 12.7 mm (0.5 in.) hose clamps instead of screws to secure the bracket to a pole.

Connecting Reader Antennas

To safely install the reader antennas, follow the information below.

IMPORTANT: The appropriate Zebra antennas provide optimal performance for various use cases. To meet optimum RF specifications, an antenna with maximum VSWR = 1.3 must be used.

CAUTION: To ground the device, use the pre-installed #10-32 x 0.250" grounding screw on the side of the device.

IMPORTANT: The protective caps should remain on all connectors when not in use, especially for outdoor applications.

WARNING: Follow all antenna installation and power connection instructions before operating the reader to avoid personal injury or equipment damage that may result from improper use. To safeguard personnel, be sure to position all antenna(s) according to the specified requirements for your regulatory region.

CAUTION: Power off the reader before connecting antennas. Never disconnect the antennas while the reader is powered on or reading tags. This can damage the reader.

Do not turn on the antenna ports from a host when the antennas are not connected.

Maximum antenna gain (including any cable loss) cannot exceed 6.7 dBiL. Ensure that the device is correctly set to the country where the reader is being used to assure regulatory compliance.

When mounting the antennas outside the building, equipment shall permanently connect to building earth (ground) by a skilled person. Perform this in accordance with applicable national electrical installation codes.

To connect the antennas to the reader, attach the RP-TNC connector coming from each antenna to an antenna port and secure the cable using wire ties. Do not bend the cable beyond the rated bend radius.

Communication and Power Connection

Use a standard Power-Over Ethernet (PoE) or PoE+ connection for the reader to a host or network.

IMPORTANT: The protective caps should remain on all connectors when not in use, especially for outdoor applications.

Ethernet Connection

The reader communicates with the host using an Ethernet connection (10/100/1000 Base-T Ethernet cable).

This connection allows access to the Administrator Console, which changes reader settings and controls the reader. With a wired Ethernet connection (10/100/1000 Base-T cable), power using either the approved reader Zebra power supply or by PoE/PoE+ through the Ethernet cable.

Ethernet: Power via External Power Supply

The FXR90 RFID reader communicates to the host through a 10/100/1000 Base-T Ethernet cable and receives power through a Zebra power supply.

1. Select the 1 m, 3 m, 5 m, or 15 m Ethernet cable.
2. Connect the Ethernet cable to the FXR90 Ethernet M12 connector. Go to Connecting the Ethernet Cable to the M12 Connector for instructions.
3. Connect the other end of the Ethernet cable to the host system LAN port.
4. Assemble the power supply cable connector to the reader.
5. Route the power cable.
6. Connect the FXR90 Zebra AC power supply to a wall outlet.
7. Verify that the unit booted properly and is operational.
8. On a networked computer, open an internet browser and connect to the reader. Go to Connecting to the Reader.
9. Log into the Administrator Console. Go to Administrator Console Login .

Ethernet: Power via PoE or PoE+

The PoE installation option allows the reader to communicate and receive power on the same 10/100/1000 Base-T Ethernet cable.

1. Select the 1 m, 3 m, 5 m, or 15m Ethernet cable.
2. Connect the Ethernet cable to the FXR90 Ethernet M12 connector. Go to Connecting the Ethernet Cable to the M12 Connector for instructions.
3. Connect the other end of the cable to an Ethernet network with PoE or PoE+ capability.
4. Verify that the reader booted properly and is operational.
5. On a networked computer, open an internet browser and connect to the reader. Go to Connecting to the Reader.

6. Log into the Administrator Console. Go to Administrator Console Login.

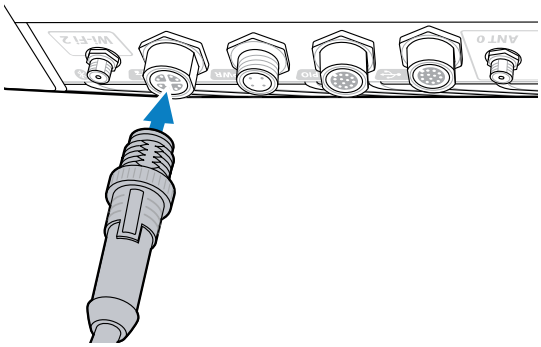
Connecting the Ethernet Cable to the M12 Connector

This procedure describes how to connect the Ethernet cable to the M12 connector.

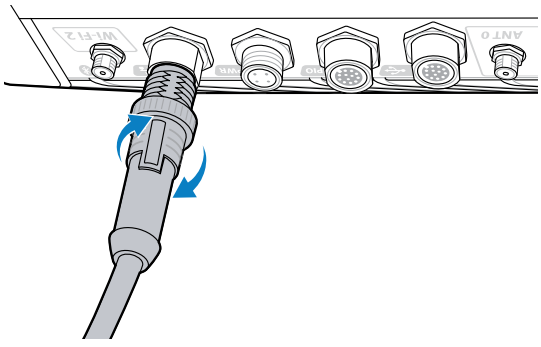
Table 7 Ethernet Cables

Part	Description
CBL-ENT00100-M1200	1 m (39.3 in.) Ethernet Cable
CBL-ENT00300-M1200	3 m (118.1 in.) Ethernet Cable
CBL-ENT00500-M1200	5 m (196.9 in.) Ethernet Cable
CBL-ENT01500-M1200	15 m (590.6 in.) Ethernet Cable

1. Position the Ethernet cable connector so that its keying feature aligns with the matching keying features on the M12 connector.

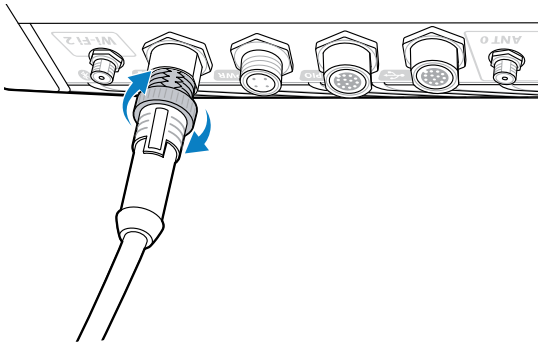


2. Carefully insert the cable into the M12 connector, and then rotate the Ethernet cable while applying light pressure.



The cable locks into place after the keying features align.

3. Secure the connection by hand-tightening the Ethernet cable connector to the M12 connector.



NOTE:

- Tools are not required for this connection.
- Ensure only Zebra cable assemblies are used with the FXR90.
- This procedure also applies to other M12 connectors, including USB, GPIO, and Power.

Power Source

The following table provides power sources and their features accordingly to ensure proper power connection.

Table 8 Power Source

Power Source	Features
PoE	RFID (31.5 dBm)
PoE+	1. RFID (33 dBm), USB 2. RFID (31.5 dBm), Wi-Fi/Bluetooth
Power Brick	RFID (33 dBm), WAN, Wi-Fi/Bluetooth, USB

USB Connection

The USB port supports (by default) a Network mode of operation. This enables a secondary network interface as a virtual network adapter over USB.

The Ethernet network interface co-exists with the USB virtual network adapter. However, only one application connection (RFID or web console connection) is allowed a time. The default IPv4 to access the reader is 169.254.10.1.

IMPORTANT: Keep protective caps on all connectors when not in use, especially for outdoor applications.

See Also

Connecting the Ethernet Cable to the M12 Connector

GPIO Interface Connection

The GPIO connection allows up to 4 inputs, 4 outputs and supplies +24 VDC for external sensors and signaling devices. The GPIO interface is electrically isolated from the reader's chassis ground, but its ground is common to the power return of the 24 VDC external supply when this is present.

GPIO signals allow some flexibility. Inputs are pulled up within the reader to +5 VDC and can be shorted to ground to pull them low. They are broadly compatible with industrial sensors with NPN outputs and may be connected directly to relays or switch contacts. Alternatively, they can be driven by 5V logic. In the low-state logic, the current source from the reader is approximately 3 mA, so standard gates in most logic families can drive them directly. Current flow in the logic high state is close to zero. The general-purpose outputs are open-drain (NPN type) drivers, pulled up to 5V. Each output can withstand voltages up to +30 VDC but should not be driven negatively. Drive 24V relays, indicator lamps, etc., by wiring them between the +24 VDC supply pin and the general-purpose output pins. Although each output can sink up to 1A, the maximum current drawn from the internal 24V supply is 1A, so use an external power supply if the current requirements exceed this. Note that the state of the general-purpose outputs is inverted; for example, driving a control pin high at the processor pulls the corresponding output low.

Table 9 GPIO Color Codes

Color	Description
Red	+12V/24V AUX DC Power Out
Black	GROUND
Brown	GP OUT 1
Orange	GP OUT 2
Yellow	GP OUT 3
Green	GP OUT 4
Blue	GROUND
Purple	GP IN 1
Grey	GP IN 2
White	GP IN 3
Pink	GP IN 4
Light Green	GROUND

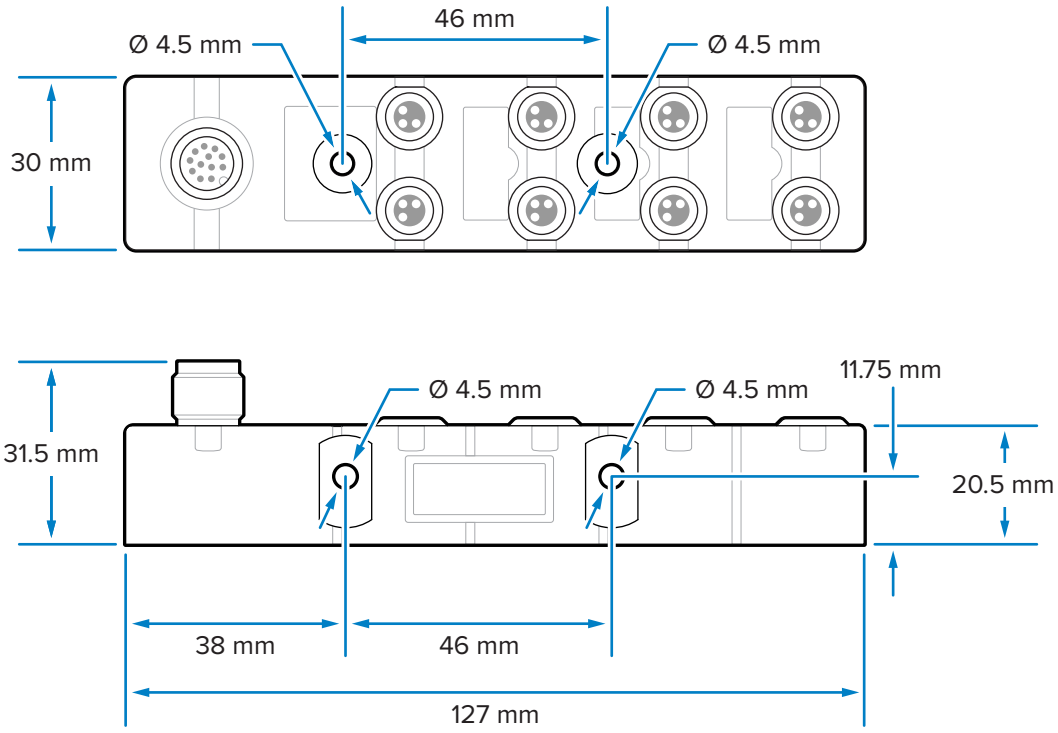
See Also

Connecting the Ethernet Cable to the M12 Connector

GPIO Breakout Block Mounting Specifications

This section provides information about mounting locations, dimensions, and torque specifications for the GPIO Breakout Block (P/N: BLOK-M12PN-01).

Figure 11 Mounting Dimensions



The Breakout Block can be mounted using M4 screws through either the two front or two side holes.

Component Specifications

The torque specifications follow for the different components:

- M4 Mounting hardware: 0.6 N-m to 0.8 N-m (5.3 in-lb to 7.1 in-lb)
- M8 connectors: 0.4 N-m to 0.5 N-m (3.5 in-lb to 4.4 in-lb)
- M12 connector: 0.6 N-m to 0.7 N-m (5.3 in-lb to 6.2 in-lb)

GPIO Wiring

This section provides wiring information for the GPIO Breakout Block (P/N: BLOK-M12PN-01).

IMPORTANT: The M8 connectors on the left are outputs, and the M8 connectors on the right are inputs.

Figure 12 GPIO Connections

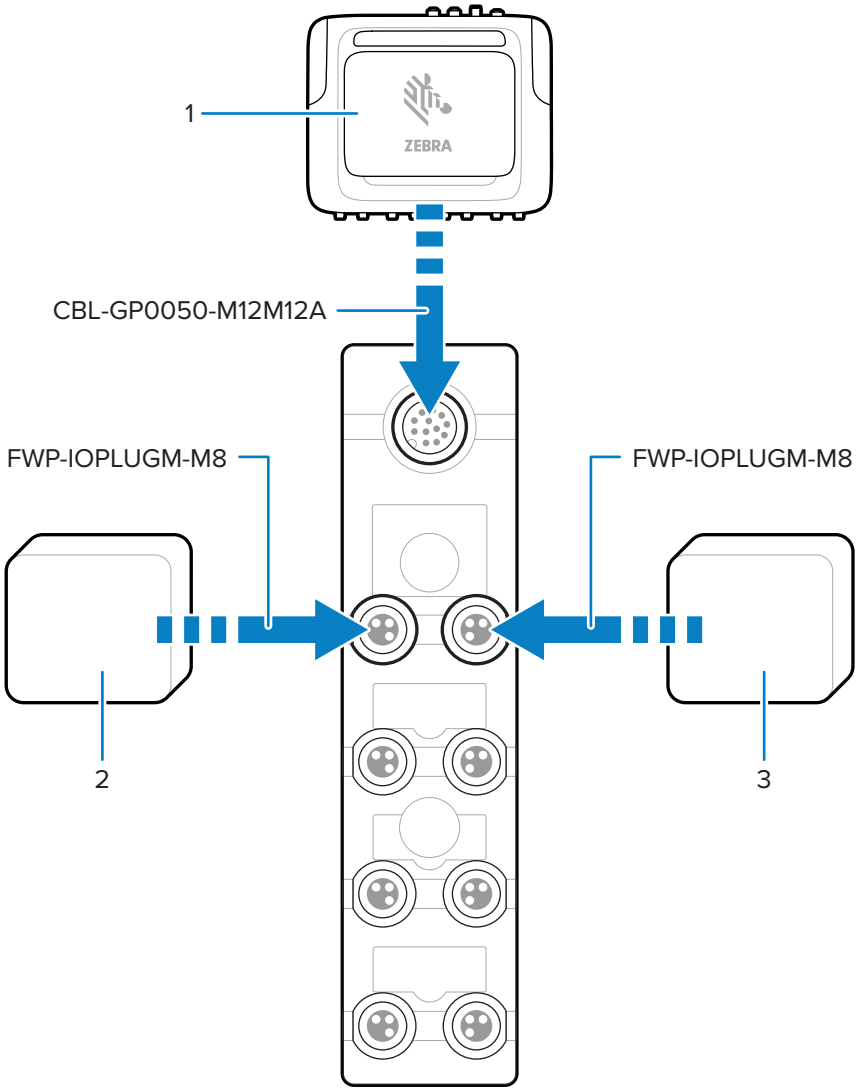


Table 10 Connection Parts

Part	Description
1	FXR90 Reader
2	Output Device
3	Input Device

Figure 13 Connector Pins

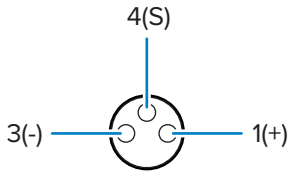


Table 11 Pin Values

Pin Number	Value
Pin 1	Positive 24VDC
Pin 3	Negative
Pin 4	Signal

GPIO Breakout Block LED Behavior

This section explains the LED behavior for different use cases of the GPIO breakout block

Table 12 LED Indications

LED behavior	Use Case
The green power LED turns on.	The FXR90 24VDC output is enabled.
The adjacent yellow LED turns on.	• The output from the FXR90 is low. • The input to the FXR90 is high or low.
The adjacent yellow LED turns off.	The output from the FXR90 is high.

NOTE: LEDs do not turn on when 24VDC output is disabled.

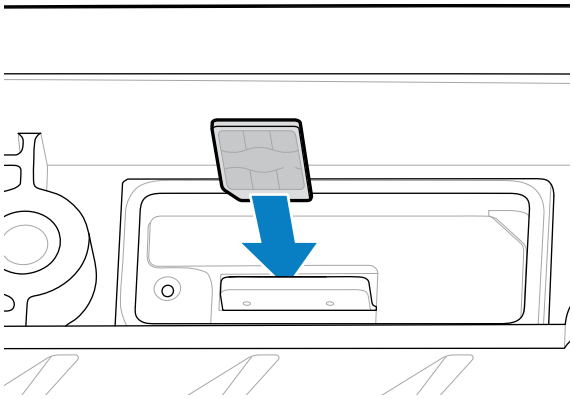
Installing the SIM Card

This section provides instructions for the safe installation of the physical SIM Card.

CAUTION—ESD: Follow proper electrostatic discharge (ESD) precautions to avoid damaging the SIM card. Proper ESD precautions include but are not limited to, working on an ESD mat and ensuring the operator is properly grounded.

1. Locate the SIM door on the device. See callout 9 in FXR90 Parts.
2. Using a screwdriver, rotate the screw holding the door in a counter-clockwise direction to unlatch the door and reveal the SIM slot.

3. To install the SIM card:
   - If no SIM card is currently in place, push the SIM card into the provided slot.
   - If a SIM card is already in place, push the existing card to remove it and then push in the new SIM.



4. Using a screwdriver, rotate the screw in a clockwise direction to latch the door closed.

Refer to Configure Network Settings - WAN Tab for information about configuration in the Administrator Console.

Power Supply Options

This section reviews power supply options, procedures, and notices.

IMPORTANT: The only ways to provide power to the reader are with the Zebra-approved AC-DC power supply, the DC-DC power supply, through a PoE connection via an injector, or to 12-24 VDC directly using the Zebra-approved flying-leads cable or the Zebra-approved auto auxiliary power outlet adaptor (cigarette lighter) cable.

IMPORTANT: Refer to Power Source to ensure proper power connection.

WARNING: Do not directly connect the reader to the line voltage.

Connecting the AC-DC Outdoor Input

Follow the instructions in this section to connect the AC-DC power supply input (P/N: PWR-BGA24V90W0WW).

1. Connect the appropriate AC power supply cord using the threaded circular connector. Fully insert the circular connector and hand-tighten it to secure it.
2. Determine the type of AC power supply cord.
   - When using the open lead AC power supply cord (CBL-PWRA150-M1200), connect the corresponding wire phase to the AC power system following the color codes below.

     Table 13 Wire Phase Color Codes

Phase	Color
Line	Black
Neutral	White
Protective Earth	Green / Yellow

   - When using an AC power supply cord terminating in a fixed IEC connector (CBL-PWRA035-M12IEC), connect to an appropriate IEC-style cord set.

For all applications, the connection should be performed by a licensed electrician, following local electrical codes, using certified connectors, wiring boxes, and weatherproof provisions as needed.

See Also

Connecting the Ethernet Cable to the M12 Connector

Connecting the AC-DC Outdoor Output

Follow the instructions in this section to connect the AC-DC power supply output (P/N: PWR-BGA24V90W0WW)

1. Connect the DC output cord (CBL-PWRD035-M12M12 or CBL-PWRD100-M12M12) to the power supply using the threaded circular connector. Ensure the appropriate length cord is used.

   Fully insert the circular connector and hand-tighten it to secure it.

2. Connect the opposite end of the DC output cord to the RFID reader.

See Also

Connecting the Ethernet Cable to the M12 Connector

Connecting the DC-DC Input

Follow the instructions in this section to connect the DC-DC power supply input (P/N: PWR-BGA24V90W1WW).

1. Using the threaded circular connector, connect the DC power supply cord (CBL-PWRD150-M12M00).

   Make sure the circular connector is fully inserted and screwed down; hand tighten only.

2. Observe the DC input wire color code

Table 14 DC Wire Color Code

SIGNAL	CONN 1	COLOR
DC_IN_POS (9-60 VDC)	1	RED
	2	RED
DC_IN_NEG	3	BLACK
	4	BLACK
ENABLE (DEFAULT ON)	5	BLUE

IMPORTANT: Grounding the ENABLE signal will disable the unit. Letting it float will enable it. ENABLE should not be connected to a voltage greater than 18 V DC.

Connection should be performed by a qualified professional, following local electrical codes, using certified connectors, wiring boxes, and weatherproof provisions as needed.

See Also

Connecting the Ethernet Cable to the M12 Connector

Connecting the DC-DC Output

Follow the instructions in this section to connect the AC-DC power supply output (P/N: PWR-BGA24V90W1WW).

1. Connect the DC output cord (CBL-PWRD035-M12M12 or CBL-PWRD100-M12M12) to the power supply using the threaded circular connector. Ensure the appropriate length cord is used.

   Fully insert the circular connector and hand-tighten it to secure it.

2. Connect the opposite end of the DC output cord to the RFID reader.

See Also

Connecting the Ethernet Cable to the M12 Connector

Connecting the AC-DC Indoor Power Supply

Follow the instructions in this section to connect the AC-DC power supply (P/N: PWR-BGA24V78W3WW).

Locate the indoor use power supply in a cool, dry location.

- For Input: Connect an appropriate IEC power supply cord following local receptacle configurations.
- For Output: Connect the DC output cord to the RFID reader following the connection instructions provided.

See Also

Connecting the Ethernet Cable to the M12 Connector

Power Supply Mounting Pattern

The images below detail the mounting pattern for the outdoor AC-DC power supply (P/N: PWR-BGA24V90W0WW) andDC-DC power supply(P/N: PWR-BGA24V90W1WW) .

Figure 14 Outdoor AC-DC Power Supply Mounting Pattern

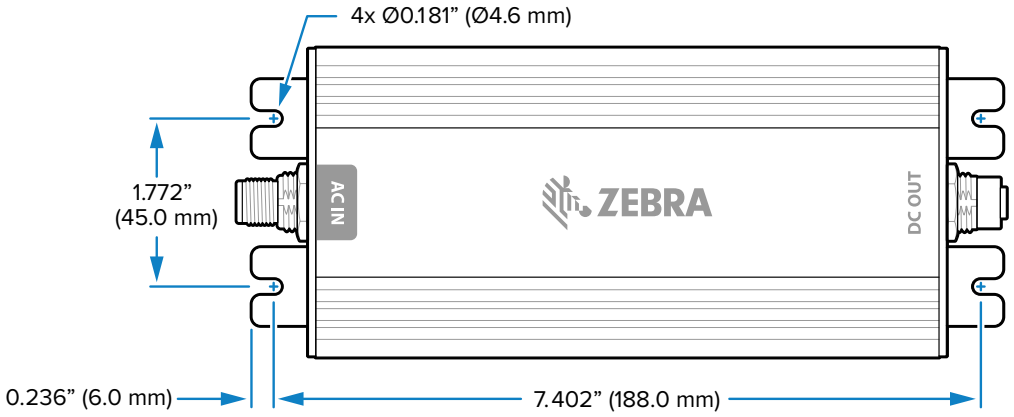
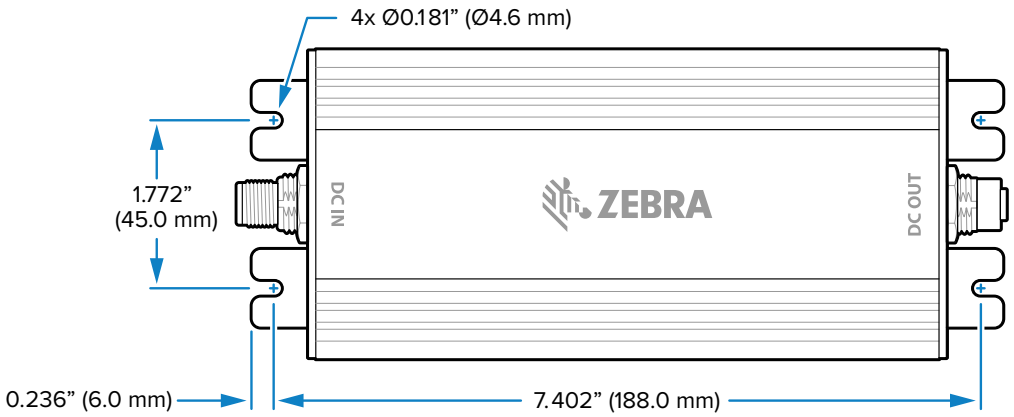


Figure 15 DC-DC Power Supply Mounting Pattern



NOTE: This does not apply to the indoor AC-DC (P/N: PWR-BGA24V78W3WW) power supply.

Cable Length Versus Voltage Drop

Table 15 Minimum Recommended Voltage at Battery Terminals

Cable Length of CBL-PWRD150-M12M00 (18 AWG x 2 DC+, DC-)	VDC
0 m (0 ft)	9.0
1.5240 m (5 ft)	9.2
3.048 m (10 ft)	9.4
4.572 m (15 ft)	9.6
6.096 m (20 ft)	9.8
7.620 m (25 ft)	10.0
9.144 m (30 ft)	10.2
10.668 m (35 ft)	10.4
12.192 m (40 ft)	10.6
13.716 m (45 ft)	10.8
15.240 m (50 ft)	11.0

Administrator Console

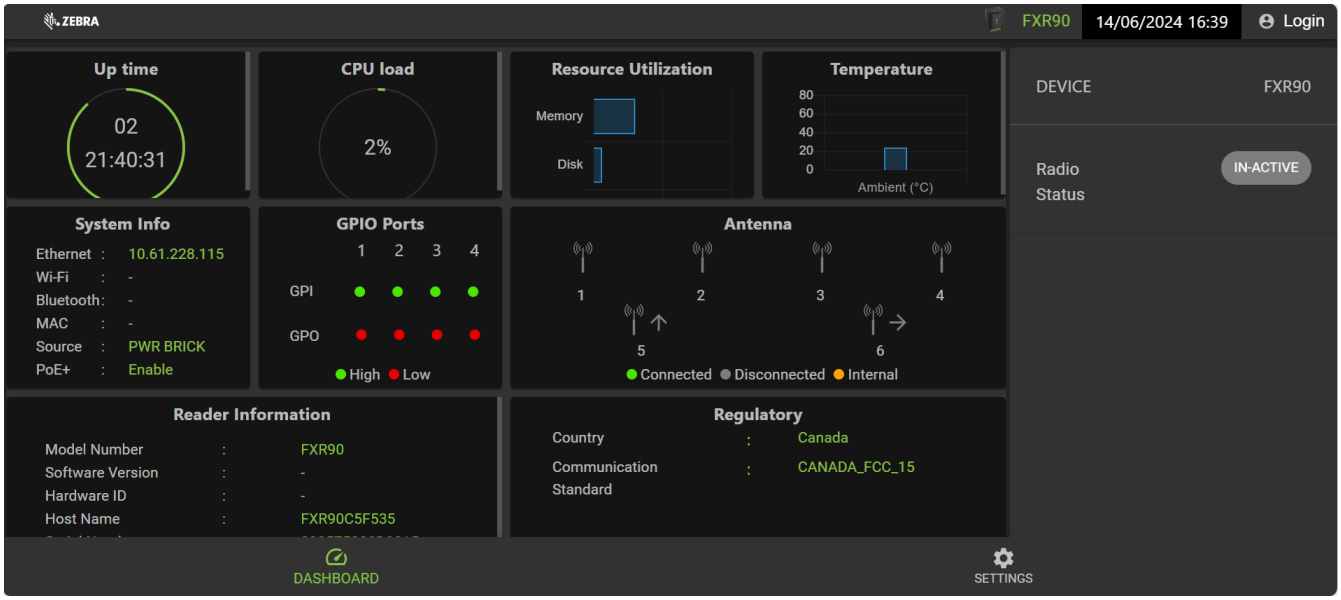
This section describes the web-based Reader Administrator Console functions and procedures. Access the Administrator Console using a web browser from a host computer and use it to manage and configure the readers.

NOTE: The screens and windows in this section may differ from actual screens and windows. The applications described may not be available on (or applicable to) all devices. Procedures are not device-specific and are intended to provide a functional overview.

Reader Administrator Console

Review the layout for the Reader Administrator Console.

Figure 16 Reader Administrator Console Home Screen



The following information is available from the home screen tiles.

- **Up Time** - Displays the amount of time since the last device reboot.
- **CPU load** - Displays a percent of resources being used by the device at a particular time.
- **Resource Utilization** - Displays memory usage and disk usage.

- **Temperature** - Displays ambient temperature in Celsius.
- **System Info** - Displays Ethernet, Wi-Fi, Bluetooth, MAC, Source, and PoE+ status.
- **GPIO Ports** - Displays port status.
- **Antenna** - Displays antenna status.
- **Reader Information** - Displays Model Number, Software version, Hardware ID, Host Name, Serial Number, Radio Firmware, and USB Port status.
- **Regulatory** - Displays Country and Communication Standard.
- **Radio Status** - Indicates the state as either active or in-active.
- **Quick View Rapid Read (UniqueTags, TotalReads, Reads/Sec)** - Displays a count of unique tags, total tag reads, and tag reads per second.

NOTE: The Quick View Rapid Read window will appear only after a user logs in as Admin. Go to Quick View Rapid Read for more information.

Auto Discovery

The reader supports WS-Discovery to readers in a subnet. The reader implements WS-Discovery conforming to RFID Reader Management Profile (RDMP) specification in ISO 24791-3. RDMP is based on an extension for Device Profile for Web Services (DPWS). The discovery mechanism is limited to subnets and does not work across subnets. The 123RFID Desktop application supports this feature and lists the discovered reader using reader host names. Because this feature is based on WS-Discovery, the readers can also be discovered on Windows computers by selecting the Network icon in a file browser.

Go to zebra.com/123rfid for more information on 123RFID Desktop.

Connecting to the Reader

Overviews different methods for connecting to the reader.

To use the Administrator Console to manage the reader, power up the reader, and connect it to an accessible network. The green power LED indicates that the reader is ready. If the green power LED is not lit, reset the reader. See Resetting the Reader.

Connect to the reader in one of two ways:

- Connecting via Host Name
- Connecting via IP Address

NOTE: See Obtaining the IP Address via Command Prompt for more information.

There are three ways to assign an IP address to the reader:

- Using DHCP on the network.
- Using Link Local Networking when DHCP Server is Not Available
- Statically assigning an IP.

Assigning the IP supports connection using the host name or IP address. Alternatively, connect the reader directly to a local computer using zero-configuration networking.

NOTE: When using Link Local networking, the readers cannot communicate with computers on different subnets or with computers that do not use automatic private IP addressing.

Connecting to the Reader via Command Prompt

This section provides command prompt summary instructions for accessing the IP address/hostname.

To obtain the reader IP address without logging into the reader, open a command window and ping the reader hostname. Go to Connecting via Host Name for detailed instructions.

Connecting via the Host Name

This section provides information and instructions for connecting the reader using the hostname.

CAUTION: Reader hostname is not guaranteed to work at all times. Its recommended use is only in networks where the probability for IP collisions is low, such as a network in which a DNS server is configured to work together with DHCP to register host names. Host name usage is not recommended in a network without strict control to prevent IP collisions, such as informal networks that use static IP configuration.

NOTE: Connect the reader to a network that supports hostname registration and lookup to ensure the network can access the reader using the hostname. For instance, some networks can register host names through DHCP. When first connecting to the reader, it is recommended to keep DHCP enabled in both the PC and the reader. Use the hostname printed on the reader label, or construct it using the reader MAC address on the reader back label. The hostname is a string with an FXR90 prefix followed by the last three MAC address octets. For example, for a MAC address of 00:15:70:CD:3B:0D, use the prefix FXR90, followed by the last three MAC address octets (CD, 3B, and 0D), for the hostname FXR90CD3B0D. Type https://FXR90CD3B0D in the browser address bar to access the reader.

1. Open a browser.

   It is recommended to use the most up-to-date version of Chrome, Firefox, Safari, or Edge.

2. Enter the hostname provided on the reader label in the browser (for example, https://fxr907cd3b0d) and press Enter.

   The Console Login window appears, and the reader is ready.

Go to Administrator Console Login to log in to the reader.

Connecting via IP Address

Follow the instructions to connect the reader to the administrator console using the IP Address.

1. Open a browser.

   Zebra recommends using the most up-to-date version of Chrome, Firefox, Safari, or Edge.

2. Enter the IP address in the browser (for example, https://157.235.88.99) and press Enter.

   The Console Login window appears and the reader is ready.

Proceed to Administrator Console Login to log in to the reader.

Using Link Local Networking when DHCP Server is Not Available

If a DHCP server is not available, the reader can use Link Local networking to automatically provide a unique network IP address. The reader can then use TCP/IP to communicate with other computers also using a Link Local networking-generated IP address.

NOTE: When using Link Local networking, the reader cannot communicate with computers on different subnets, or that do not use automatic private IP addressing. Automatic private IP addressing is enabled by default.

Use the Link Local networking procedure when the reader is connected directly to a PC. It reduces the overhead needed to configure the reader to a static IP address.

When Link Local networking executes after failing to detect a DHCP server, the reader automatically assigns an IPv4 IP address to the Ethernet interface in the form `169.254.xxx.xxx`. This IP address is predictable because it uses the last 2 bytes of the MAC address, usually represented as HEX values, to complete the IPv4 address. These values are converted to decimal format (for example, if the MAC address ends with `55:9A`, the IPv4 address assigned by the Link Local algorithm is `169.254.85.148`.

Windows-based computers support APIPA/Link Local networking by default when DHCP fails. To enable APIPA for a Windows PC, go to support.microsoft.com/ and search for APIPA.

Using Zero-Configuration Networking when DHCP Server is Not Available

If DHCP server is not available, the FXR90 readers can use zero-configuration networking to automatically provide a unique network IP address. The reader can then use TCP/IP to communicate with other computers also using a zero-configuration networking-generated IP address.

NOTE: When using zero-configuration networking, the reader cannot communicate with computers on different subnets, or that do not use automatic private IP addressing. Automatic private IP addressing is enabled by default.

When zero-configuration networking executes after failing to detect a DHCP server, the reader automatically assigns an IPv4 IP address to the Ethernet interface in the form `169.254.xxx.xxx`. This IP address is predictable because it uses the last 2 bytes of the MAC address, usually represented as HEX values, to complete the IPv4 address. These values are converted to decimal format. For example, if the MAC address ends with `55:9A`, the IPv4 address assigned by the zero-configuration algorithm is `169.254.85.148`.

Windows-based computers support APIPA/zero-configuration networking by default when DHCP fails. To enable APIPA for a Windows PC, go to support.microsoft.com/ and search for APIPA.

Administrator Console Login

Introduces the protocol to login to the administrator console.

NOTE: Use the most up-to-date version of Chrome, Firefox, Safari, or Edge. These browsers were tested and validated to work properly. Other browsers may or may not work correctly.

First Time / Start-up Login

This section provides the necessary information for first-time login to the administrator console.

When starting the reader for the first time, set the region of reader operation.

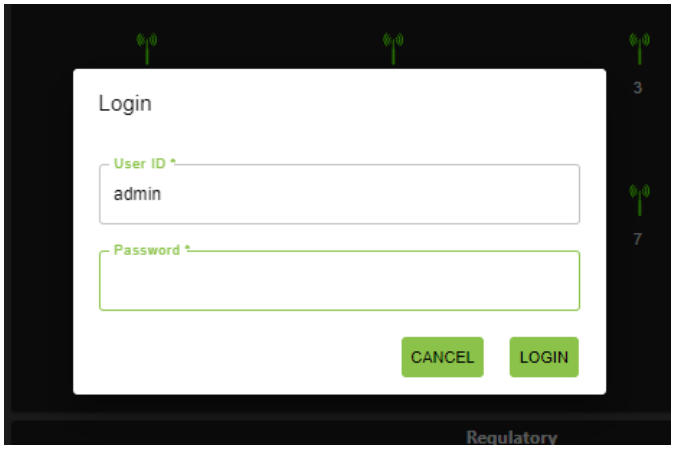
NOTE: Setting the reader to a different region is illegal.

Logging In with Default User ID and Password

This section provides instructions for default login.

The User Login window displays upon connecting to the reader with a web browser.

1. In the **User ID** field auto-populates admin. Enter change in the **Password** field.



2. Click **Login**.
3. As a first-time user, you will be prompted to change your password.

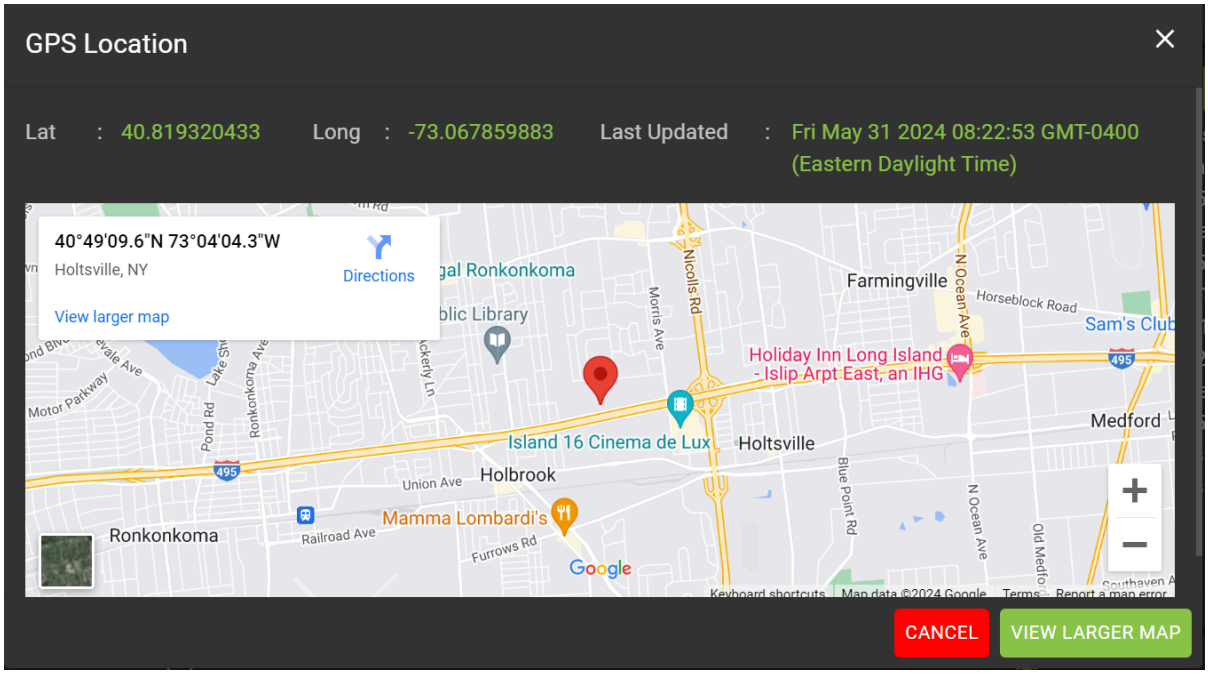
Accessing GPS

GPS functions provide information about the location of the reader.

In order to access GPS, the reader must be connected to the administrator console.

1. Click the icon in the upper right corner.

   A dialogue box displays with GPS location.



2. To expand the map, click **VIEW LARGER MAP**.

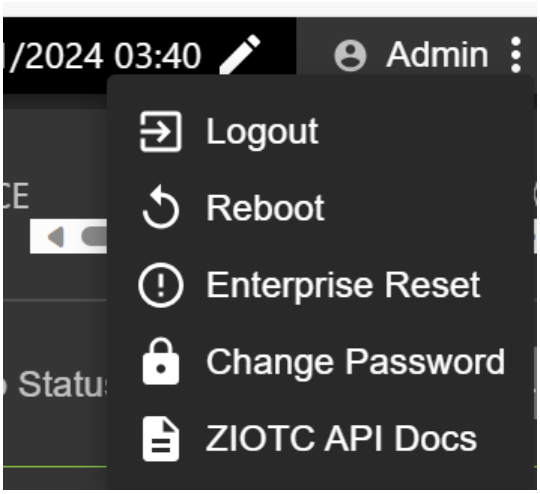
   A new tab opens with the larger map screen.

3. To close the dialogue box, click **CANCEL**.

Admin Drop-down Menu

This section describes the features accessible from the Admin Drop-down menu.

Figure 17 Admin Drop-down Menu



The Administrator Drop-down menu provides the following options:

- **Logout** - This option allows the user to log out of the reader.

- **Reboot** - This option restarts the reader.
- **Enterprise Reset** - This option returns the reader to factory settings.
- **Change Password** - This option allows the user to change the login password.
- **ZIOTC API Docs**- This option allows the user to access the ZIOTC API Documentation.

Accessing IOT-Connect API Docs

IOT-Connect API documentation (ZIOTC) provides more detailed software command procedures and can be accessed through the administrator console.

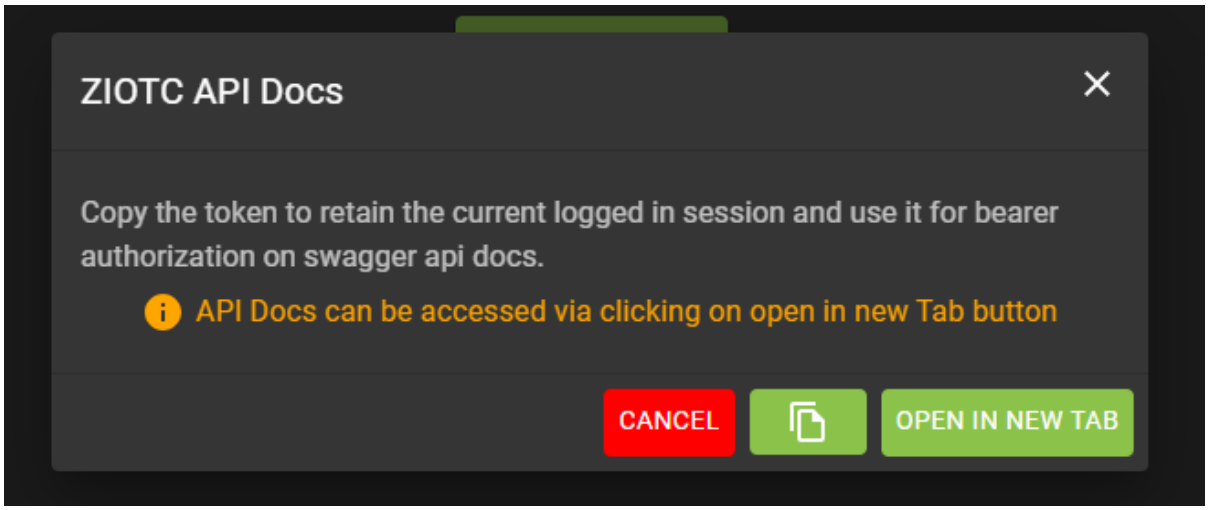
To access, the reader must be connected to the administrator console.

1. Click **Admin** in the top right portion of the administrator console.

   menu appears. Refer to Admin Drop-down Menu for details about this menu.

2. Click **ZIOTC API Docs**.

   The ZIOTC API box appears.



3. Click the paper icon in the right corner of the dialogue box to copy the token.

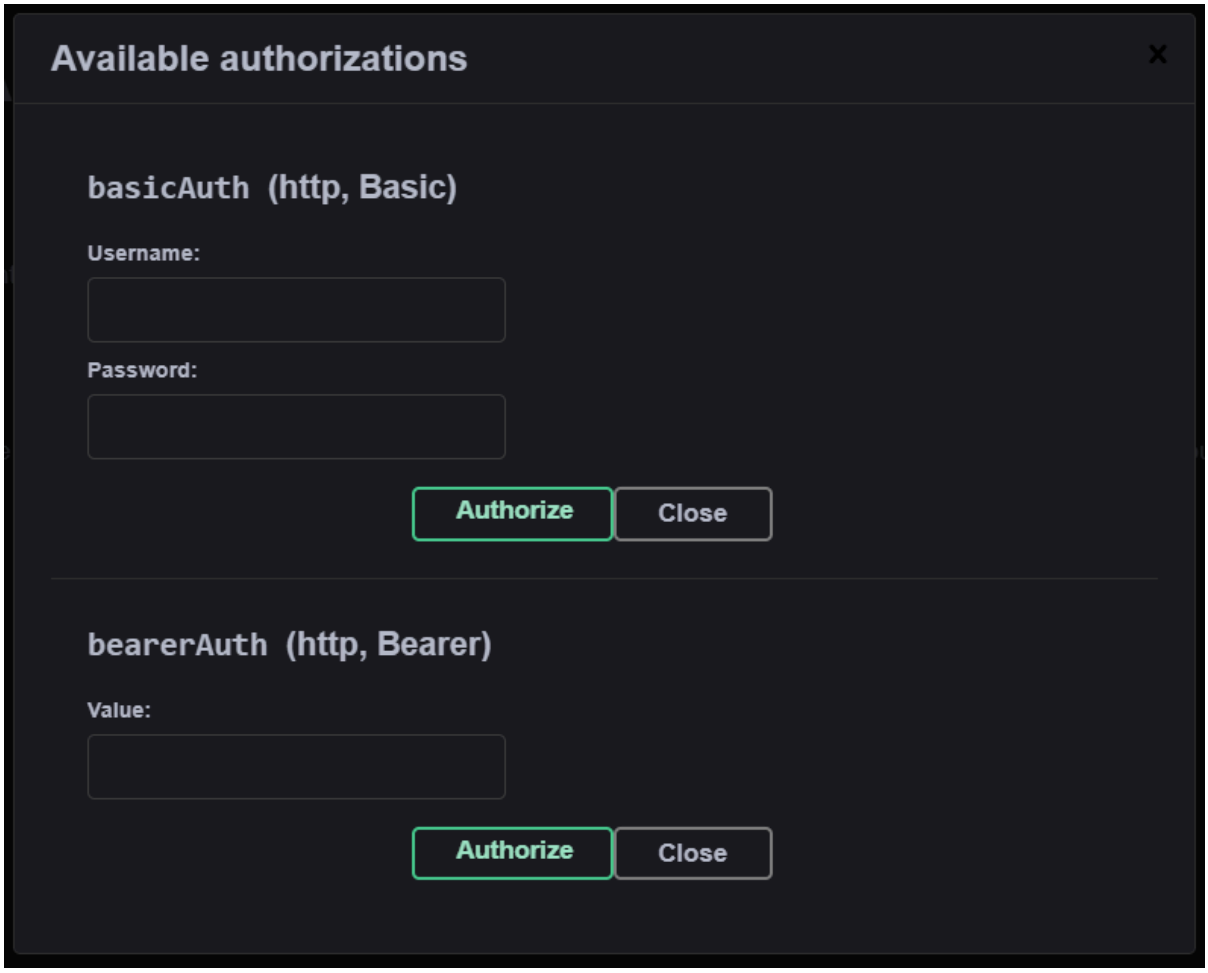
4. Click **OPEN IN NEW TAB**.

   The IoT Connector REST API Swagger page opens in a new tab.



5. Click **Authorize**.

   A dialogue box for Available authorizations displays.



6. In the box labeled **Value:** paste the token copied in Step 3.

7. Click **Authorize**.

   Asterisks display in the value field and the **Authorize** button is replaced with **Logout**.

8. Click **Close** to return to the main IoT Connector REST API page.

The reader is now connected to the IoT Connector REST API.

Resetting the Reader - Simple Reboot

Use the procedure to reboot the reader while retaining the user ID and password.

IMPORTANT: It is not recommended to hard reboot the reader by disconnecting the power. This discards all tag events and system log information.

1. Insert a paperclip into the reset hole to press and hold the reset button.

   See SIM Tray and Reset Button for a detailed location.

   a. All LEDs turn green, except the Bluetooth, which turns blue.

   b. The power LED blinks yellow.

2. Release the reset button. The total duration pressed should be less than 8 seconds.

   The LED Bootup sequence occurs. Go to Bootup LED Sequence for a detailed description.

Resetting the Reader- Factory Reset

Use the procedure to reboot the reader and return to factory configurations.

1. Insert a paperclip into the reset hole to press and hold the reset button.

   See SIM Tray and Reset Button for a detailed location.

   a. All LEDs turn green, except the Bluetooth, which turns blue.

   b. The power LED blinks yellow.

   c. The power LED blinks green five times.

2. Release the reset button. The total duration pressed should be at least 8 seconds.

   The LED Bootup sequence occurs. Go to Bootup LED Sequence for a detailed description.

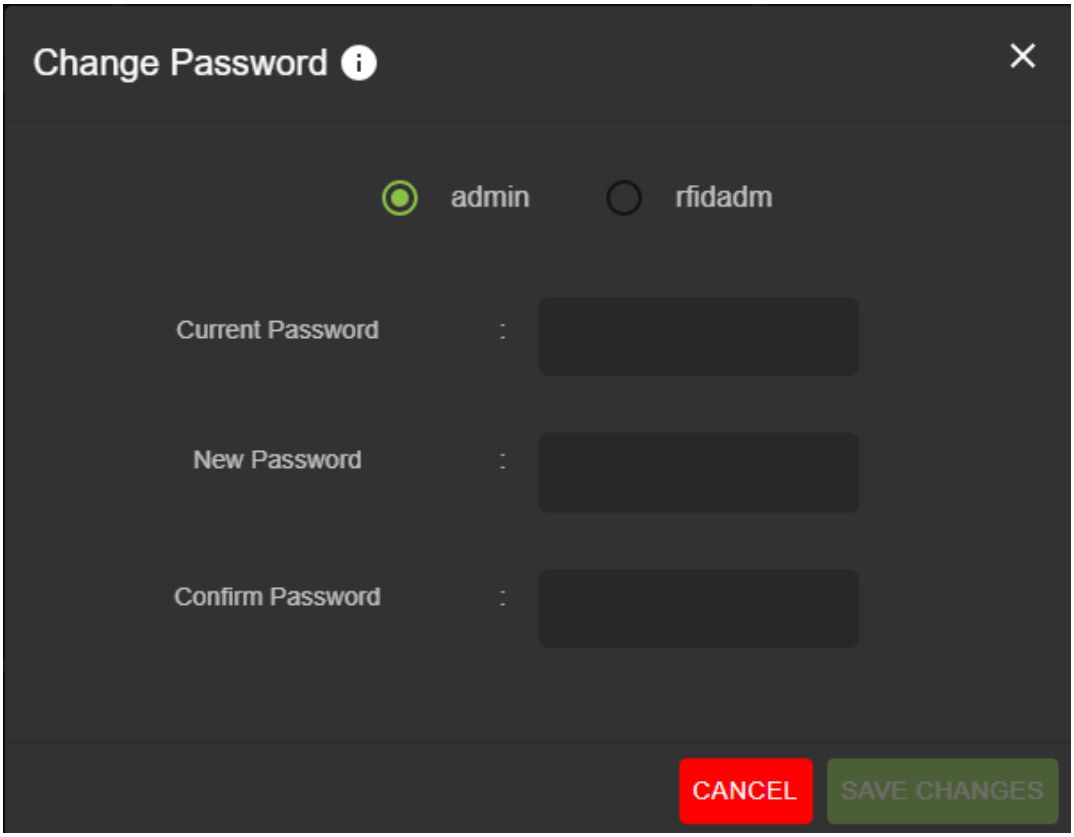
The device reboots to factory settings.

Change Password

Instructions to change the admin password for the reader administrator console.

Select **Change Password** from the admin menu to view the Change Password window.

Figure 18 Change Password Window



1. In the **Current Password** field, enter the existing password.
2. In the **New Password** field, enter the desired new password.
3. In the **Confirm Password** field, reenter the desired new password.
4. Click **Save Changes**.

Change Password - rfidadm

Follow the steps to set the rfidadm password for the reader administrator console.

Select **Change Password** from the admin menu to view the Change Password window.

1. Click the radio button labeled **rfidadm**. See Change Password Window.

   Options for rfidadm display.
2. In the **New Password** field, enter the desired new password.
3. In the **Confirm Password** field, reenter the desired new password.
4. Click **Save Changes**.

Setting the Region

For the global reader configurations, set the region of operation.

IMPORTANT: Setting the unit to a different region is illegal.

NOTE: Region configuration is not available for the readers to operate in the United States (under FCC rules). Skip this step if you are configuring the readers to be used in the US.

- **Region of Operation** - Select the region for the country of operation from drop-down list. This list includes regions with regulatory approval to use with the current board.
- **Communication Standard** - Select the communication standard from the list of standards that the chosen region supports. If a region supports only one standard, it is automatically selected.
- **Channel Hopping** - Check to select Channel Hopping. This option appears only if the chosen region of operation supports this.
- **Operating Channels** - Select a subset of channels to operate (from the list of supported channels). This option appears only if the chosen region of operation supports this.

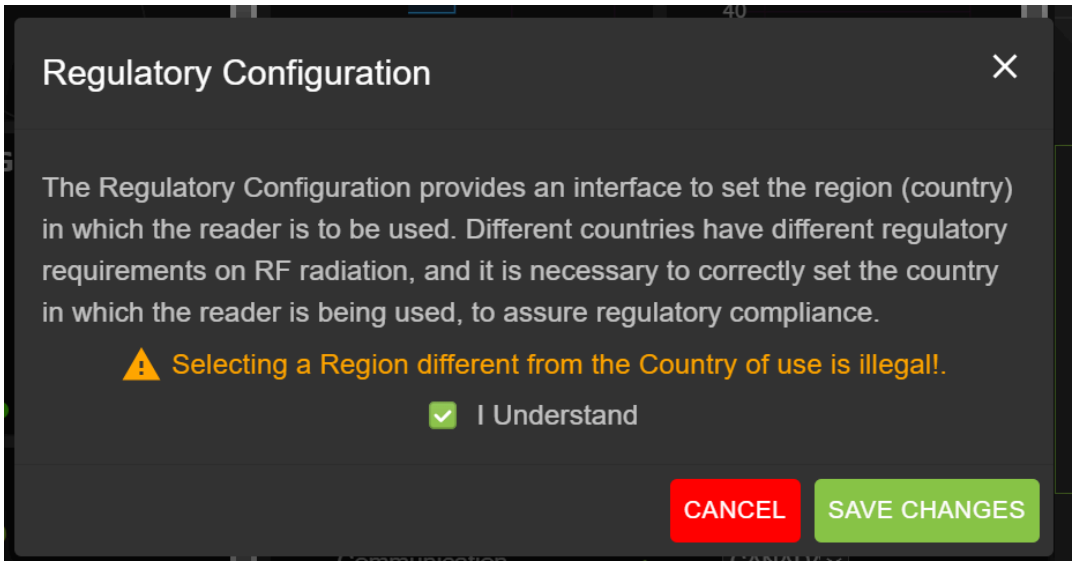
1. Click the pencil icon in the regulatory title to open the settings editor.



2. In the same window, select the Communication Standard, if applicable.
3. In the same window, select Frequency Hopping, if applicable.
4. In the same window, select the appropriate channels if applicable.

5. Click the check icon to finalize changes.

   The confirmation dialogue box appears.



6. Check the I Understand statement and click save changes.

The screen will reflect the selections.

Administrator Console Option Selections

An overview of the sections for the Administrator Console.

- **Configure Reader** - go to Configure Reader
  - **Antenna** - go to Antenna status and Antenna configuration
  - **Quick View Rapid Read Window** - go to Quick View Rapid Read Window
  - **Region** - see Configure Region
- **Change Password** - go to Change Password
- **GPIO** - go to GPIO
- **Applications** - go to Applications
- **Firmware** - go to Firmware Update
- **System Log** - go to System Log

Configure Reader

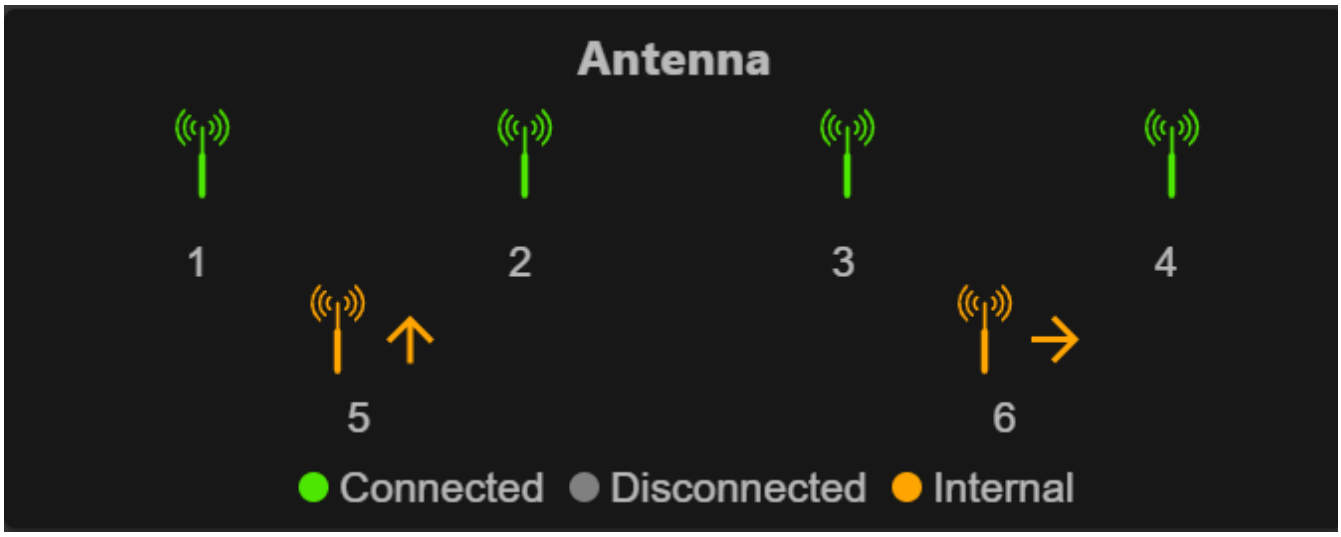
For configuration options not available in the Dashboard, click **Settings** identified by the gear icon in the bottom right of the Home screen.

For Home screen details, see Reader Administrator Console.

Antenna Status

Status buttons indicate the status of the reader's read points.

Figure 19 Antenna Status



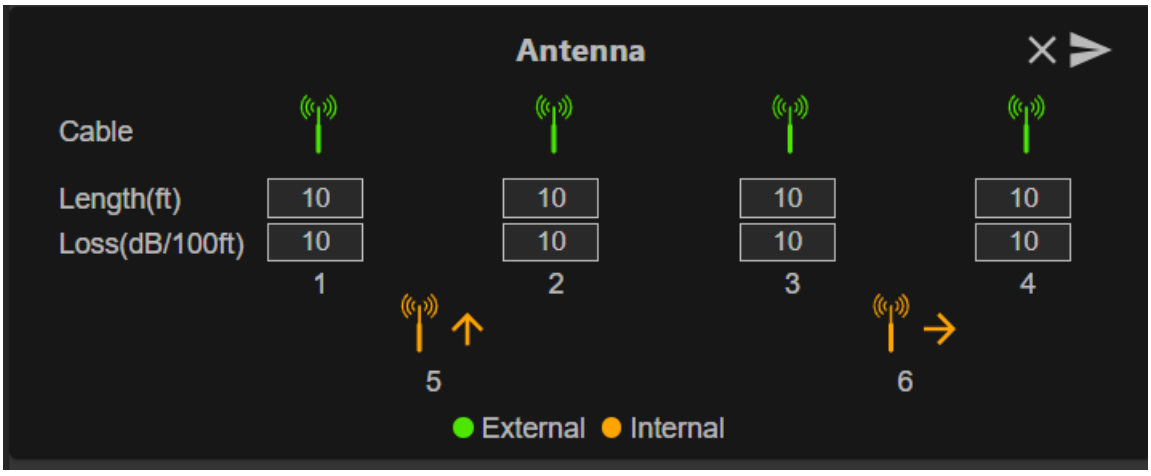
Status button color indications follow.

- **Green**: Indicates an externally connected antenna.
- **Yellow**: Indicates an internally connected antenna.
- **Gray**: Indicates that the antenna is not connected.

Antenna Configuration

Reviews the configuration settings for the Antenna.

Figure 20 Antenna Default Configuration



- **Cable loss (dB/100 ft)** - Specifies the cable loss in terms of dB per 100 feet length for the antenna cable that is used to connect this read point port to the antenna. Refer to the specification of the

antenna cable for this information. The default value is 10. Setting this and the cable length to non-zero values allows the compensating for the RF signal loss in the cable due to attenuation by specifying an appropriate increase in the transmit power for this read point. The reader uses this and the cable length value to internally calculate the cable loss. The calculated cable loss is internally added to the power level configured on the read point.

- **Cable length (ft)** - Sets the cable length in feet of the physical cable that connects the read point port to the antenna. The default cable length is 10 feet.

Set Properties by clicking the arrow button.

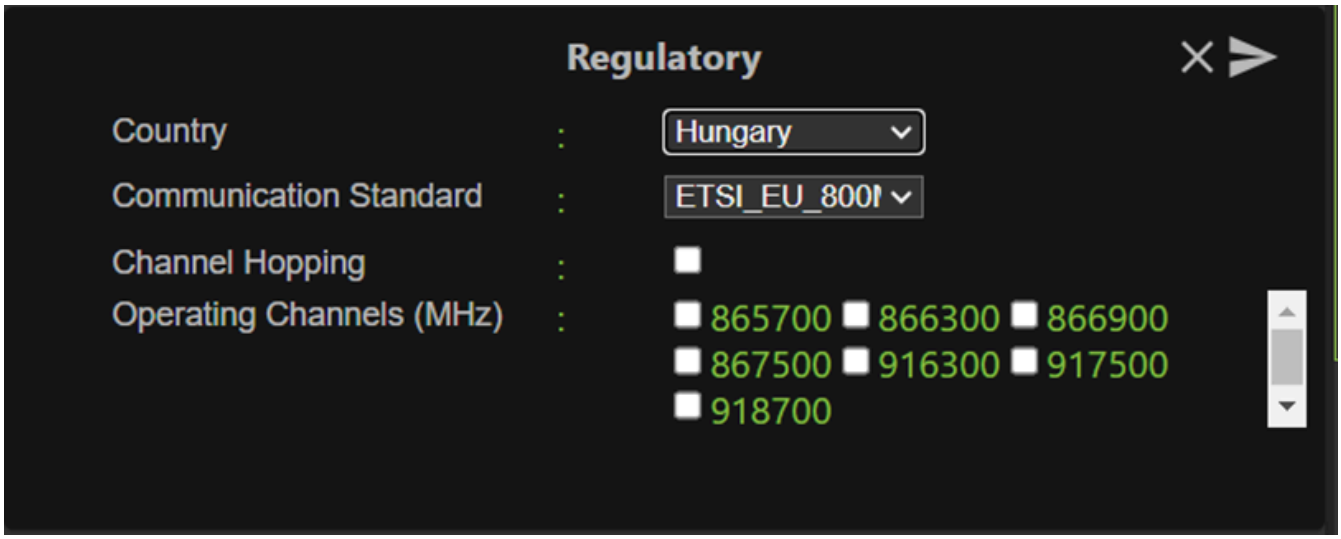
Configure Region

Different countries have different RF regulatory requirements. To ensure regulatory compliance, set the reader for specific regulatory requirements in the country of reader operation using the Regulatory tile of the administrator console.

NOTE: Region configuration is not required for readers configured to operate in the United States region (under FCC rules).

Because of the differing frequency requirements, there are several hardware versions. The software limits the list of choices on this page to those compatible with the hardware. If only one option is compatible with the hardware, that option is selected automatically.

Figure 21 Configured Region Menu



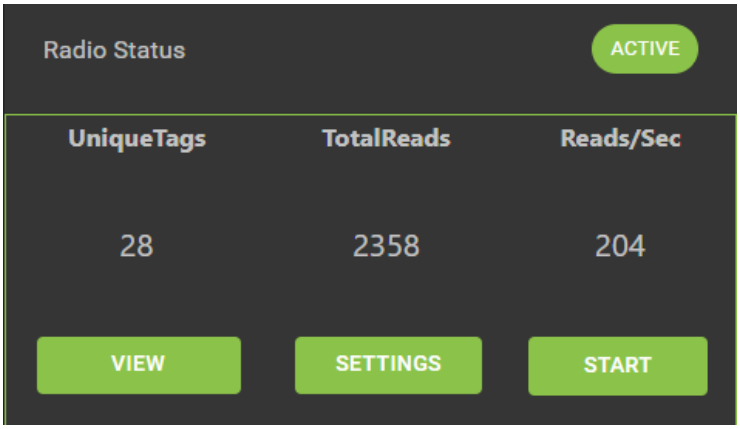
- **Region of Operation** - Select the region for the country of operation from drop-down list. This list includes regions with regulatory approval to use with the current board.
- **Communication Standard** - Select the communication standard from the list of standards that the chosen region supports. If a region supports only one standard, it is automatically selected.
- **Channel Hopping** - Check to select Channel Hopping. This option appears only if the chosen region of operation supports this.
- **Operating Channels** - Select a subset of channels to operate (from the list of supported channels). This option appears only if the chosen region of operation supports this.
- Click the arrow in the upper right to set changes.

Quick View Rapid Read

The Quick View Rapid Read window displays a count of unique tags, total tag reads, and tag reads per second. This window will appear on the Adminstrator Console home screen only after a user logs in as Admin.

- **UniqueTags** - Displays the number of unique tags.
- **TotalReads** - Displays a count of total tag reads.
- **Reads/Second** - Displays a count of tag reads per second.
- **View** - Click to open the Tag Read Summary window.
- **Settings** - Click to open the Mode Configuration window.
- **Start/Stop** - Starts and stops tag read operations.

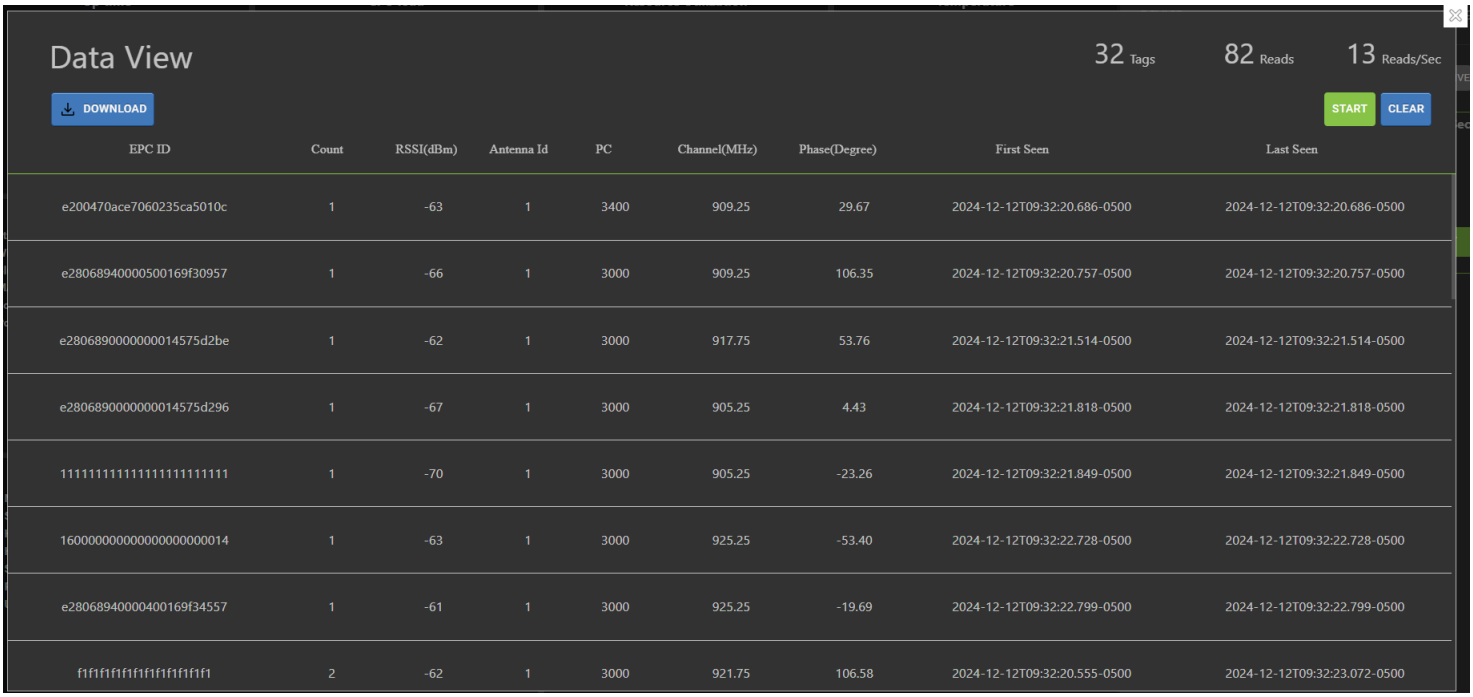
Figure 22 Quick View Rapid Read Window



Tag Read Summary

Click **View** to open the Tag Read Summary window (Data View) to view tag inventory data.

Figure 23 Tag Read Summary Window



EPC ID	Count	RSSI(dBm)	Antenna Id	PC	Channel(MHz)	Phase(Degree)	First Seen	Last Seen
e200470ace7060235ca5010c	1	-63	1	3400	909.25	29.67	2024-12-12T09:32:20.686-0500	2024-12-12T09:32:20.686-0500
e28068940000500169f30957	1	-66	1	3000	909.25	106.35	2024-12-12T09:32:20.757-0500	2024-12-12T09:32:20.757-0500
e2806890000000014575d2be	1	-62	1	3000	917.75	53.76	2024-12-12T09:32:21.514-0500	2024-12-12T09:32:21.514-0500
e2806890000000014575d296	1	-67	1	3000	905.25	4.43	2024-12-12T09:32:21.818-0500	2024-12-12T09:32:21.818-0500
11111111111111111111	1	-70	1	3000	905.25	-23.26	2024-12-12T09:32:21.849-0500	2024-12-12T09:32:21.849-0500
16000000000000000000014	1	-63	1	3000	925.25	-53.40	2024-12-12T09:32:22.728-0500	2024-12-12T09:32:22.728-0500
e28068940000400169f34557	1	-61	1	3000	925.25	-19.69	2024-12-12T09:32:22.799-0500	2024-12-12T09:32:22.799-0500
f1f1f1f1f1f1f1f1f1f1f1f1	2	-62	1	3000	921.75	106.58	2024-12-12T09:32:20.555-0500	2024-12-12T09:32:23.072-0500

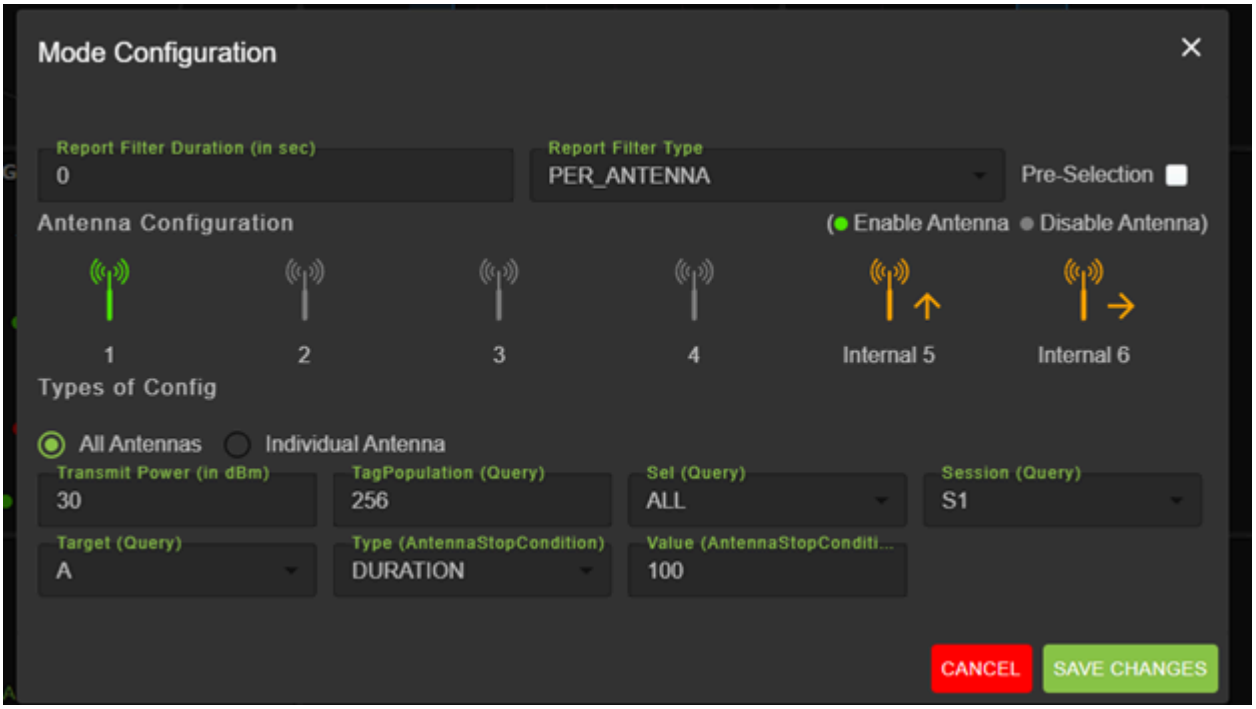
The following information is available from the Tag Read Summary window.

- **EPC ID** - Displays the Electronic Product Code tag identifier.
- **Count** - Displays the number of times a tag is read.
- **RSSI(dBm)** - Received Signal Strength Indicator. Displays the measured signal's power to the reader.
- **Antenna ID** - Indicates the chosen antenna.
- **PC** - Displays the Protocol Control bits stored within the tag's EPC memory.
- **Channel(MHz)** - Displays the specific frequency at which the system operates.
- **Phase(Degree)** - Displays, in degrees, the angled position of the wave at a specific time.
- **First Seen** - Displays data indicating when the tag was initially read.
- **Last Seen** - Displays data indicating the most recent time the tag was read.
- **Start** - Starts the inventory operation on the connected antennas. If there are no connected antennas, no tags in the field of view, or all antennas are user-disabled, the window indicates that inventory successfully started, but no tags display.
- **Stop** - Stops the ongoing inventory operation.
- **Clear** - Clears the existing tag list.
- **Download** - Downloads the current tag reads to a .csv file.

Mode Configuration

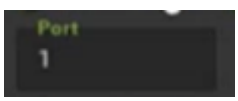
Click **Settings** to open the Mode Configuration window to configure RFID radio settings such as Antenna Power, Mode, Filter, etc.

Figure 24 Mode Configuration Window



The following information is available from the Mode Configuration window.

- **Report Filter Duration (in sec)** - Report tag for every configured second.
- **Report Filter Type**
  - **PER_ANTENNA** - Report tag once for every configured second in each antenna.
  - **RADIO_WIDE** - Report tag once for every configured second for all the antennas.
- **Pre-Selection Checkbox** - Cellular Band Filter. This filter is used for external non-RFID noise cancelation.
- **Antenna Configuration** - Displays the number of internal and external antennas connected.
- **Enable/Disable Antenna** - Indicates whether an antenna is enabled or disabled.
- **All Antennas/Individual Antenna** - This setting allows you to choose between selecting all antennas at once or individually, allowing you to configure them as a group or each one separately.
- **Port** - When an individual antenna is selected, this option appears allowing you to assign the antenna to a specific antenna port.



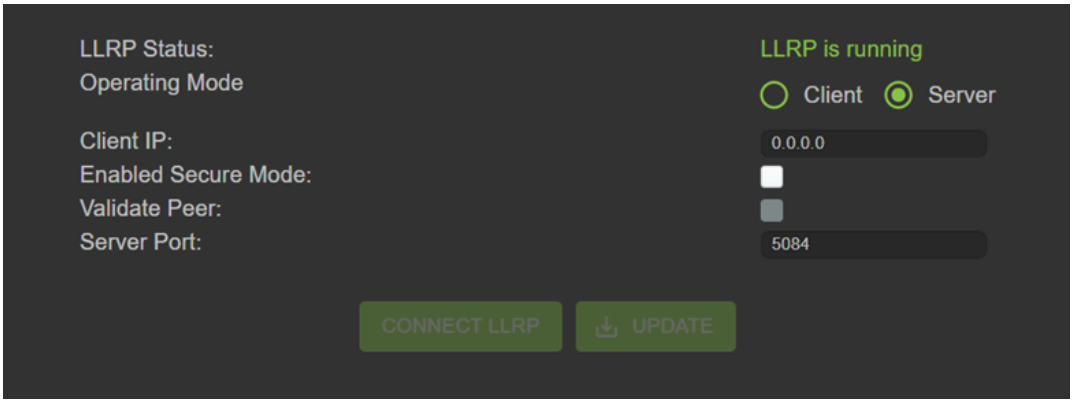
- **Transmit Power (in dBm)** - Allows you to set the different transmission power levels.
- **TagPopulation (Query)** - Sets the number of slots in the inventory round.

- **Sel (Query)** - Chooses which Tags respond to the Query
  - **All** - All tags
  - **SL** - Asserted tags
  - **NOT** - De-asserted tags
- **Session (Query)**
  - **S0** - Session 0
  - **S1** - Session 1
  - **S2** - Session 2
  - **S3** - Session 3
- **Target (Query)** - Selects whether tags whose inventoried flag is A or B
  - **A** - Tag state A
  - **B** - Tag state B
  - **AB** - Both Tag State A and B
- **Type (AntennaStopCondition)** - Choose a setting from the dropdown menu that stops the antenna from reading.
  - **DURATION** - Inventory will switch to a different antenna after 'n' Milliseconds.
  - **INVENTORY_COUNT** - Inventory will switch to a different antenna after 'n' number of Inventory attempts.
  - **SINGLE_INVENTORY_LIMITED_DURATION** - Inventory will switch to a different antenna after either ‘n’ Milliseconds or one round, whichever condition is met first.
- **Value (AntennaStopCondition)** - Values to be set for Selected AntennaStopCondition Type

LLRP Configuration

This section supports setting the LLRP (Low-Level Reader Protocol) configuration on the reader.

Figure 25 LLRP Configuration Window



The following information is available from the LLRP Configuration window.

- **General Configuration**
  - **LLRP Status** - Displays the current state of the LLRP server on the reader, indicating whether LLRP is running or not.
  - **Operation Mode** - Allows the user to choose the LLRP mode on the reader. The mode can be set to either “Server” or “Client”.
- **Configuration Options in "Server" Mode**
  - **Client IP** - Displays the IP address of the currently connected LLRP client. If there is no LLRP client connection, this will be 0.0.0.0.
  - **Server Port** - Allows configuring the LLRP listening port on the reader. The default port is 5084.
  - **Connect Status (Connect LLRP/Disconnect LLRP)** - Indicates whether a client is connected. This button will be grayed out if there is no client connected. If an LLRP client is connected to the reader, the button will be enabled, allowing the user to disconnect the client by clicking it.
- **Configuration Options in "Client" Mode**
  - **Server IP** - Allows configuring the IP address of the server to connect to.
  - **Server Port** - Allows configuring the LLRP host port to connect to. The default port is 5084.
  - **Connect Status (Connect LLRP/Disconnect LLRP)** - Indicates whether the reader is connected to the LLRP host. This button toggles between “Connect LLRP” and “Disconnect LLRP”. Clicking on “Connect LLRP” will initiate an LLRP connection to the host server.
- **Configuration Options in “Secure” Mode**
  - **Security Mode** - Specifies whether LLRP is configured to communicate in secure or unsecured mode. The LLRP port will switch to 5085 by default if “Enable Secure Mode” is checked. The port value can be overridden by users.
  - **Validate Peer** - Specifies whether validation of the peer against a certificate issued by the same certification authority is required. If the user selects the option to validate the peer, the secure LLRP service on the reader will allow connections only for valid secure peer entities whose certificates are issued by the same certification authority as the reader’s certificate. By default, the reader comes with self-signed certificates, and the option to enable peer certificate-based validation is disabled by default.

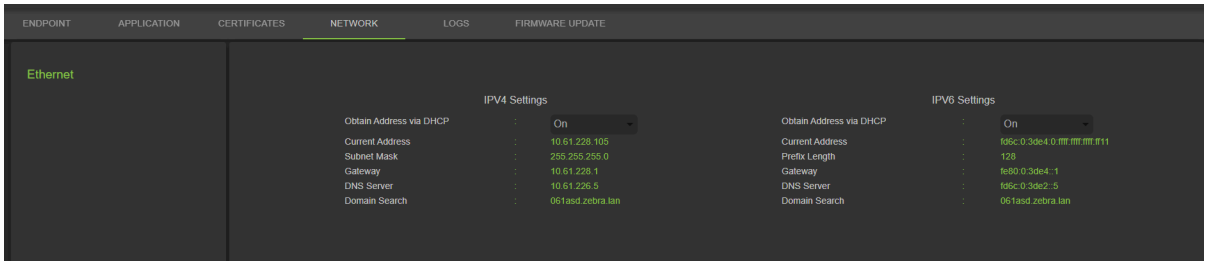
Network Settings

Click the gear icon to open Settings, then click the Network tab. This window has tabs for Ethernet, Wi-Fi, and Bluetooth. Ethernet has options for IPv4 and IPv6. Bluetooth is only IPv4.

Configure Network Settings - Ethernet Tab

This section provides details about the configuration options for Ethernet connection.

Figure 26 Configure Network Settings- Ethernet Tab



Ethernet IPv4

The section describes Ethernet IPv4 connection with the reader.

- **Obtain IPv4 Address via DHCP** - The reader supports both automatic TCP/IPv4 configuration via DHCP and manual configuration. The DHCP button turns DHCP on and off.

NOTE: If **Obtain Address Via DHCP** is turned on, this window displays actual current values of the reader's IPv4 address, subnet mask, default gateway, DNS server, and domain name search. Because these are obtained from the DHCP server, they cannot be changed manually. If DHCP is turned off, you can set the following values for these fields.

- **Current IPv4 Address** - IP address (in dotted notation) at which the reader is assigned.
- **IPv4 Subnet Mask** - Subnet mask (in dotted notation) appropriate for the network in which the reader resides.
- **IPv4 Default Gateway** - Default gateway (in dotted notation) appropriate for the network in which the reader resides.
- **IPv4 DNS Server** - DNS server (in dotted notation) appropriate for the network in which the reader resides.
- **Domain Name Search** - The domain name for which a reader is assigned.

NOTE: You must select the arrow button to update the network configuration. If saving changes is unsuccessful, the system indicates the problem and allows correcting it by repeating the operation. DHCP and IP address updates are immediately applied.

Ethernet IPv6

The section describes the Ethernet IPv6 connection with the reader.

- **Obtain IPv6 Address via DHCP** - The reader supports both automatic TCP/IPv6 configuration via DHCP and manual configuration. The DHCP button turns DHCP on and off.

NOTE: If **Obtain Address via DHCP** is turned on, this window displays the current values of the reader's IPv6 address, subnet mask, default gateway, DNS server, and domain name search. Because these are obtained from the DHCP server, they cannot be changed manually. If DHCP is turned off, you can set the following values for these fields.

- **Current IPv6 Address** - IP address (in colon notation) at which the reader is assigned.
- **Prefix Length** - Prefix length appropriate for the reader's network.
- **IPv6 Default Gateway** - Default gateway (in colon notation) appropriate for the network in which the reader resides.
- **IPv6 DNS Server** - DNS server (in colon notation) appropriate for the network in which the reader resides.
- **Domain Name Search** - The domain name assigned to the reader.

NOTE: You must select the arrow button to update the network configuration. If saving changes is unsuccessful, the system indicates the problem and allows correcting it by repeating the operation. DHCP and IP address updates apply immediately.

802.1x Configuration

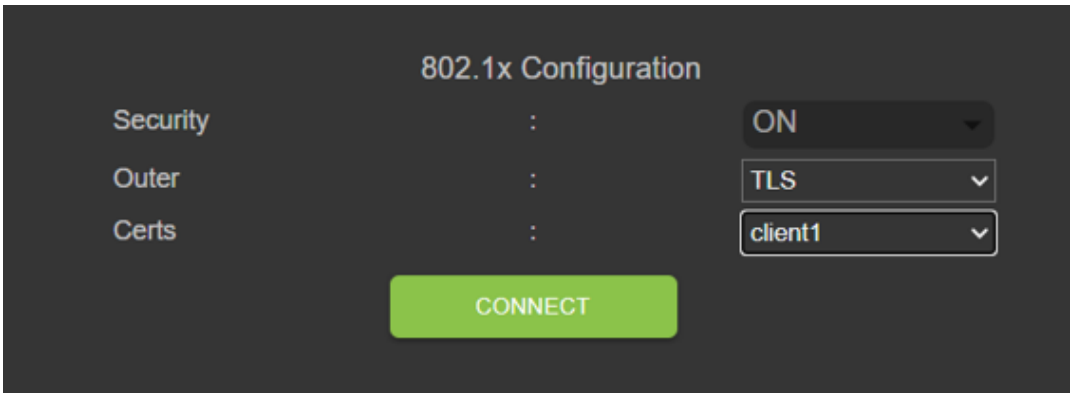
The section describes the Ethernet 802.1x connection of the reader for a secured network.

NOTE: For secured network access on the reader, authentication/authorization is fulfilled by the remote Radius server. Dynamically IPv4/IPv6 address(es) are obtained on successful authentication. Connection to secured network and user must select inner/outer authentication. Following are inner/outer authentication combinations.

802.1x - TLS Authentication

This section shows settings for outer authentication as TLS; there is no inner authentication option. A client-type installed certificate is required.

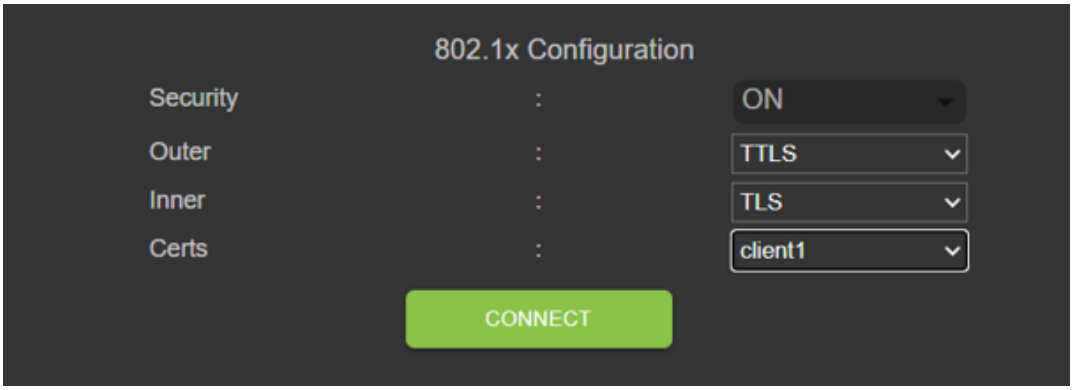
Figure 27 802.1x Configuration - TLS



802.1x - TTLS/TLS Authentication

This section shows settings for outer authentication as TTLS and inner authentication as TLS. A client-type installed certificate is required.

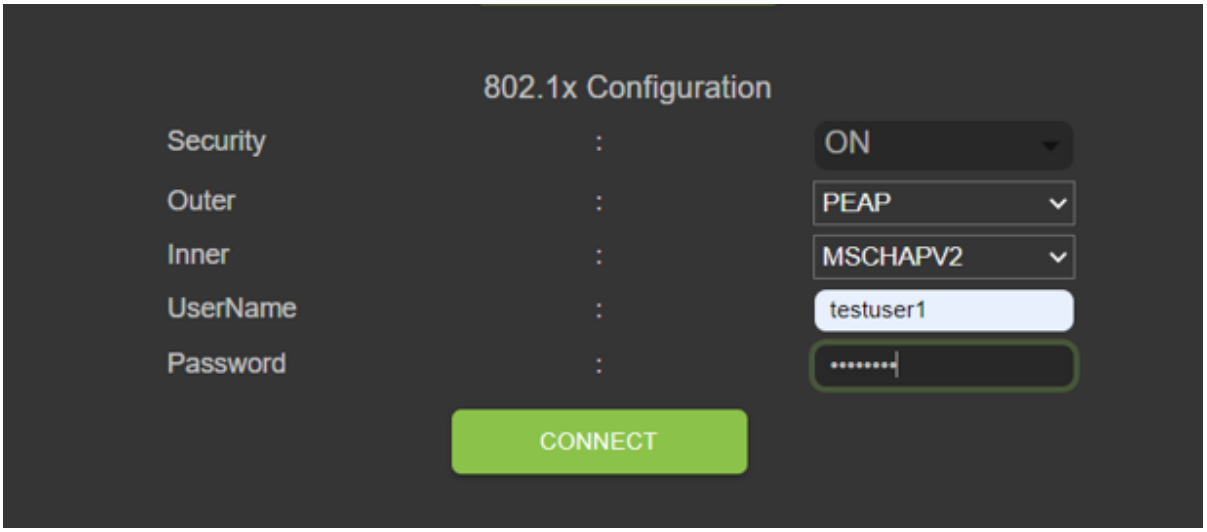
Figure 28 802.1x Configuration - TTLS/TLS



802.1x - PEAP/MSCHAPV2

This section shows settings where outer authentication is PEAP and inner authentication is MSCHAPV2. User name and password are required.

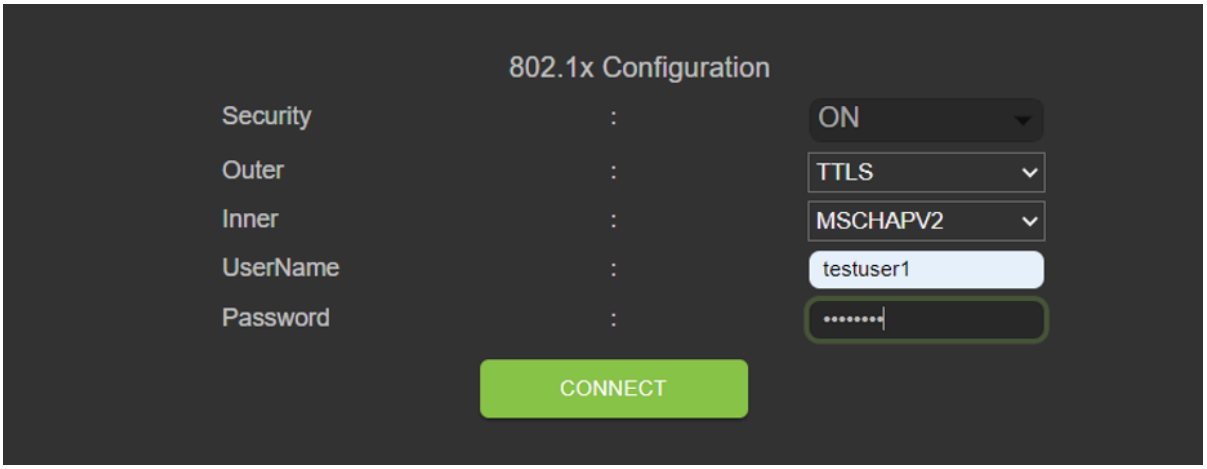
Figure 29 802.1x Configuration - PEAP/MSCHAPV2



802.1x - TTLS/MSCHAPV2

This section shows settings where outer authentication is TTLS and inner authentication is MSCHAPV2. User name and password are required.

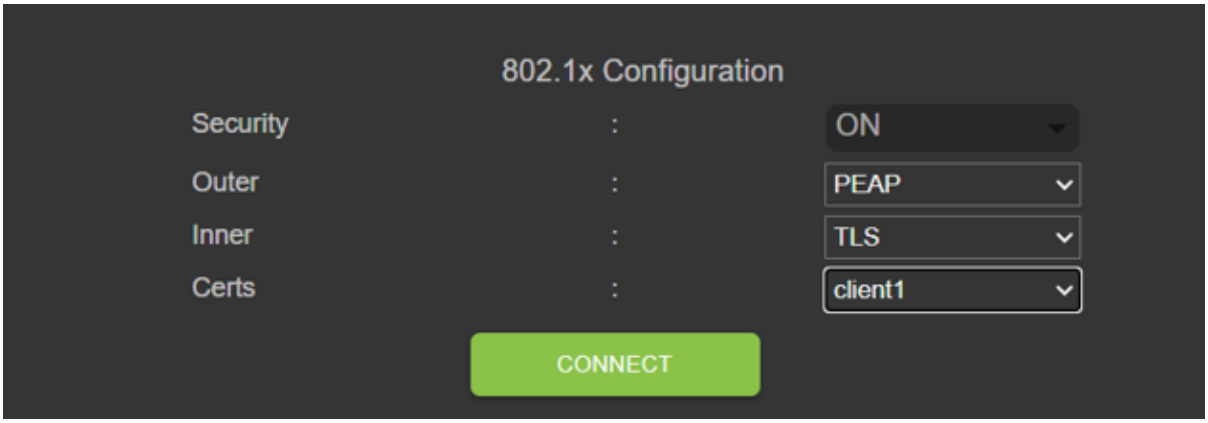
Figure 30 802.1x configuration - TTLS/MSCHAPV2



802.1x - PEAP/TLS

This section shows settings where outer authentication is PEAP and inner authentication is TLS. User name and password are required.

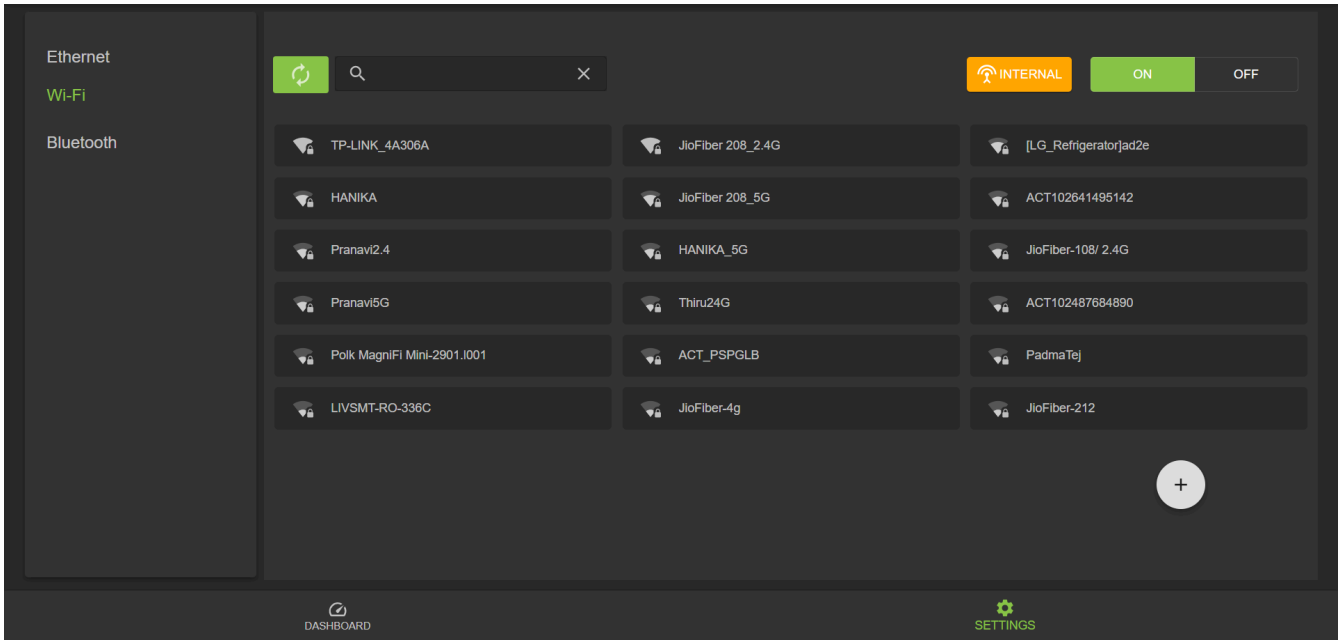
Figure 31 802.1x Configuration - PEAP/TLS



Wi-Fi Configurations

The console acts as a Wi-Fi client that can connect to available Wi-Fi networks. SSID names are listed for available networks on the Wi-Fi default page. Each SSID can have different configurations available for security.

Figure 32 Wi-Fi Default Page



Connecting to the WPA2 Personal

To connect to the network:

1. Click the SSID name from the available list for the network configured with WPA2 security.
2. In the dialog box, enter the passkey.
3. Click **Connect**.

Figure 33 WPA2 PSK Configuration

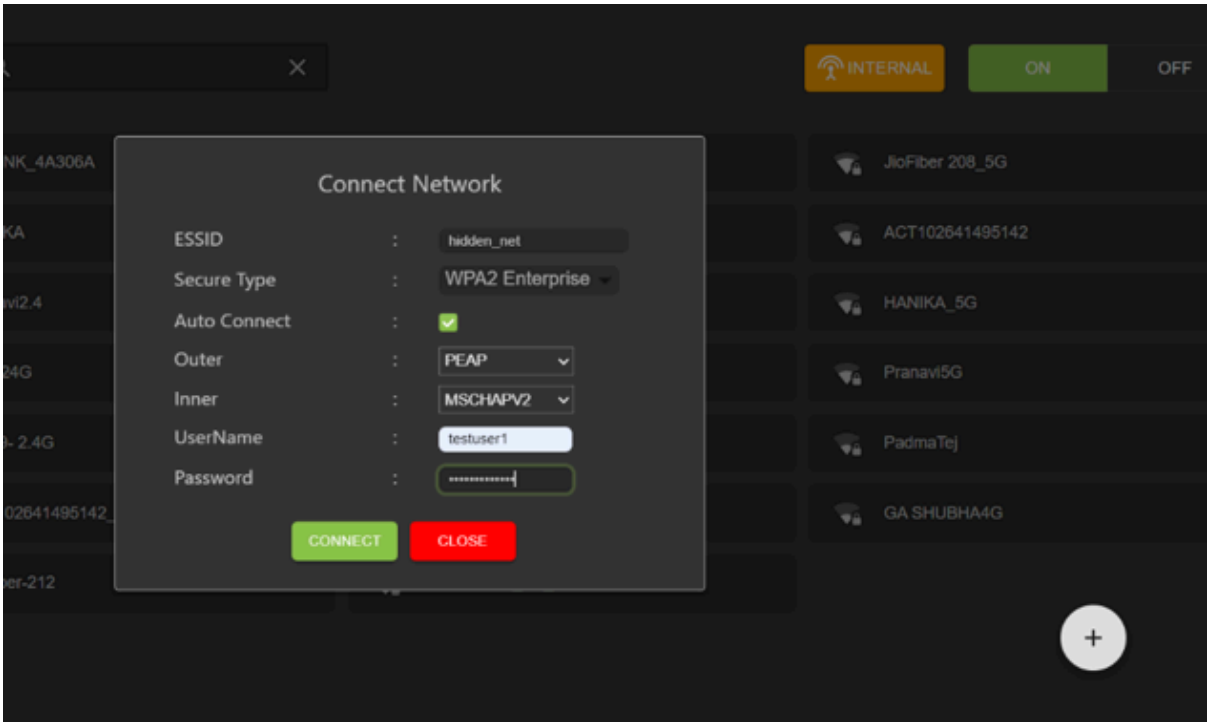


Connecting to Hidden WiFi Network

This explains how to connect to a hidden network.

NOTE: The reader supports connection to an access point based on OWE (Opportunistic Wireless Encryption). Connecting to an access point of unsecured open network/WPA is denied. Dynamically, IPv4/IPv6 addresses are obtained after a successful connection to an access point.

Figure 34 Connect Network Dialogue Box



1. From the Wifi settings tab, click the plus button in the lower corner.

   The Connect Network dialogue box will display.

2. Enter the ESSID and applicable security information.
3. Click **Connect**.

WPA2 Enterprise Configurations

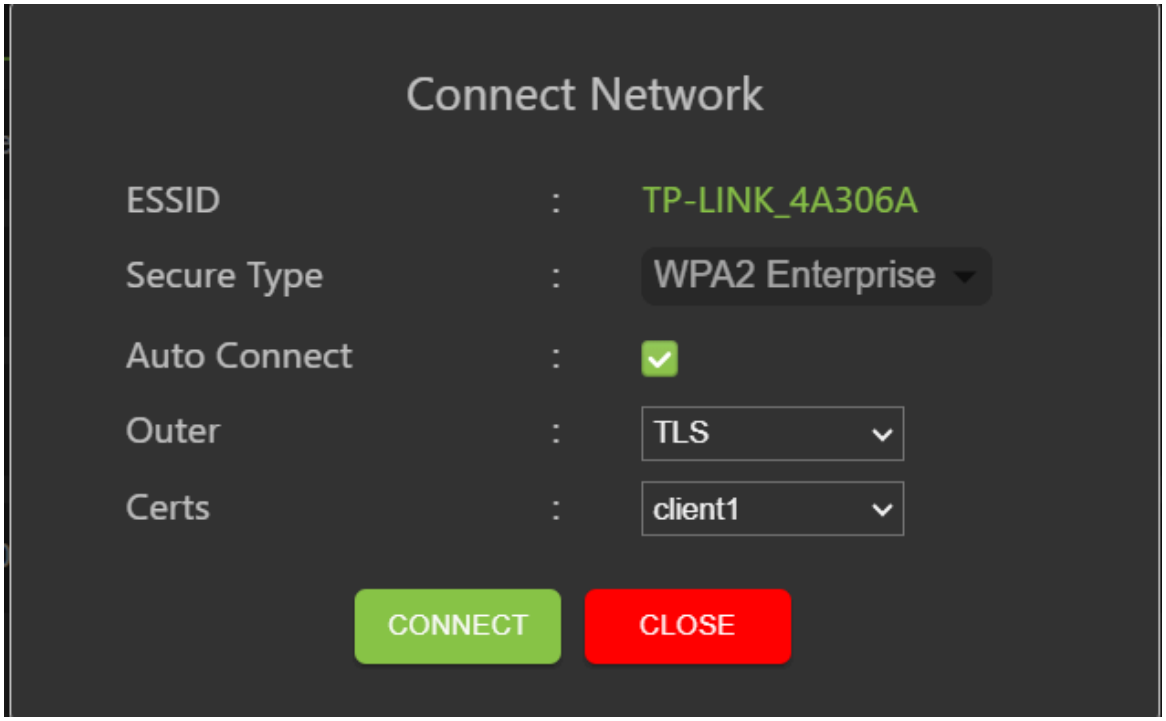
Connection to access point with SSID and user-selected inner/outer authentication. Following are inner/outer authentication combinations.

NOTE: WPA3 Enterprise authentication combinations are the same as those shown for WPA2 Enterprise connections.

TLS

With outer authentication as TLS, there is no inner authentication option. Client-type installed certificate is required

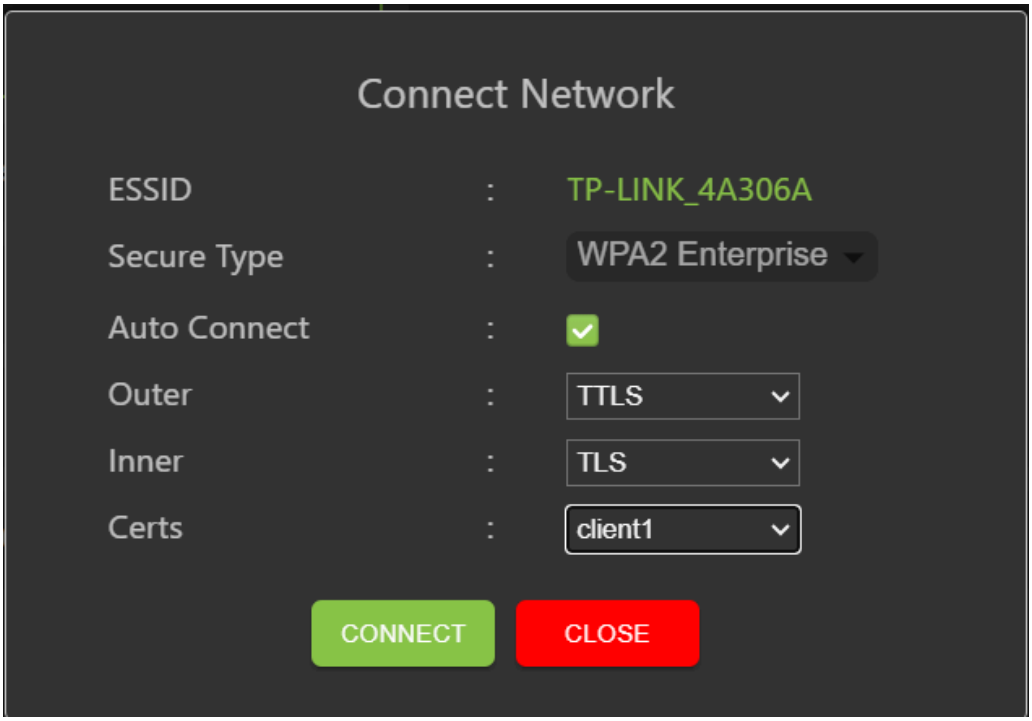
Figure 35 WPA2 Enterprise TLS



TTLS/TLS

When outer authentication is TTLS and inner authentication is TLS, Client type installed certificate is required.

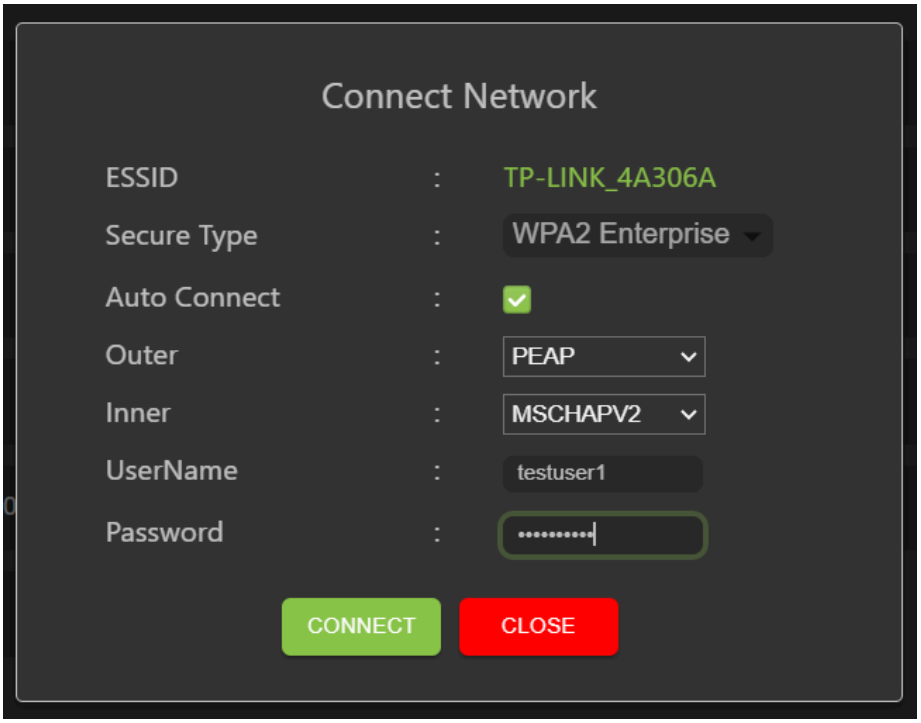
Figure 36 TTLS Authentication



PEAP/MSCHAPV2

When outer authentication is PEAP and inner authentication is MSCHAPV2, user name, and password are required.

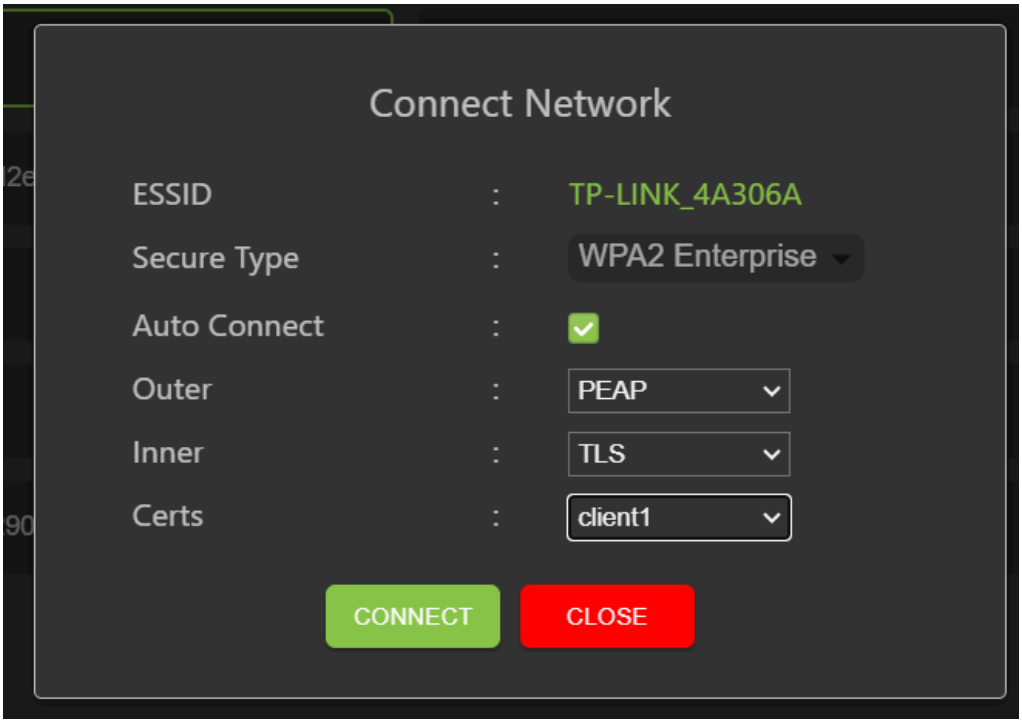
Figure 37 Outer Authentication: PEAP Inner Authentication: MSCHAPV2



PEAP/TLS

When outer authentication is PEAP and inner authentication is TLS, a Client type installed certificate is required.

Figure 38 PEAP Authentication



WPA3 Personal

Connect to access point with SSID and user-supplied passkey.

Figure 39 WPA3 Personal

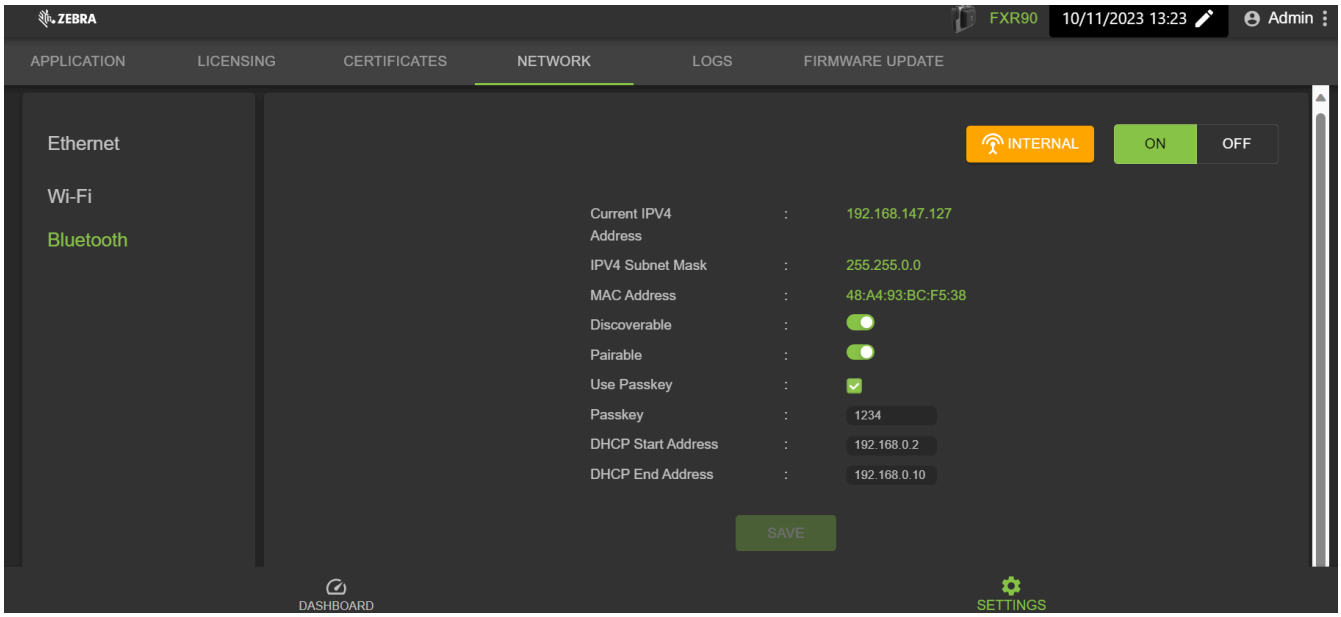


NOTE: Use the "Auto Connect" option to connect automatically to stored SSID when the network is disconnected and to connect on boot.

Configure Network Settings - Bluetooth Tab

This section reviews the configuration settings for Bluetooth in the reader administrator console.

Figure 40 Configure Network Settings - Bluetooth Tab



The reader supports only automatic IP configuration of the Bluetooth interface.

Because these are automatically configured for a reader, they cannot be changed manually.

- **Current IPV4 Address** - Displays the IPV4 Address of the reader and is set automatically.
- **IPV4 Subnet Mask** - Displays the IPV4 Subnet mask address of the reader and is set automatically.
- **MAC Address** - Displays the MAC Address of the reader hardware and is set automatically.
- **Discoverable** - Select whether other Bluetooth-enabled devices see the reader on discovery.
- **Pairable** - Select whether any Bluetooth-enabled device can pair with reader.
- **Use Passkey** - Enable this option to mandate the connecting device to supply a pre-determined passkey to use for authentication while pairing.
- **Passkey** - The passkey to use for authentication.
- **DHCP start address** - The starting address of the DHCP IP range out of which an IP is assigned to the connecting device.
- **DHCP end address** - The end address of the DHCP IP range out of which an IP is assigned to the connecting device.

NOTE: The DHCP IP range specified using the DHCP start address and DHCP end address options determines the client's IP connecting to the reader. The first two octets of the IP address of the reader Bluetooth interface are fixed to 192.168, and the last two octets are the decimal equivalent to the last two octets of the reader's ethernet MAC address.

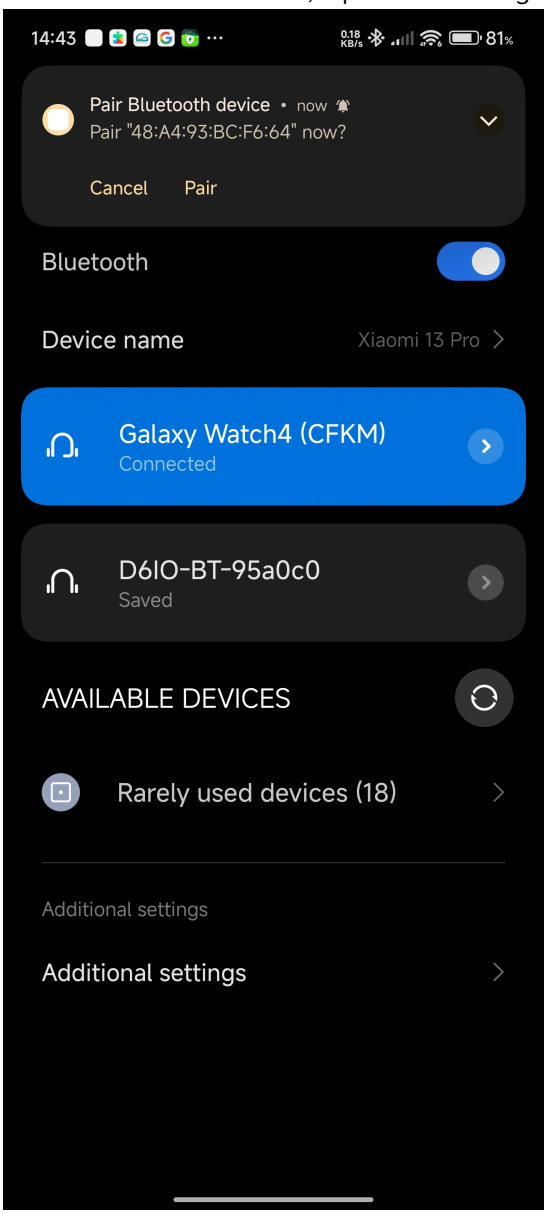
Bluetooth Connection

Bluetooth can connect Android, Windows, and iOS mobile devices to the reader administrator console in the browser.

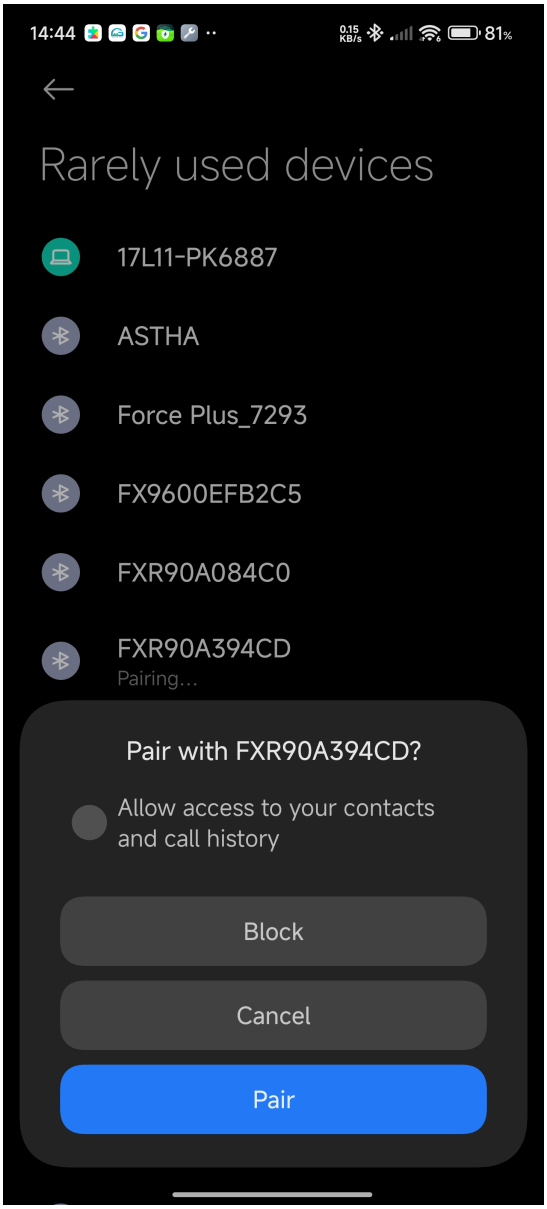
Connecting via an Android Device

This section provides information about Bluetooth connection to an Android device with an NFC tag.

1. To connect:
   - For a first-time connection, tap the device tag near the reader.

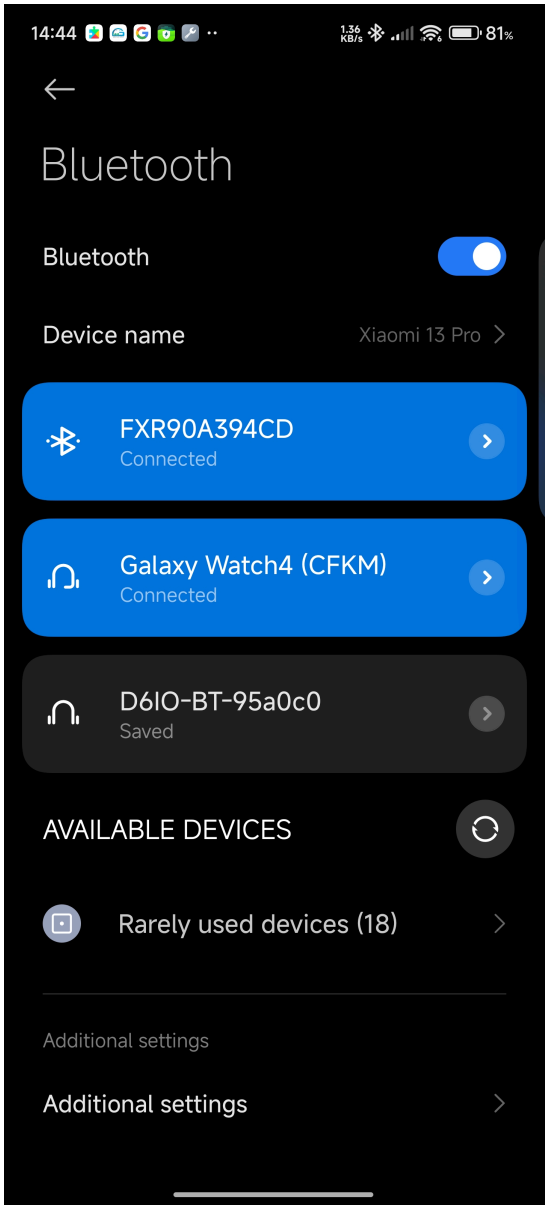


   - For a previously connected device, click the device title in the available devices menu.

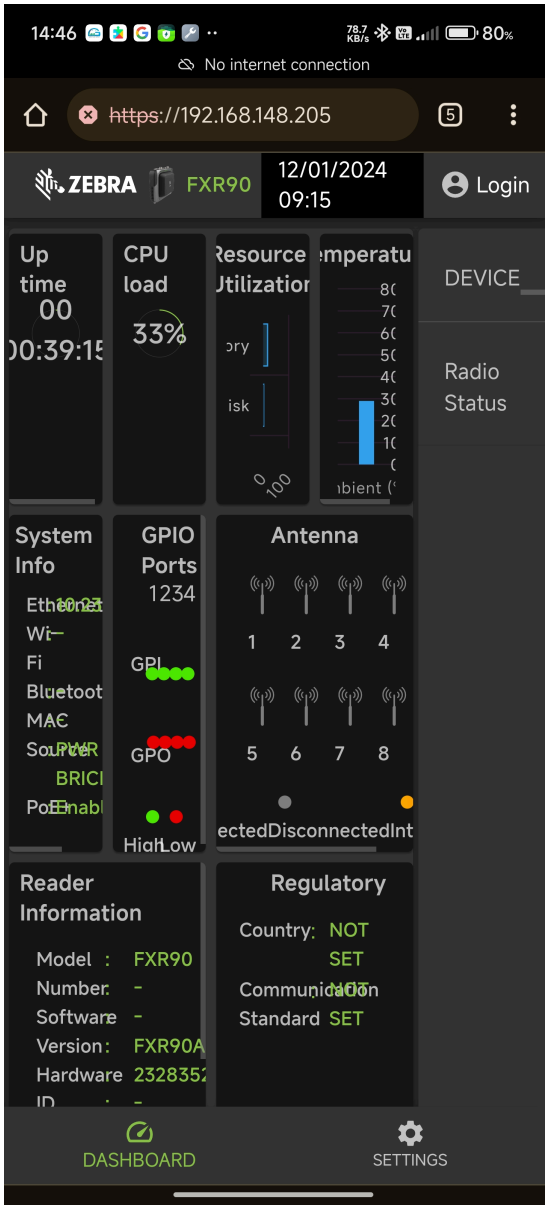


A dialog box will display with an NFC pair prompt.

2. Follow the pairing instructions on the device screen.



3. Access the reader administrator console using the Bluetooth IP address.



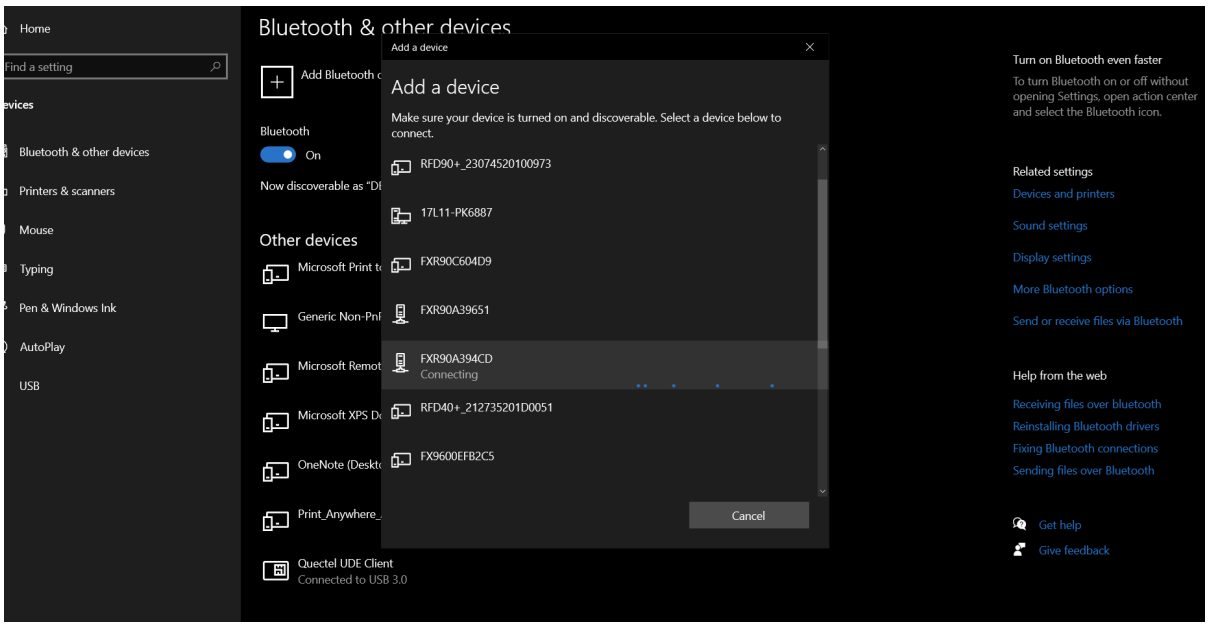
Connect via Windows Device

This section provides information about Bluetooth connection to a Windows device.

1. From the Bluetooth and other devices page, click **Add A Device**.

   A dialogue box displays.

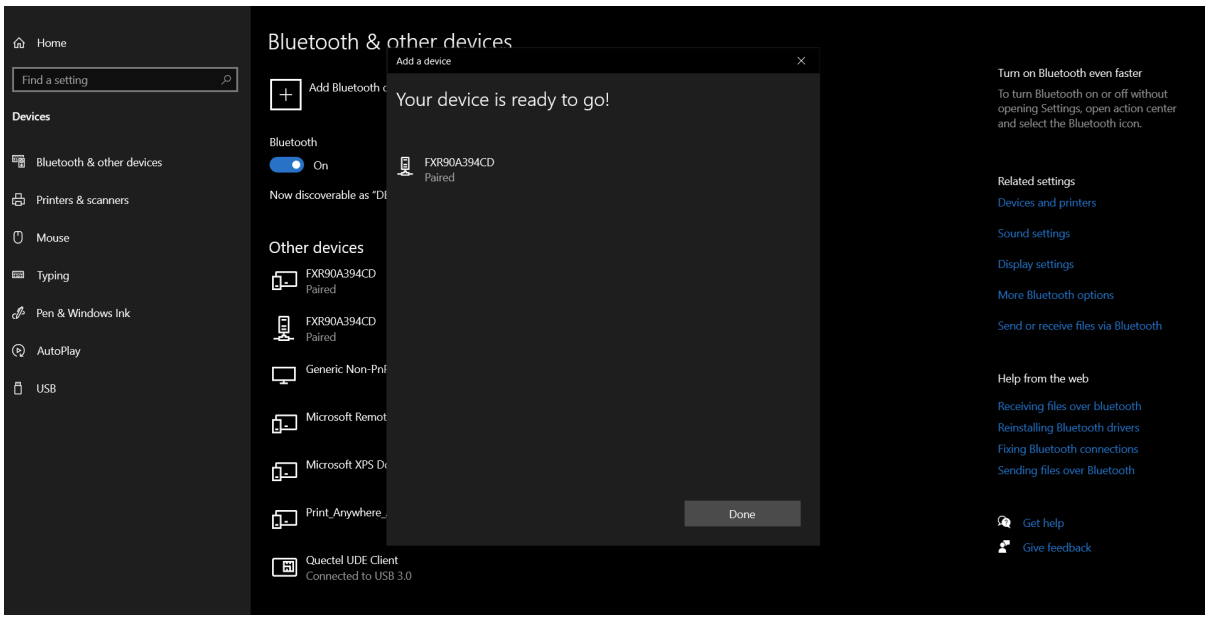
   Figure 41 Windows Add Bluetooth Device



2. Click the device name to connect.

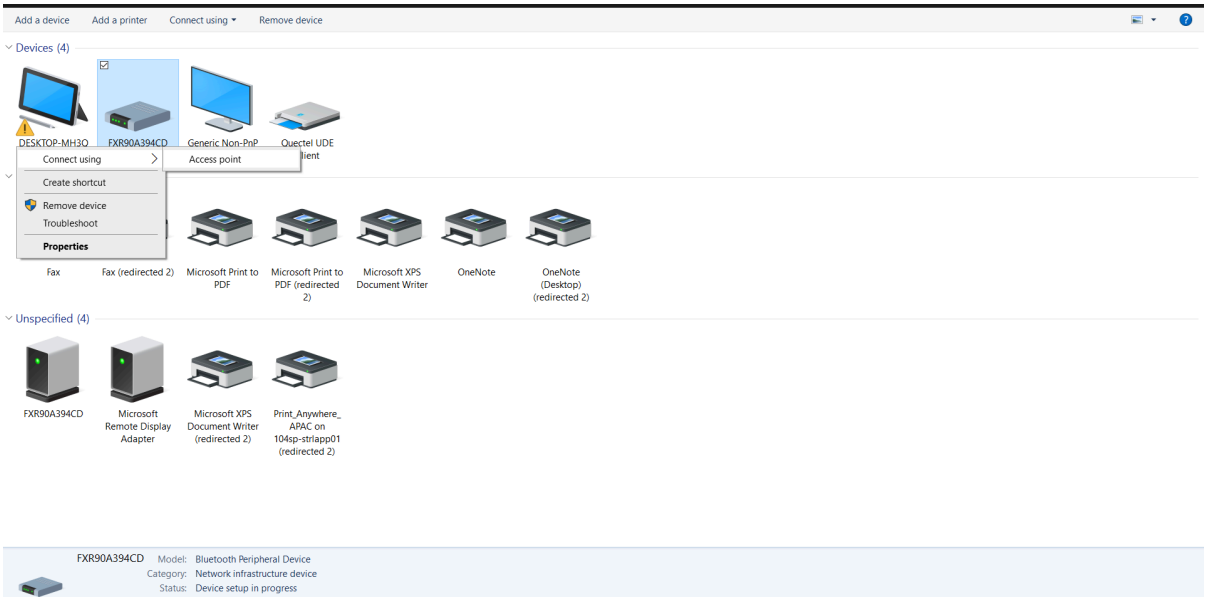
   A dialogue box displays indicating a successful connection.

   Figure 42 Windows Successful Connection



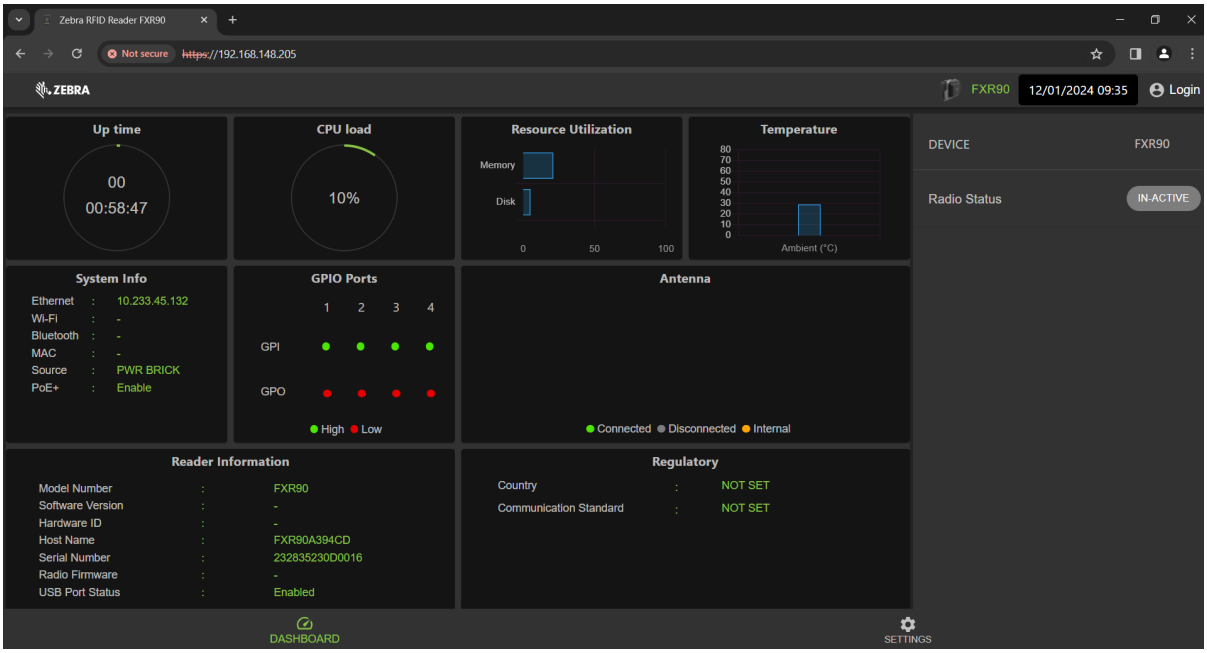
3. Click the device in the file explorer to open drop-down settings. Click **Connect using** and **Access point** to join the PAN network.

Figure 43 Windows Access Point



4. Access the reader console using the Bluetooth IP address.

Figure 44 Windows Tablet: Reader Administrator Console

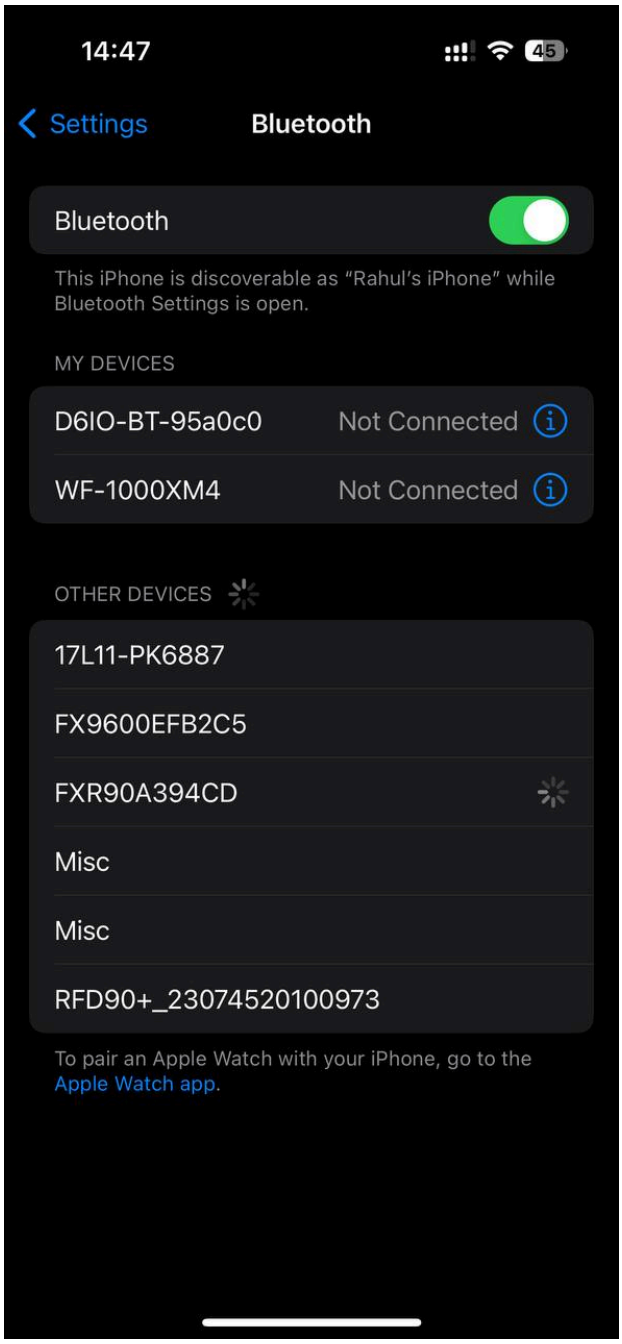


Connecting via an iOS Device

This section provides information about Bluetooth connection to an iOS device.

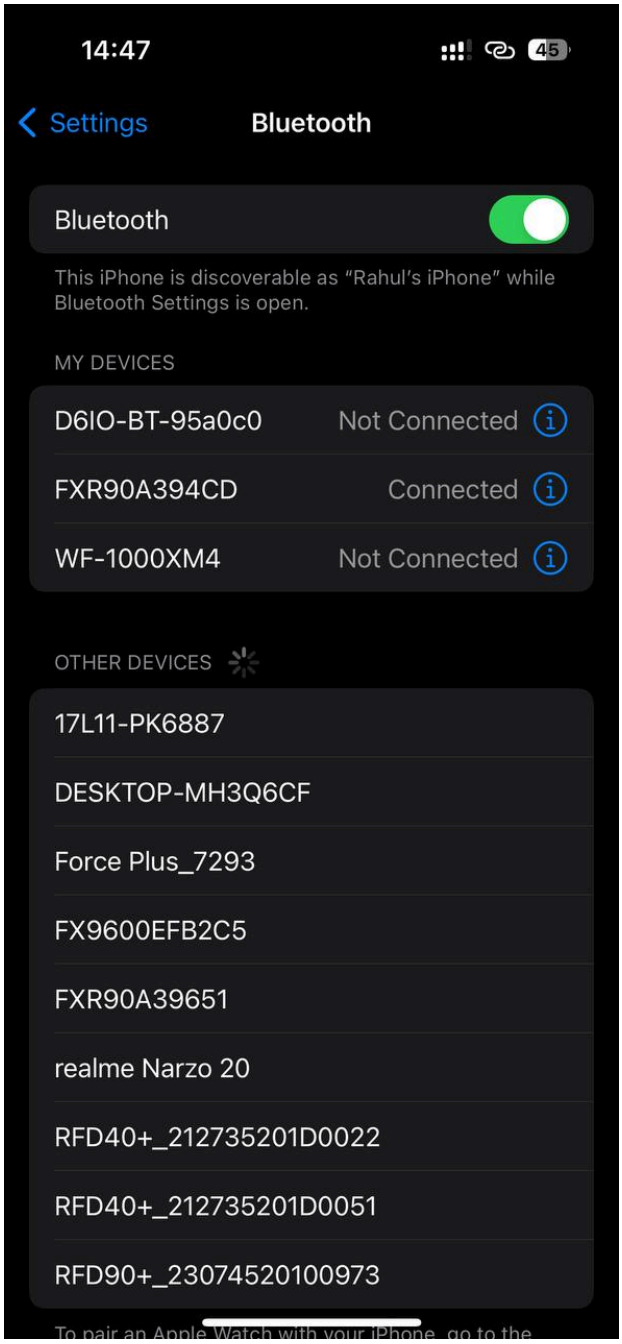
1. Using the iOS device, identify the device name on the Bluetooth other devices section and click it.

Figure 45 iOS Bluetooth Pair



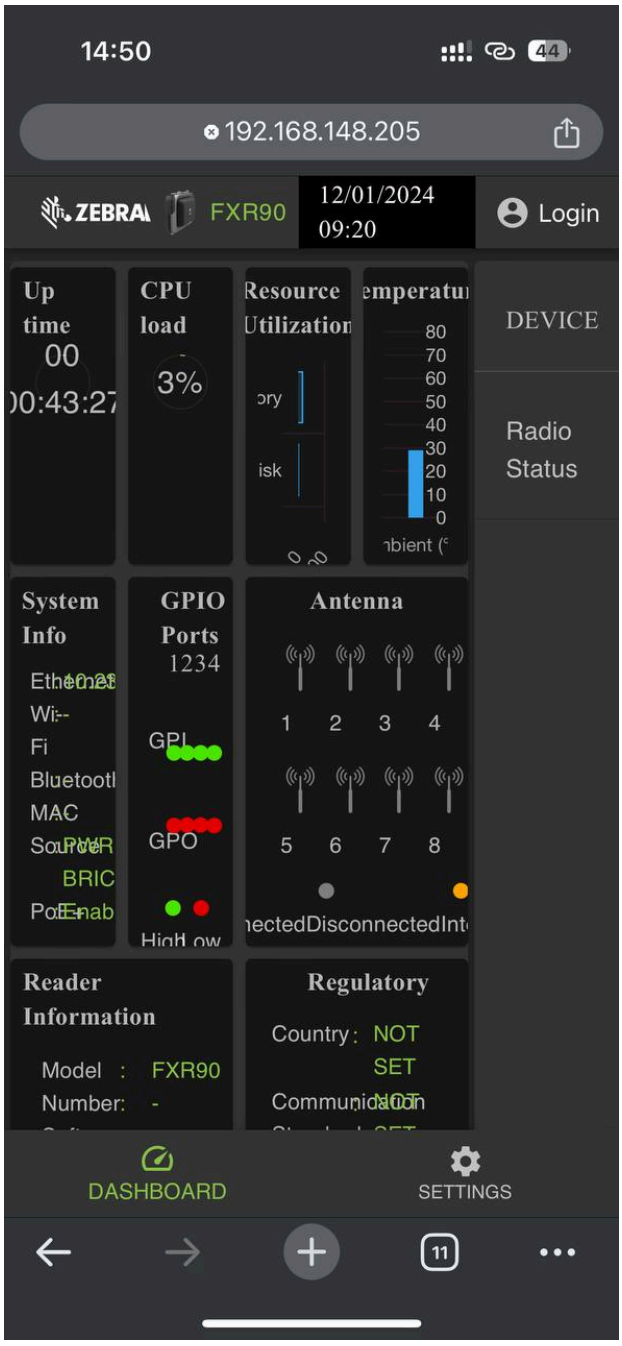
2. Confirm the device is paired successfully. The reader's name will now be included in the **My Devices** menu.

Figure 46 iOS Bluetooth Pair Successful



3. Use the Bluetooth IP address to access the reader administrator console.

Figure 47 iOS Administrator Console

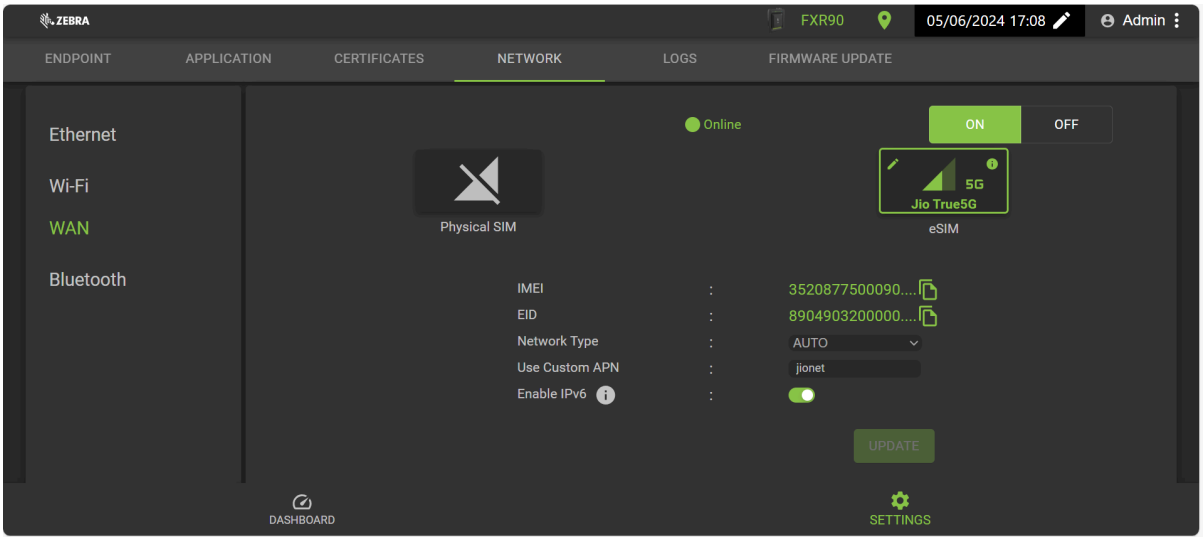


Configure Network Settings - WAN Tab

The WAN tab allows users to configure and review information for physical SIM and eSIM connections.

IMPORTANT: eSIM support may not be fully available in certain regions. Please check with your local Zebra contact to get the latest carrier support information.

Figure 48 Administrator Console- WAN Settings



The fields below allow you to customize physical SIM and eSIM connections. To switch between them, click the labeled icon.

- **Network Type**: Specifies the network connection type for the WAN function. The default is**AUTO**; alternate options are **LTE** and **NR5G**.
- **Use Custom APN** : User can type a custom access point name (APN).
- **Enable IPv6**: Select this option to use IPv6 connection for WAN.

Connecting eSIM

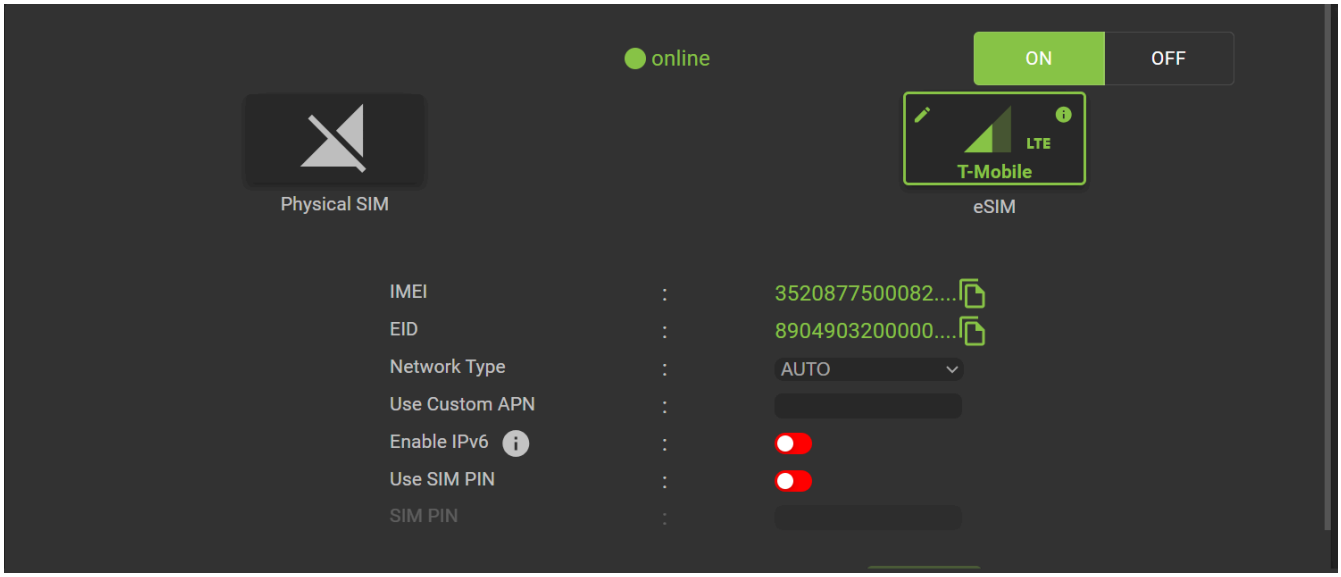
This section demonstrates how to connect applicable WAN models to eSIM in the administrator console window.

To connect eSIM, the reader must be connected to the administrator console. Refer to Administrator Console for further information.

IMPORTANT: Before adding an eSIM, contact your carrier to obtain the eSIM service and its activation code.

The reader must have active internet connectivity via Ethernet or Wi-Fi .

Figure 49 Reader Administrator Console: eSIM



1. In the **Network** tab, click **WAN** on the left sidebar of the console.

   The settings screen displays.

2. If WAN settings display **OFF**. Click **ON**.

3. Select the eSIM icon:

   - For first-time connection, select the pencil icon to access manage profiles. Manage Profiles displays as a dialogue box.
   - If reconnecting to a previously set profile, the status will update in the center of the screen until it displays connected and the carrier name displays below the icon.

4. On the **Manage Profiles** screen:

   - To add a new profile, click the plus (+) icon. Activation ID and NickName fields display. Enter the carrier information and click **ADD**.
   - To switch profiles, click the box of the profile to be active. The screen displays a confirmation. Click **YES** to confirm the choice.

   The dialogue box for Manage Profiles closes, and the main WAN screen displays.

5. The WAN screen displays options for IMEI, EID, Network Type, Custom, APN, and SIM PIN. Applicable fields will depend on the carrier. Complete the appropriate fields and click **Update**.

The eSIM functionality displays the phrase online in the center of the page, and the WAN function can be used.

To disconnect the eSIM, refer to the FXR90 Integration Guide (P/N: MN-004924-XXEN).

Disconnecting from eSIM

Follow the steps in this section to shut off the WAN function or switch to physical SIM.

To manage eSIM settings, the reader must be connected to the administrator console.

1. In the **Network** tab, click **WAN** on the left sidebar of the console.

   The settings screen displays.

2. Disconnect from eSIM:

   - To shut off WAN capabilities, click **OFF** in the upper-right of the screen.
   - To switch to Physical SIM, click the icon labeled **Physical SIM**.

The eSIM function is disconnected.

Deleting an eSIM Profile

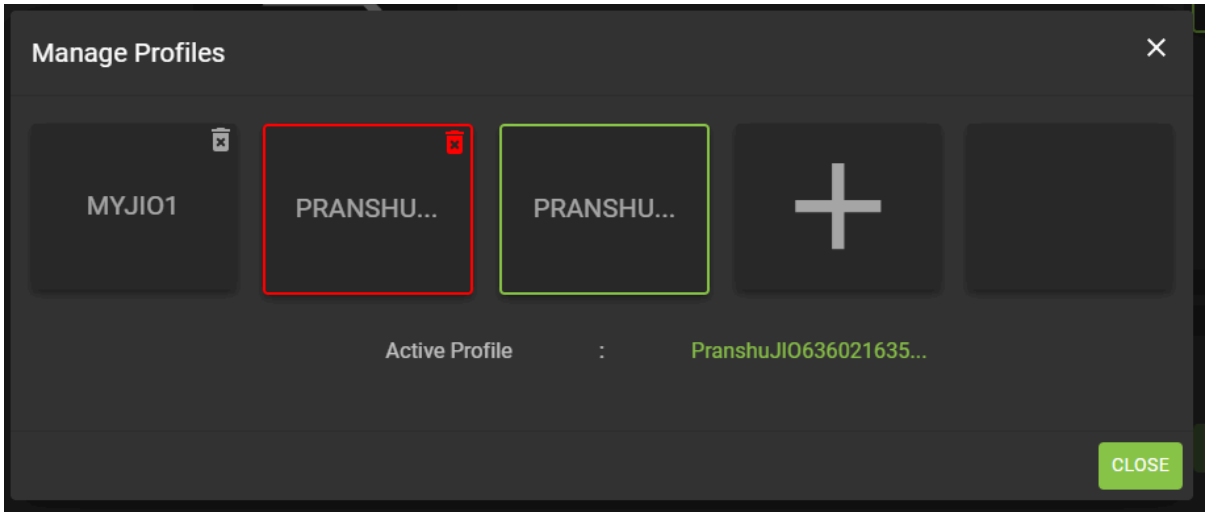
This section provides instructions on how to delete an eSIM profile. This may be necessary if there is a change of carrier.

To connect eSIM, the reader must be connected to the administrator console.

1. In the **Network** tab, click **WAN** on the left sidebar of the console.

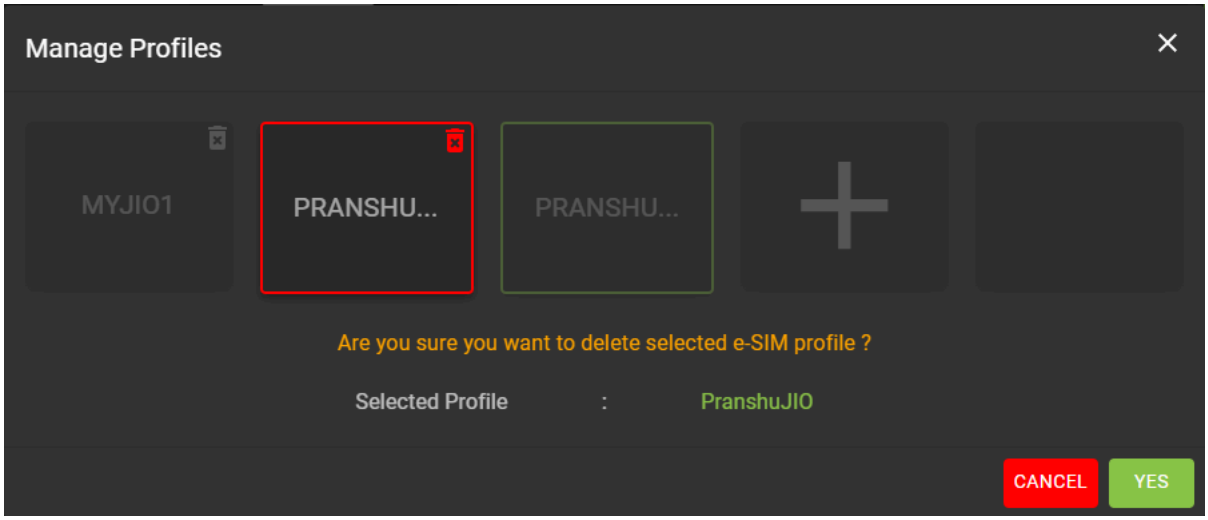
   The settings screen displays.

2. Select the pencil icon to access Manage Profiles, which displays as a dialogue box.
3. On the **Manage Profiles** screen, hover over the profile to be deleted and click the trashcan icon.



   The confirmation prompt displays.

4. Click **YES** to confirm.

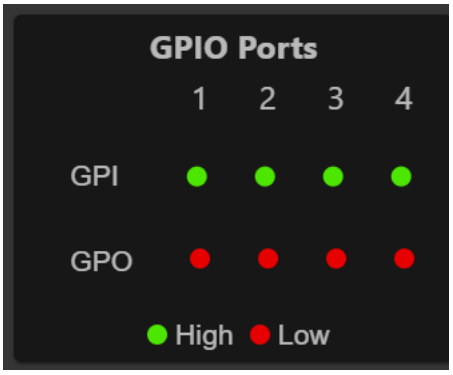


The Selected Profile is deleted.

GPIO

The GPIO Control Page allows viewing and setting the status for GPI pins

Figure 50 Example GPIO tile



Click the pencil icon of the GPIO tile on the home page to edit settings.

- To set a GPO pin high or low, select the image next to the required pin number.:
  - Green indicates GPIO HIGH
  - Red indicates GPIO LOW

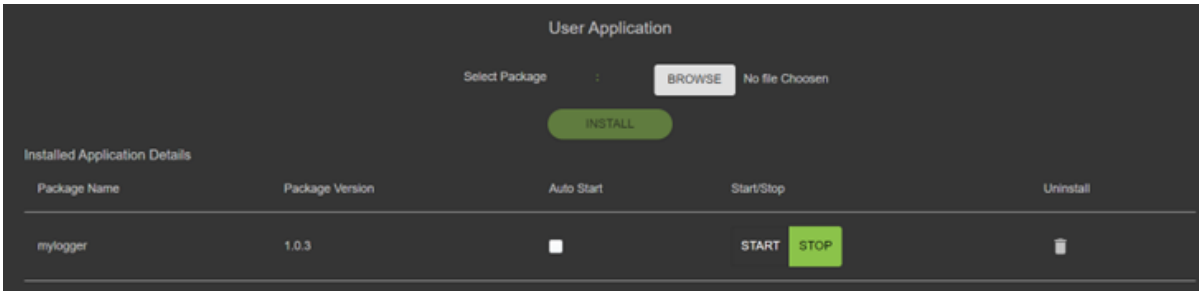
Applications

The console's application page displays upload and installation information for user applications.

NOTE: For application development, go to ZIOTC documentation. Refer to Accessing IOT-Connect API Docs.

Select **Applications** to view the User Application Page. This window allows installing applications on the reader and provides details of the installed application.

Figure 51 User Application Page



The Existing Packages section includes the following:

- **Select Package** - Click **Browse** to select an application file for installation. Click **Install** to start the installation.
- **List of Installed Apps** - The menu lists the current packages installed in the reader with their names and versions.
- **AutoStart** - Select this check box to run the application at startup.
- **Start/Stop** - The image displays the running status as follows. Select the image to toggle the status.
  - **Green** - Indicates the application is running.
  - **Red** - Indicates the application is not running.
- **Uninstall** - Removes the package from the reader.

Firmware Update

The console's firmware update page provides the user access to select the method of uploading and appropriate files for updates.

NOTE: When the reader firmware is updated, the outdated web page may display due to cached information. Refresh the browser to update the browser web page.

Select **Firmware Update** from the to view the Firmware Update window.

NOTE: You must log in as an Administrator to have access to this window.

The reader supports three firmware update methods:

- Using a USB drive.
- File-based update that allows uploading the firmware files from the PC (or a network location) to the reader and running the update.
- HTT/HTTPS, FTP, FTPS, or SCP server-based update

The revert option allows the firmware to be reset to a prior version.

Firmware Update - USB Drive

Update the reader firmware using an M12 USB by the following procedure.

The FXR90 supports both USB HOST and USB CLIENT through the same M12 port. Connect the drive via a Zebra-approved M12 USB Host cable or M12 splitter cable. See FXR90 Connections.

1. Copy all reader update files into the root folder of the USB drive.
2. Connect the USB drive to the USB Host Cable.

   The status led blinks yellow as the device updates.

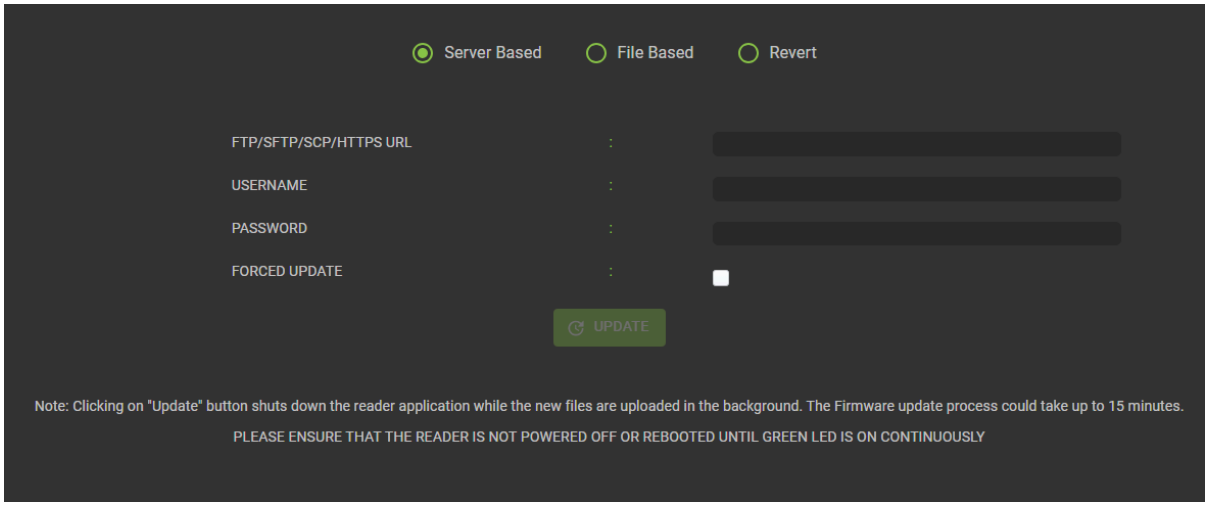
The new firmware is installed.

Updating the Firmware - Server Based

The firmware can be updated by connecting a server to the administrator console.

To complete the firmware update, the reader must be connected to the administrator console.

1. In **Settings**, click the **Firmware Update** tab to access setting options.
   a) Click the radio button labeled **Server Based** to open display entry fields.



2. Enter server information in the given fields: **FTP/SFTP/SCP/HTTPS URL**, **USERNAME, PASSWORD**.
3. If applicable, click the white box across from **FORCED UPDATE**.

   A green check icon displays in the box.
4. Click **UPDATE** to initiate the firmware update.

The reader application will shut down while the new files are loaded in the background. The update process can take up to 15 minutes.

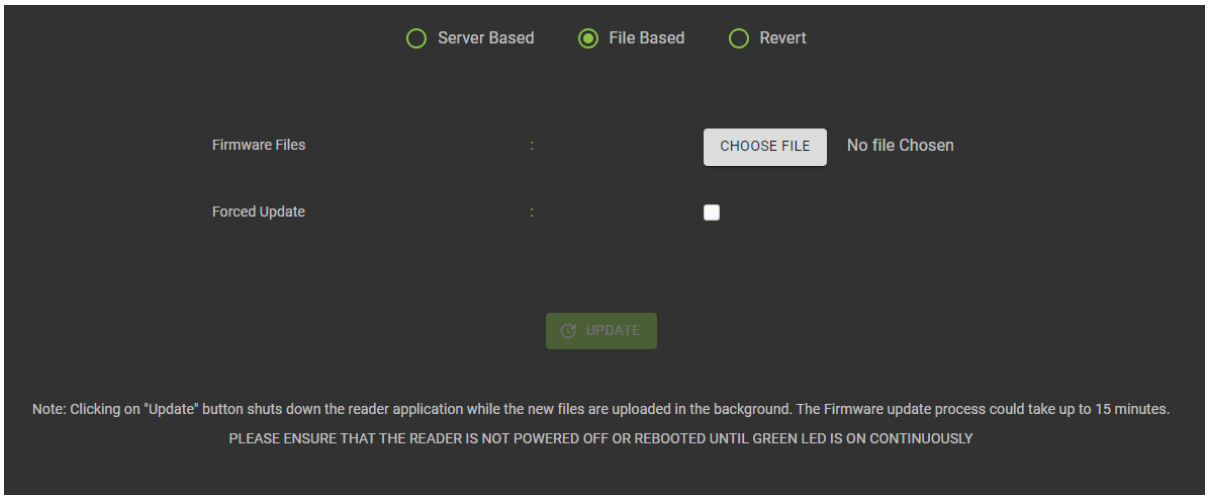
Updating the Firmware - File Based

The firmware can be updated by uploading a local file to the administrator console.

To complete the firmware update, the reader must be connected to the administrator console.

1. In **Settings**, click the **Firmware Update** tab to access setting options.

   a) Click the radio button labeled **File Based** to open display entry fields.



2. Click **Choose File** .

   An additional window with the local file picker displays.

3. If applicable, click the white box across from **FORCED UPDATE**.

   A green check icon displays in the box.

4. Click **UPDATE** to initiate the firmware update.

The reader application will shut down while the new files are loaded in the background. The update process can take up to 15 minutes.

Reverting the Firmware Update

This section provides details on how to revert the firmware to a previous version.

To complete the firmware update, the reader must be connected to the administrator console.

1. In **Settings**, click the **Firmware Update** tab to access setting options.

   a) Click the radio button labeled **Revert**.

   The **Current Firmware Version** and **Backup Firmware Version** displays.

2. Click **Revert Back** to initiate the process.

The reader application will shut down while the new files are loaded in the background. The update process can take up to 15 minutes.

Reader Certificates

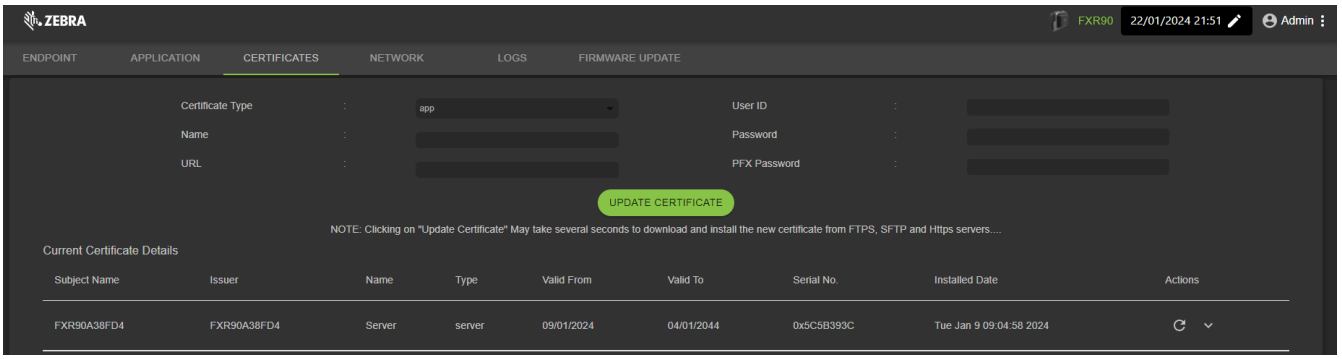
This page can update, delete, and refresh the digital certificates of the reader and display the installed certificate details.

The current certificates installed in the reader are shown along with the following properties.

- Subject Name.
- Issuer Name.

- Name (only for 'client/app' type certificates).
- Type.
- Validity From and To dates.
- Serial Number.
- Date of installation.
- Delete option (only for 'client/app' type certificates).
- Refresh option (download the certificate from the same remote server if previously updated using the Update Certificate option.)
- Public Key option (only for 'client/app' type certificates).

Figure 52 Certificates



To update the certificate, the following fields must be provided:

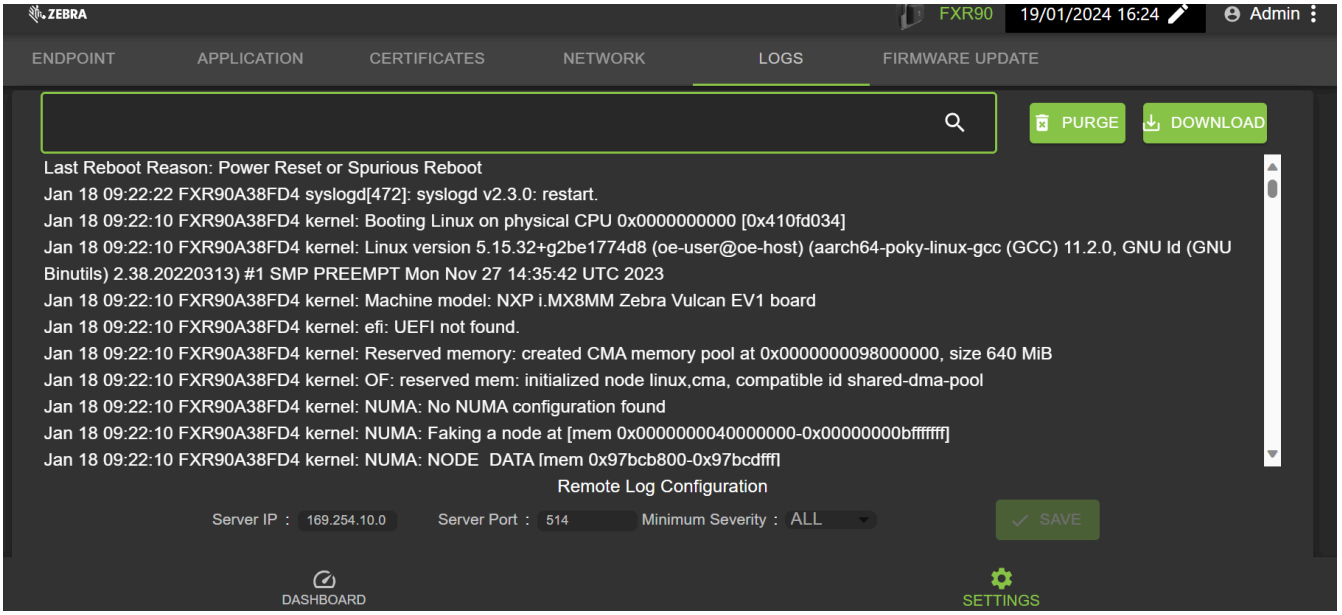
- Server Based
  - **Certificate Type** - Select the certificate type: server, client/app. The server denotes the reader's services like https/ftps/ssh. The type client/app denotes the reader as a client to connect for remote service like 802.1x EAP authentication.
  - **Name** - Provide a name for selected certificate type.
  - **URL** - Provide the complete URL of the FTPS/HTTPS/SFTP server, including the certificate file name and its path.
  - **User ID** - Provide the user name of FTPS/HTTPS/SFTP server.
  - **Password** - Provide the password of FTPS/HTTPS/SFTP server
  - **PFX Password** - Provide the private key password for the alias PFX file password of the PFX file.

System Log

This window lists the reader's log information.

Click the **Settings** gear icon from the Home Screen, then click **Logs** from the top menu to access the page.

Figure 53 System Log Window



The system log screen provides options for:

- **Search** - Typing in the green box, marked with the magnifying icon searches the logs for a specific term or phrase.
- **Purge** - Clears the log.
- **Download** - Downloads the log file to the local device.

Troubleshooting

This section overviews common issues, their causes, and solutions.

Problem	Cause	Solution
The IoTC connection failed.	The regulatory settings have not been configured.	Set the RFID regulatory information. See Setting the Region for more details.
Reader Administrator Console and 123RFID are not reading tags.	• The operating mode is not set to CUSTOM. • The Data endpoint changed from the default WebSocket.	• Set the operating mode to CUSTOM. • Update Reader Administrator Console and 123 RFID settings to the WebSocket endpoint. • Ensure that Tag Data Channels are set properly. • Enterprise Reset option resets to factory defaults.
iOS devices are unable to pair via Bluetooth.	iOS does not allow the use of a fixed PIN (passkey).	Disable passkey from the Bluetooth settings.
The Bluetooth connection fails on a Windows laptop.	The computer is running an older Windows OS.	• Upgrade to the latest Windows 11. • Disable passkey from the Bluetooth settings.
There is no SSH/SFTP for a rfidadm user.	The password is not set for rfidadm.	Set the password for rfidadm which is mandatory to access the applications partition via SSH/ SFTP.
A issue occurs that needs debugging	This is a result of deployment challenges.	Collect the syslogs from the Reader Administrator Console or ZIOTC for analysis.

Technical Specifications

The following tables summarize the RFID reader intended operating environment and technical hardware specifications.

Table 16 Technical Specifications

Item	Description
Physical and Environmental Characteristics	
Dimensions	335 mm x 254 mm x 73.8 mm (13.2 in. x 10.0 in. x 2.9 in.) with the RFID antenna and mounting bracket. 291 mm x 254 mm x 70.8 mm (11.5 in. x 10.0 in. x 2.8 in.) with the RFID antenna and without the mounting bracket. 335 mm x 254 mm x 55 mm (13.2 in. x 10.0 in. x 2.2 in.) for models with the bracket and without the RFID antenna. 291 mm x 254 mm x 52 mm (11.5 in. x 10.0 in. x 2.0 in.) for models with neither the bracket nor antenna.
Weight	2.70 kg (5.95 lbs) 8 Port with Mounting Bracket 2.50 kg (5.50 lbs) 8 Port without Mounting Bracket 3.07 kg (6.75 lbs) Integrated Antenna with 4 External RP-TNC Antenna Ports without Mounting Bracket 2.86 kg (6.30 lbs) Integrated Antenna with 4 External RP-TNC Antenna Ports with Mounting Bracket
Base Material	Die-cast aluminum and plastic
Visual Status Indicators	Multi-color LEDs: Power, Activity, Status, Application, Ethernet, Wi-FI, WAN (4G/5G), and Bluetooth
Mounting	Flush Mount Brackets and Articulating VESA Mount for Wall or Pole Mounting.
Environmental Specifications	

Table 16 Technical Specifications (Continued)

Item	Description
Operational Temperature	-40° to +65° C/ -40° to +149° F
Storage Temperature	-40° to +70° C/ -40° to + 158° F
Humidity	5% - 95% relative humidity non-condensing
Ingress Protection	IP65 and IP67
Vibration	MIL STD 810 Method 514, Procedure I-Random .04g2/Hz (20 Hz to 2000 Hz), 6 grms-Sine sweep 4g peak, 5Hz to 2 kHz
Altitude	MIL STD 810 Method 500
Solar Radiation	IEC 60068-2-5 Procedure A
Salt Fog	MIL STD 810H Method 509.7
ESD	
Connectivity	
Communications	10/100/1000 BaseT Ethernet (M12 Connector) w/ PoE support, PoE+, USB Client, USB Host (x2)(M12 Connector)
General Purpose I/O	4 GPI/4GPO Optically Isolated Aux Voltage Output up to 1A 12 Pin M12 A-Coded Connector
Power	DC Input (12V to 24V, M12 DC Input Connector) PoE (802.3af), PoE+ (802.3at)(M12 Ethernet Connector) 24Vdc, 3.25A PoE 55V
Antenna Ports	FXR90-4: 4 mono-static ports (reverse polarity TNC) FXR90-4: Integrated Antenna with 4 External RP-TNC Antenna Ports FXR90-8: 8 mono-static ports (reverse polarity TNC)
Hardware/OS and Firmware Management	
Memory	Flash 16GB EMMC; LPDDR4 2GB
Operating System	Linux
Firmware Upgrade	Web-based and remote firmware upgrade capabilities
Network Services	DHCP, HTTPS, SFTP, SSH, and NTP
Network Slack	IPv4, IPv6
Security	Transport Layer Security Ver. 1.3, FIPS 140-2 Level 1

Table 16 Technical Specifications (Continued)

Item	Description
Air Protocols	EPCglobal UHF Class 1 Gen2, ISO/IEC 18000-63
Frequency (UHF Band)	Global Reader: 902 MHz to 928 MHz (Maximum, supports countries that use a part of this band) 865 MHz to 868 MHz US (only) Reader: 902 MHz to 928 MHz
Transmit Power Output	0dBm to +33dBm (PoE+,802.3at), DC Input) 0dBm to +31.5dBm (PoE, 802.3af)
Max Receive Sensitivity	-92 dBm RFID receive sensitivity
IP Addressing	Static and Dynamic
Warranty	
For the complete Zebra hardware product warranty statement, go to: zebra.com/warranty.	
Recommended Services	
Support Services	Zebra One Care Select and Zebra One Care On-Site
Advanced Services	RFID Design and Deployment Services