APPENDIX C FTP FIRMWARE UPGRADE

Introduction

This appendix provides reader firmware update information on using the web-based **Administrator Console**. The following methods are available to update the firmware on the FX7500 reader.

- Update 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.
- FTP / FTPS / SCP server-based update.

Use this procedure to update the following software components:

- uboot
- OS
- Reader Server Application (includes Radio API and Radio firmware)

Prerequisites

The following items are required to perform the update:

- Reader with power supply or POE connection
- Laptop (or other host computer)
- An Ethernet cable
- An FTP server
- Current firmware file examples:
  - OSUpdate.elf
  - response.txt
  - u-boot_*X.X.X.X*.bin (uBoot, *X.X.X.X* is a filename version)
  - uImage_ *X.X.X.X* (OS, *X.X.X.X* is a filename variable)

- rootfs_ *X.X.X.X*.jffs2 (Root FileSystem, *X.X.X.X* is a filename variable)
- platform_ *X.X.X.X*.tar.gz (Platform partition, *X.X.X.X* is a filename variable)

Refer to the release notes to determine which files were updated; not all of the files are updated in every release.

Failsafe Update

FX7500 provides true failsafe firmware update. Each partition (such as OS and platform) has an active and backup partition.

The firmware update process always writes the new images to the backup partition. This ensures that any power or network outages in the middle of firmware update does not prevent the reader from being operational. In the case of a firmware update failure, the power LED on the reader lights red.

Update Phases

The firmware update takes place in three phases:

- **Phase 1** - The reader application retrieves the **response.txt** and **OSUpdate.elf** files from the ftp server.
- **Phase 2** - The reader application shuts down and the **OSUpdate** starts. The files referenced in the **response.txt** file are retrieved from the FTP server and written to flash.
- **Phase 3** - The reader resets after all partitions update successfully. It may also update the RFID firmware if it detects a different version in the platform partition.

A typical entry in the **Response.txt** is:

```
;platform partition
-t5 -fplatform_1.1.15.0.tar.gz -s8004561 -u8130879
```

NOTE The Application Server, Radio API, and Radio firmware code all reside in the **Platform** partition.

The **-t** parameter is the file type, **-f** is the name of the file, and **-s** the size. Ensure the file size is correct. "**;**" comments out the rest of the line.

Updating FX7500 Reader Software

Verifying Firmware Version

To verify that the FX7500 reader firmware is outdated:

1. Log into the reader. In the **User Login** window, enter **admin** in the **User Name:** field and enter **change** in the **Password:** field.

Figure C-1 *User Login Window*

2. Select **Firmware** on the left side panel to verify that the current version of reader software is outdated, e.g., 1.1.43.

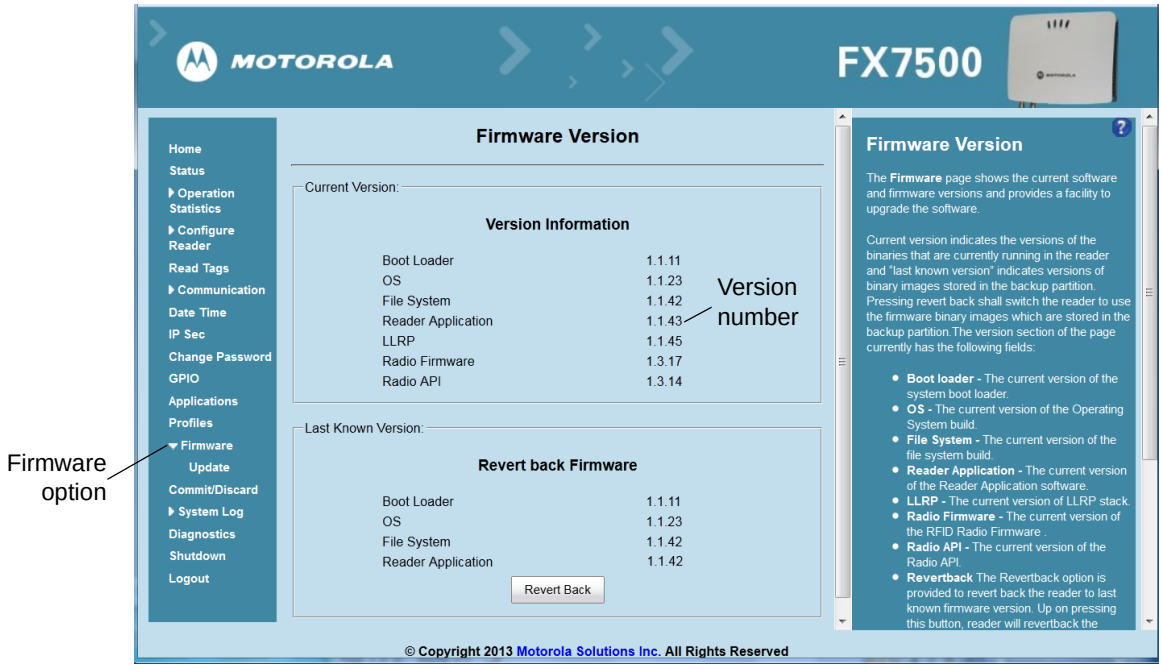


Figure C-2 *Firmware Version Window*

Updating Methods

Download the reader update files from http://www.motorolasolutions.com/support, then use one of three methods to update the reader software to a later version, e.g., 1.1.45.0 or higher:

- *Update Using a USB Drive (Recommended)*
- *File-Based Update on page C-6*
- *FTP-Based Update on page C-8*

Update Using a USB Drive (Recommended)

1. Copy all reader update files into the root folder of the USB drive.

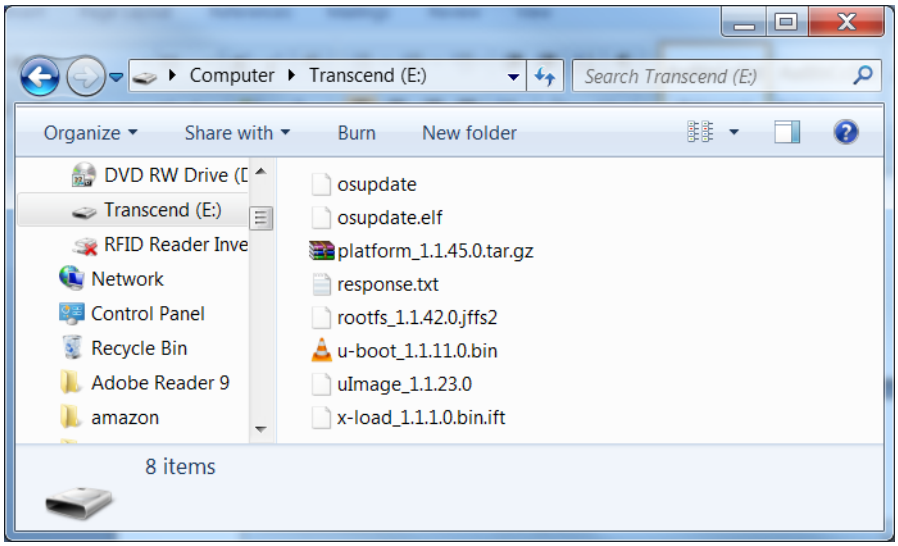
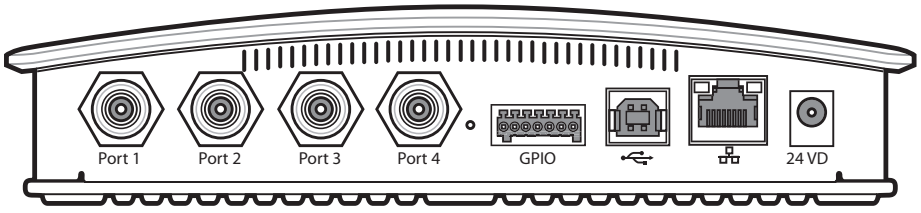


Figure C-3 *USB Drive Root Folder*

2. Insert the USB drive into the USB host port of the FX7500 RFID reader.

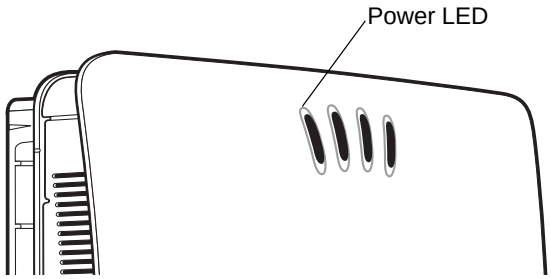


New Pic with USB Host Port to Come

Figure C-4 *USB Host Port Window*

The reader starts the update process in 5-7 seconds, and indicates progress as follows:

- The reader continuously blinks the Power LED red.
- The reader blinks all 4 LEDs orange once.
- The reader Power LED remains steady orange.
- The reader Power LED settles to a steady green to indicate that the update is complete.



New Pic with LED Labels to Come

Figure C-5 *Reader LEDs*

File-Based Update

1. Copy all reader update files into any folder on a host computer.

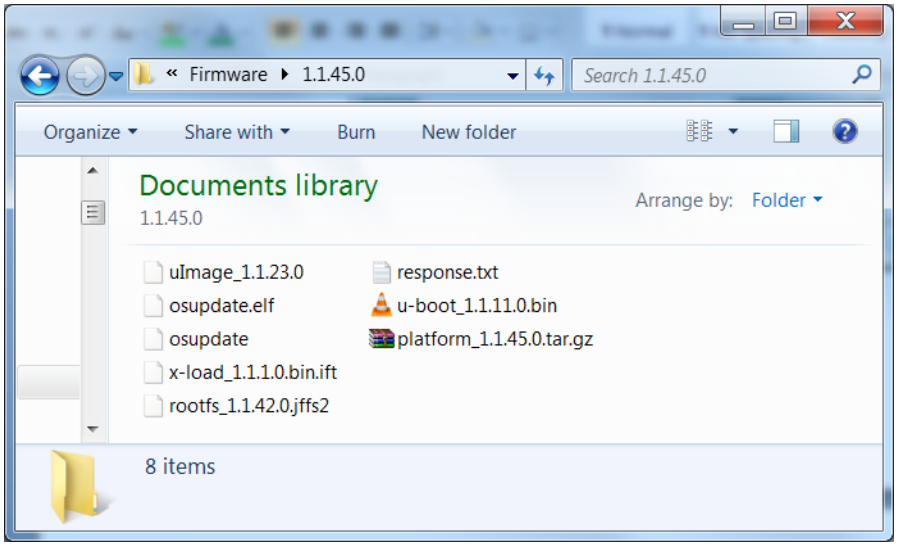


Figure C-6 *Host Computer Folder*

2. Log into the reader and navigate to the **Firmware Update** page.

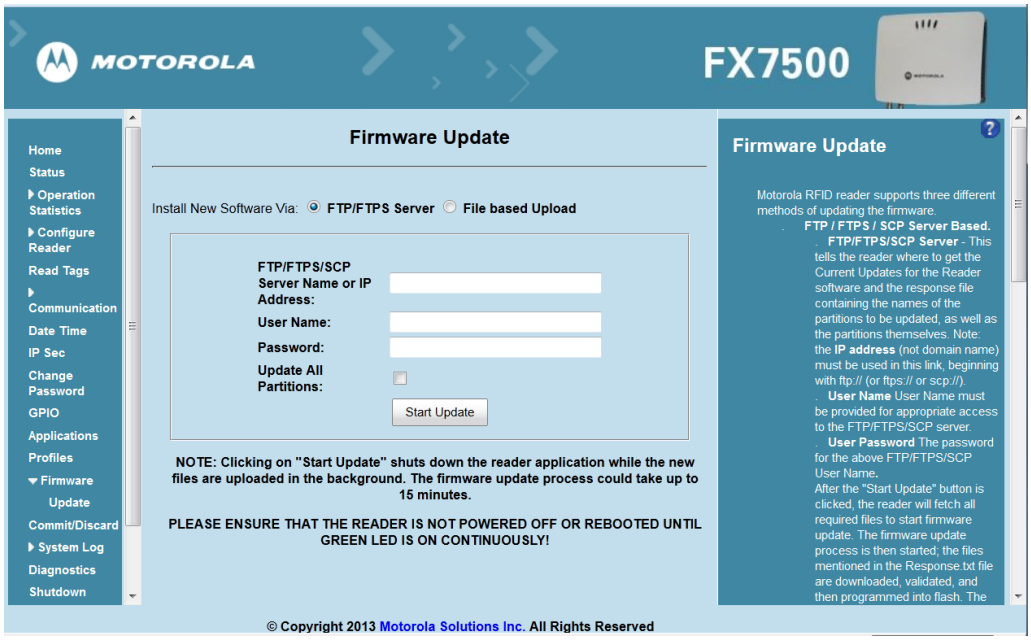


Figure C-7 *Firmware Update Window*

3. Select **File based Upload**.

4. Click on **Browse** and navigate to the folder that contains the firmware update files.

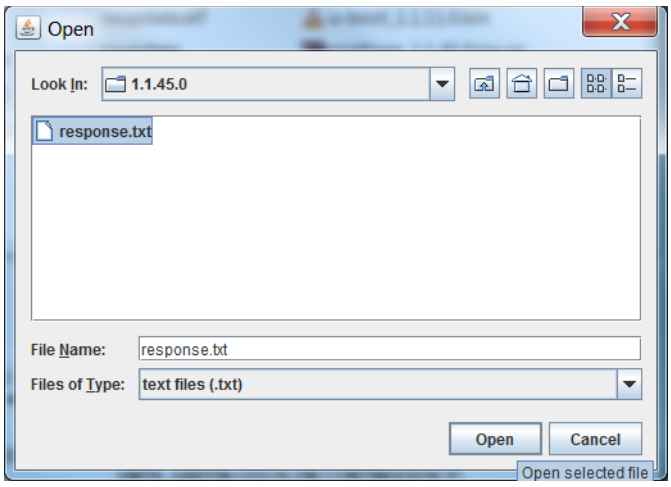
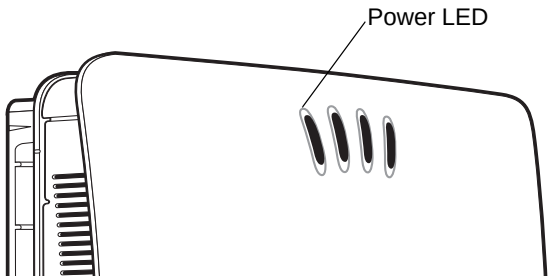


Figure C-8 *Browsing Update Files*

5. Select **response.txt** and click **Open**.
6. Click **Start Update**. The reader starts the update process and displays the update status as follows:
   - The reader continuously blinks the Power LED red.
   - The reader blinks all 4 LEDs orange once.
   - The reader Power LED remains steady orange.
   - The reader Power LED settles to a steady green to indicate that the update is complete.



New Pic with LED Labels to Come

Figure C-9 *Reader LEDs*

When the update completes, the reader reboots and returns to the FX7500 login screen.

FTP-Based Update

Copy all the update files into an appropriate FTP location.

1. Log into the reader and navigate to the **Firmware Update** page.

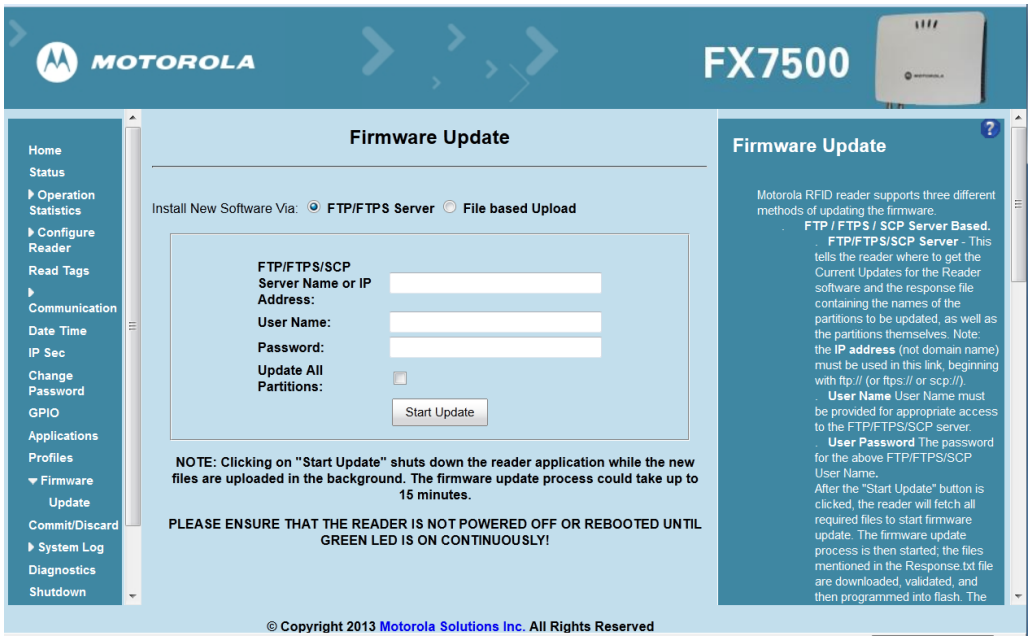
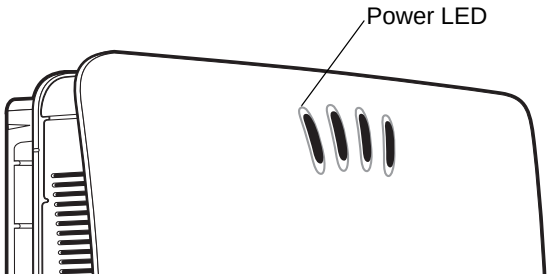


Figure C-10 *Firmware Update Window*

2. Select **FTP/FTPS Server**.
3. Enter the FTP location where the files are located.
4. Enter the **User Name** and **Password** for the FTP server login.
5. Click **Start Update**. The reader starts the update process and displays the update status as follows:
   - The reader continuously blinks the Power LED red.
   - The reader blinks all 4 LEDs orange once.
   - The reader Power LED remains steady orange.
   - The reader Power LED settles to a steady green to indicate that the update is complete.



New Pic with LED Labels to Come

Figure C-11 *Reader LEDs*

When the update completes, the reader reboots and returns to the FX7500 login screen.

Verifying Firmware Version

To verify reader update success:

1. Log into the reader. In the **User Login** window, enter **admin** in the **User Name:** field and enter **change** in the **Password:** field.

Figure C-12 *User Login Window*

2. Select **Firmware** on the left side panel to verify that the current version of reader software is the new version number, e.g., 1.1.45, which indicates that the update was successful.

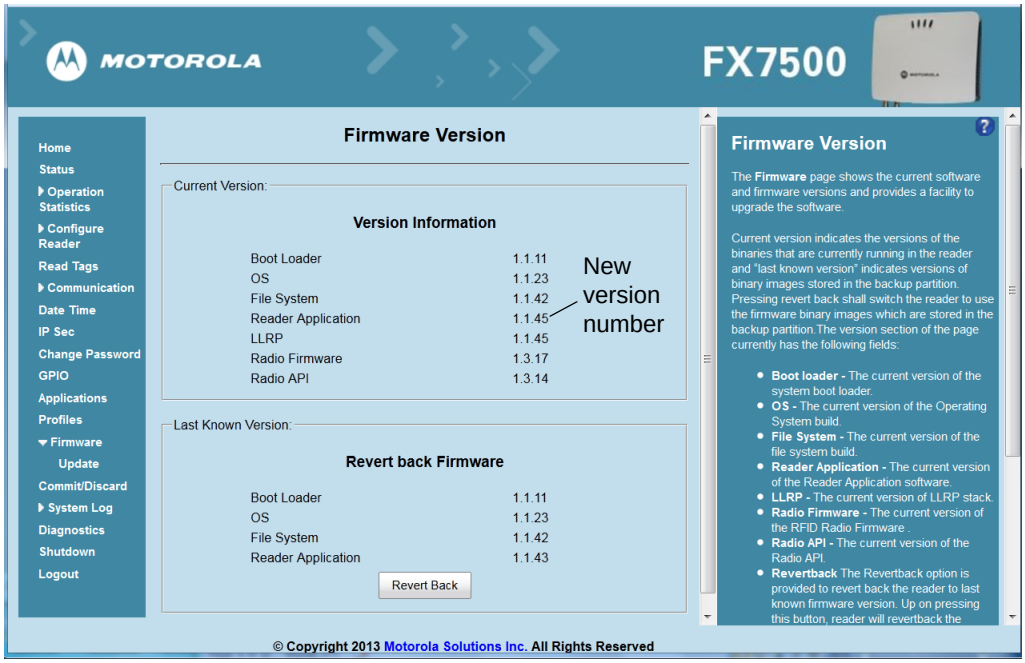


Figure C-13 *Firmware Version Window*

APPENDIX D STATIC IP CONFIGURATION

Introduction

This appendix describes three methods of setting the static IP address on an FX7500 RFID Reader.

Reader IP Address or Host Name is Known - Set the Static IP Using the Web Console

1. Browse the device using the host name, e.g., FX7500CD3B1E.
2. Log onto the device.

Figure D-1 *Reader Administration Console Login Window*

3. Click **Communication**.

4. Set **Obtain IP Address via DHCP** to **Off** and enter all required information.

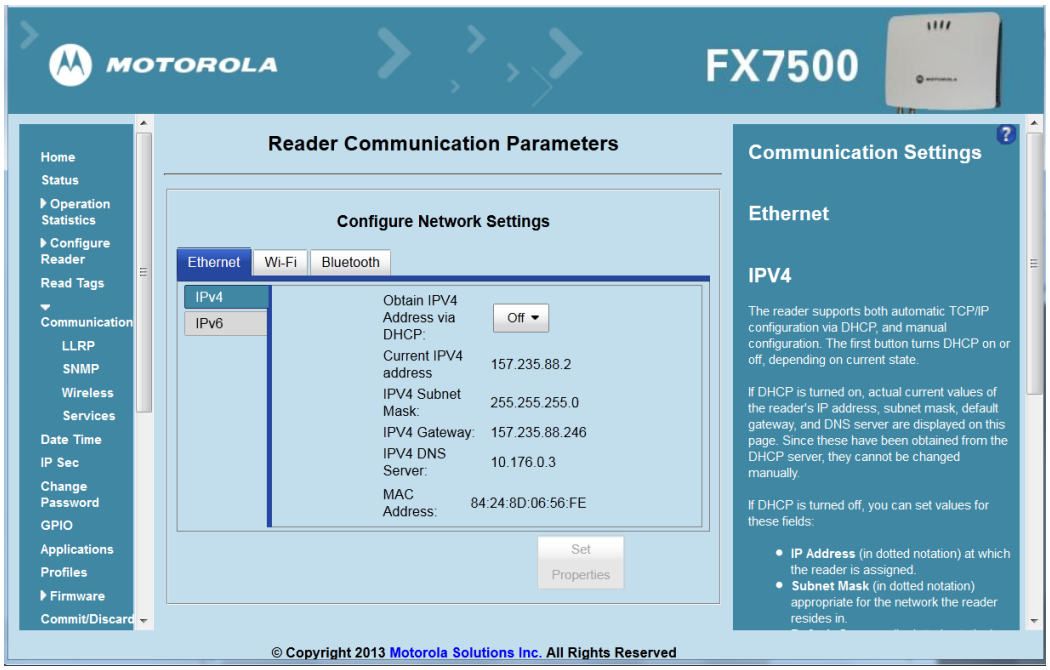


Figure D-2 *Reader Communication Parameters Window*

5. Click **Set Properties**. You can set a static IP that doesn't belong to this DHCP network.

6. Click **Commit/Discard**, then click the **Commit** button.

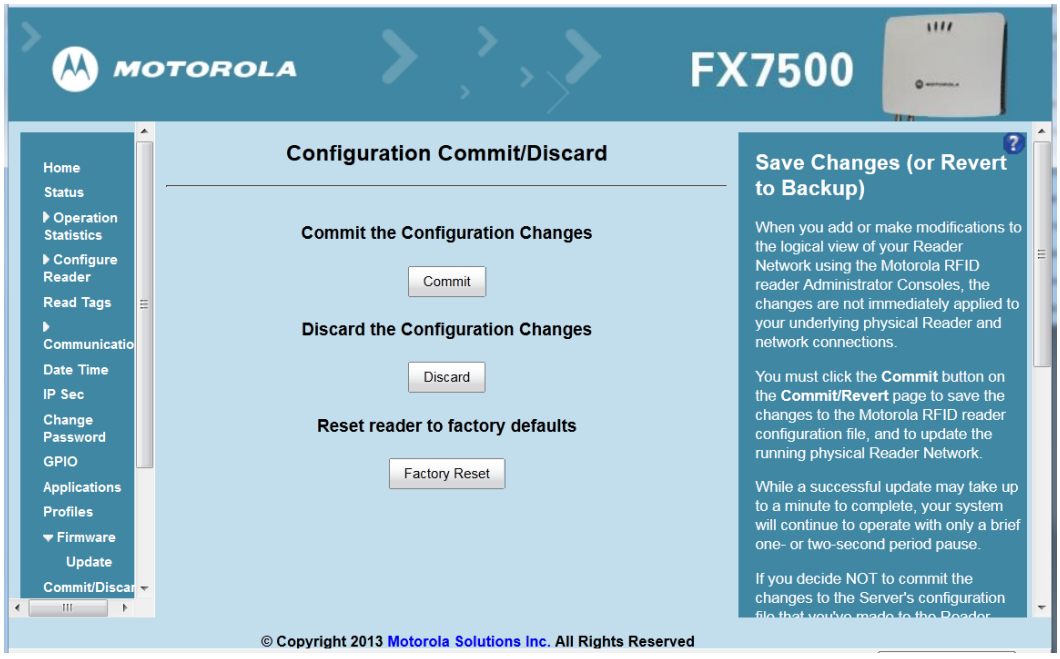


Figure D-3 *Commit/Discard Window*

7. The message **Reader IP Address config has changed. Needs reader reboot to take effect** appears. Reset the device and use the reader with the static IP network.

Reader IP is Not Known (DHCP Network Not Available) - Set the Static IP Using the Web Console

1. Connect the device and a PC running Windows XP to the same network that doesn't have a DHCP server, or connect the device directly to the PC.
2. Ensure both the device and PC Ethernet jack use at least one LED to indicate network connection detect.
3. If the PC uses an assigned static IP, update it to use DHCP. The PC obtains an IP that starts with **169**.

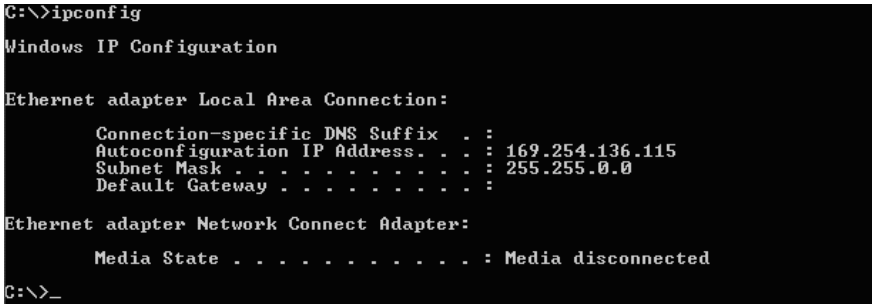


Figure D-4 *Obtain IP Address*

4. When possible, ping the host name of the device.

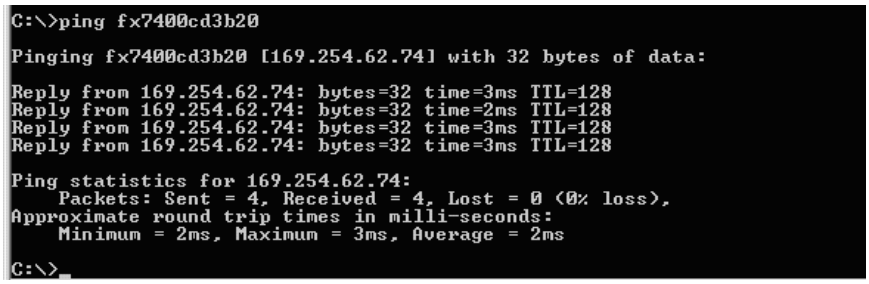


Figure D-5 *Ping the Host Name*

5. Use a browser to connect to the device with the host name, e.g., FX7500CD3B1E, or use the IP address obtained from ping replies (e.g. 169.254.62.74).
6. Log onto the device.
7. Click **Communication**.

8. Set **Obtain IP Address via DHCP** to **Off** and enter all required information.

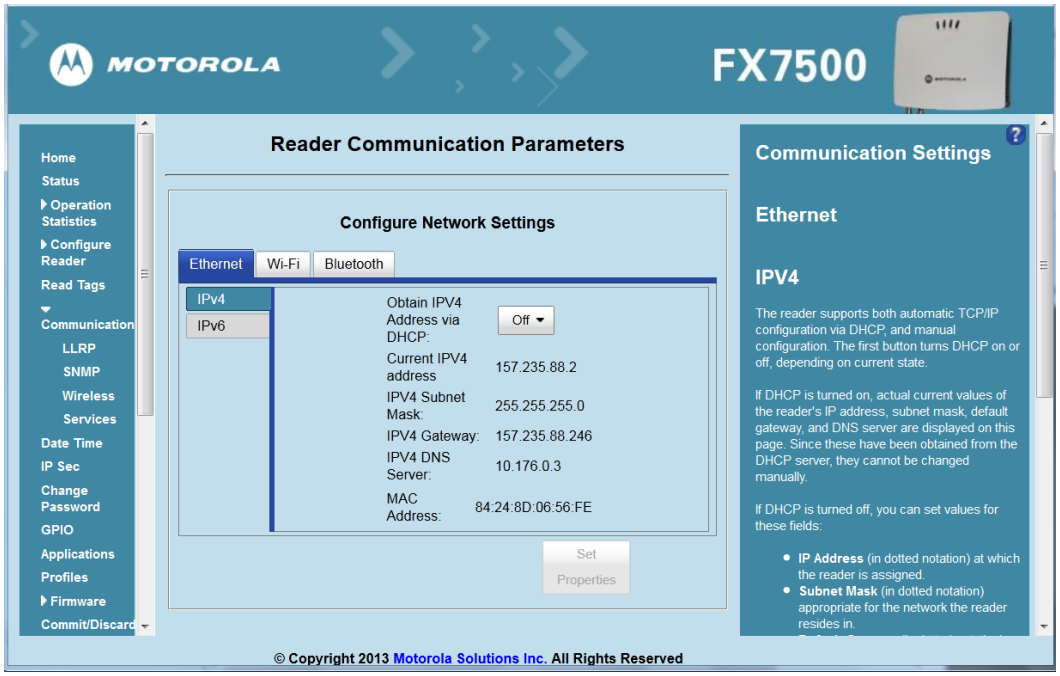


Figure D-6 *Reader Communication Parameters Window*

9. Click **Set Properties**.

10. Click **Commit/Discard**, then click the **Commit** button.

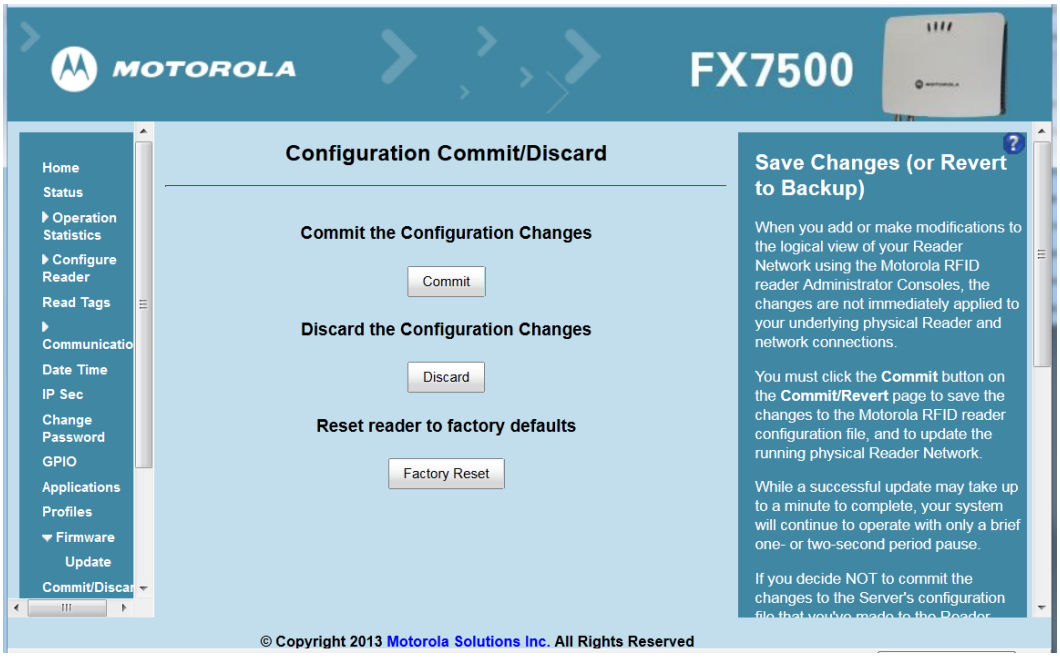


Figure D-7 *Commit/Discard Window*

11. The message **Reader IP Address config has changed. Needs reader reboot to take effect** appears. Reset the device and use the reader with the static IP network.

APPENDIX E RF AIR LINK CONFIGURATION

Introduction

This appendix lists the different air link configurations supported. The air link configuration is available through LLRP and RFID3 API interfaces.

Radio Modes

The supported modes are exposed as a list of individual **UHFC1G2RfModeTableEntry** parameters in regulatory capabilities as shown in *Table E-1* and *Table E-2*. The **Mode Index** column refers to the index used to walk the **C1G2UHFRFModeTable**. Refer to the EPCglobal *Low Level Reader Protocol (LLRP) Standard*.

Table E-1 *Radio Modes for FCC Readers*

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indicator	EPC HAG T&C Conform-ance
1	64/3	640000	1	PR_ASK	1500	6250	6250	0	Single	false
2	64/3	640000	1	PR_ASK	2000	6250	6250	0	Single	false
3	64/3	120000	2	PR_ASK	1500	25000	25000	0	Single	false
4	64/3	120000	2	PR_ASK	1500	12500	23000	2100	Single	false
5	64/3	120000	2	PR_ASK	2000	25000	25000	0	Single	false
6	64/3	120000	2	PR_ASK	2000	12500	23000	2100	Single	false
7	64/3	128000	2	PR_ASK	1500	25000	25000	0	Single	false
8	64/3	128000	2	PR_ASK	1500	12500	23000	2100	Single	false
9	64/3	128000	2	PR_ASK	2000	25000	25000	0	Single	false

***RF Mode 13 is the default air link profile.**
****RF Mode 23 is the automac air link profile.**

Table E-1 *Radio Modes for FCC Readers (Continued)*

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indicator	EPC HAG T&C Conform-ance
10	64/3	128000	2	PR_ASK	2000	12500	23000	2100	Single	false
11	64/3	160000	2	PR_ASK	1500	12500	18800	2100	Single	false
12	64/3	160000	2	PR_ASK	2000	12500	18800	2100	Single	false
*13	64/3	60000	4	PR_ASK	1500	25000	25000	0	Dense	false
14	64/3	60000	4	PR_ASK	1500	12500	23000	2100	Dense	false
15	64/3	60000	4	PR_ASK	2000	25000	25000	0	Dense	false
16	64/3	60000	4	PR_ASK	2000	12500	23000	2100	Dense	false
17	64/3	64000	4	PR_ASK	1500	25000	25000	0	Dense	false
18	64/3	64000	4	PR_ASK	1500	12500	23000	2100	Dense	false
19	64/3	64000	4	PR_ASK	2000	25000	25000	0	Dense	false
20	64/3	64000	4	PR_ASK	2000	12500	23000	2100	Dense	false
21	64/3	80000	4	PR_ASK	1500	12500	18800	2100	Dense	false
22	64/3	80000	4	PR_ASK	2000	12500	18800	2100	Dense	false
**23	64/3	variable	variable	PR_ASK	variable	6250	25000	variable	variable	false
24	64/3	320000	1	PR_ASK	1500	12500	18800	2100	Single	false
25	64/3	320000	1	PR_ASK	2000	12500	18800	2100	Single	false
26	64/3	30000	8	PR_ASK	1500	25000	25000	0	Dense	false
27	64/3	30000	8	PR_ASK	1500	12500	23000	2100	Dense	false
28	64/3	30000	8	PR_ASK	2000	25000	25000	0	Dense	false
29	64/3	30000	8	PR_ASK	2000	12500	23000	2100	Dense	false
30	64/3	32000	8	PR_ASK	1500	25000	25000	0	Dense	false
31	64/3	32000	8	PR_ASK	1500	12500	23000	2100	Dense	false
32	64/3	32000	8	PR_ASK	2000	25000	25000	0	Dense	false
33	64/3	32000	8	PR_ASK	2000	12500	23000	2100	Dense	false
34	64/3	40000	8	PR_ASK	1500	12500	18800	2100	Dense	false
35	64/3	40000	8	PR_ASK	2000	12500	18800	2100	Dense	false

***RF Mode 13 is the default air link profile.**
****RF Mode 23 is the automac air link profile.**

Table E-2 *Radio Modes for ETSI Readers*

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indicator	EPC HAG T&C Conform-ance
1	64/3	120000	2	PR_ASK	1500	25000	25000	0	Single	false
2	64/3	120000	2	PR_ASK	1500	12500	23000	2100	Single	false
3	64/3	120000	2	PR_ASK	2000	25000	25000	0	Single	false
4	64/3	120000	2	PR_ASK	2000	12500	23000	2100	Single	false
5	64/3	128000	2	PR_ASK	1500	25000	25000	0	Single	false
6	64/3	128000	2	PR_ASK	1500	12500	23000	2100	Single	false
7	64/3	128000	2	PR_ASK	2000	25000	25000	0	Single	false
8	64/3	128000	2	PR_ASK	2000	12500	23000	2100	Single	false
9	64/3	160000	2	PR_ASK	1500	12500	18800	2100	Single	false
10	64/3	160000	2	PR_ASK	2000	12500	18800	2100	Single	false
*11	64/3	60000	4	PR_ASK	1500	25000	25000	0	Dense	false
12	64/3	60000	4	PR_ASK	1500	12500	23000	2100	Dense	false
13	64/3	60000	4	PR_ASK	2000	25000	25000	0	Dense	false
14	64/3	60000	4	PR_ASK	2000	12500	23000	2100	Dense	false
15	64/3	64000	4	PR_ASK	1500	25000	25000	0	Dense	false
16	64/3	64000	4	PR_ASK	1500	12500	23000	2100	Dense	false
17	64/3	64000	4	PR_ASK	2000	25000	25000	0	Dense	false
18	64/3	64000	4	PR_ASK	2000	12500	23000	2100	Dense	false
19	64/3	80000	4	PR_ASK	1500	12500	18800	2100	Dense	false
20	64/3	80000	4	PR_ASK	2000	12500	18800	2100	Dense	false
**21	64/3	variable	variable	PR_ASK	variable	12500	25000	variable	variable	false
22	64/3	320000	1	PR_ASK	1500	12500	18800	2100	Single	false
23	64/3	320000	1	PR_ASK	2000	12500	18800	2100	Single	false
24	64/3	30000	8	PR_ASK	1500	25000	25000	0	Dense	false
25	64/3	30000	8	PR_ASK	1500	12500	23000	2100	Dense	false
26	64/3	30000	8	PR_ASK	2000	25000	25000	0	Dense	false
27	64/3	30000	8	PR_ASK	2000	12500	23000	2100	Dense	false

***RF Mode 11 is the default air link profile.**
****RF Mode 21 is the automac air link profile.**

Table E-2 *Radio Modes for ETSI Readers (Continued)*

RF Mode Index	Divide Ratio	BDR Value	M Value M2=2, FM0=1, M4=4, M8=8	FLM Value	PIE Value	Min Tari	Max Tari	Step Tari	Spectral Mask Indicator	EPC HAG T&C Conform-ance
28	64/3	32000	8	PR_ASK	1500	25000	25000	0	Dense	false
29	64/3	32000	8	PR_ASK	1500	12500	23000	2100	Dense	false
30	64/3	32000	8	PR_ASK	2000	25000	25000	0	Dense	false
31	64/3	32000	8	PR_ASK	2000	12500	23000	2100	Dense	false
32	64/3	40000	8	PR_ASK	1500	12500	18800	2100	Dense	false
33	64/3	40000	8	PR_ASK	2000	12500	18800	2100	Dense	false

***RF Mode 11 is the default air link profile.**
****RF Mode 21 is the automac air link profile.**

APPENDIX F CONNECTING WI-FI AND BLUETOOTH DONGLES

Introduction

This appendix describes how to connect to a wireless network using a USB Wi-Fi dongle on the FX7500, and how to connect to a peer device over Bluetooth using a USB Bluetooth dongle.

Connecting to a Wireless Network Using a Wi-Fi Dongle

To connect to a wireless network using a USB Wi-Fi dongle on the FX7500:

1. Plug the supported wireless dongle into the USB host port on the FX7500. Supported dongles are:
   - Wi-Fi over USB adapters with Realtek chipset RTL 8187
   - The following devices were tested:
     - Alfa AWUS036H, visit http://www.alfa.com.tw/in/front/bin/ptlist.phtml?Category=10541
     - CCrane Versa Wifi USB Adapter II, visit http://www.ccrane.com/antennas/wifi-antennas/versa-wifi-usb-adapter-II.aspx

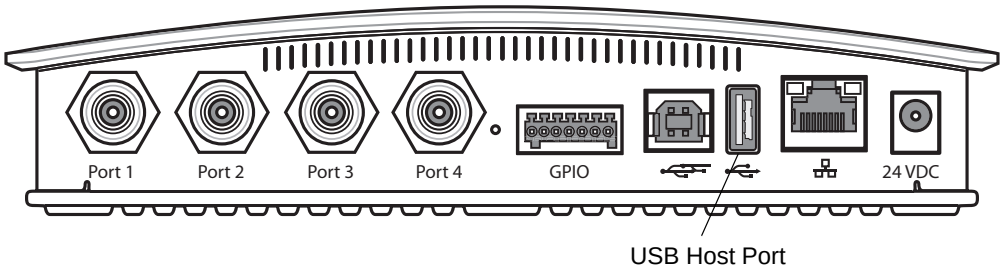


Figure F-1 *USB Host Port Location for Dongle*

2. To confirm that the Wi-Fi dongle is detected properly, log in to the reader Administrator Console. On the Home page ensure the **USB Port Status** displays **Device Connected**. Hover the mouse pointer over this link to display the WiFi dongle information shown in *Figure F-2*.

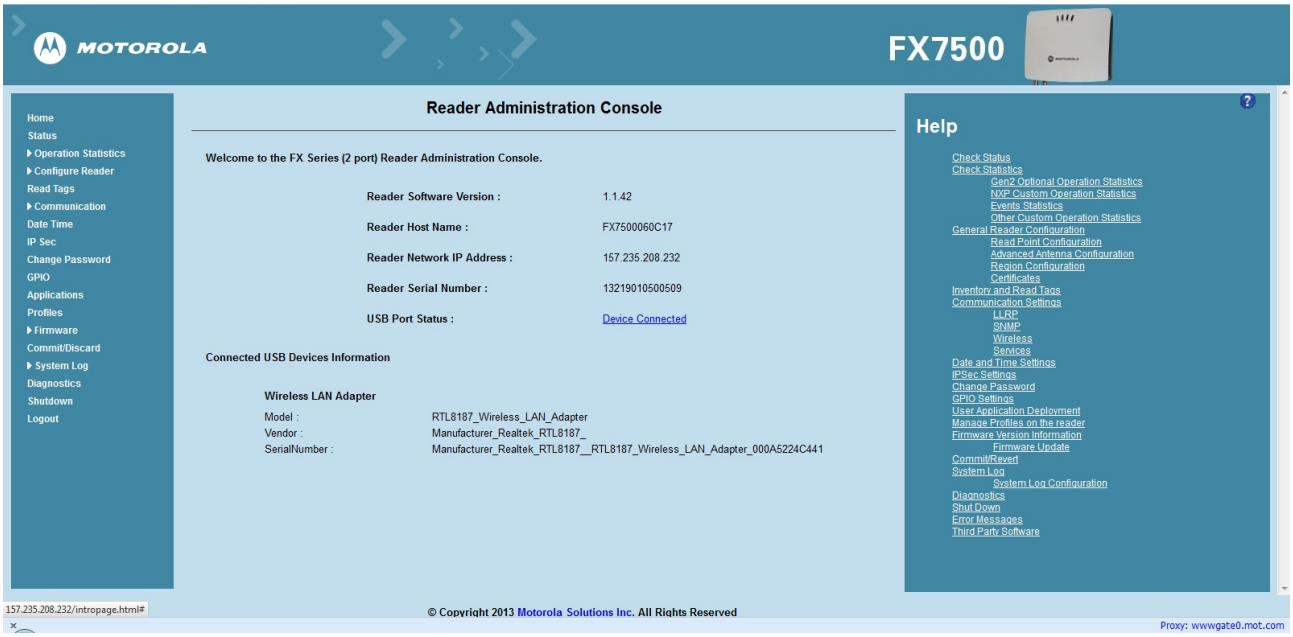


Figure F-2 *Wi-Fi Dongle Connected*

3. Select **Communication > Wireless**.

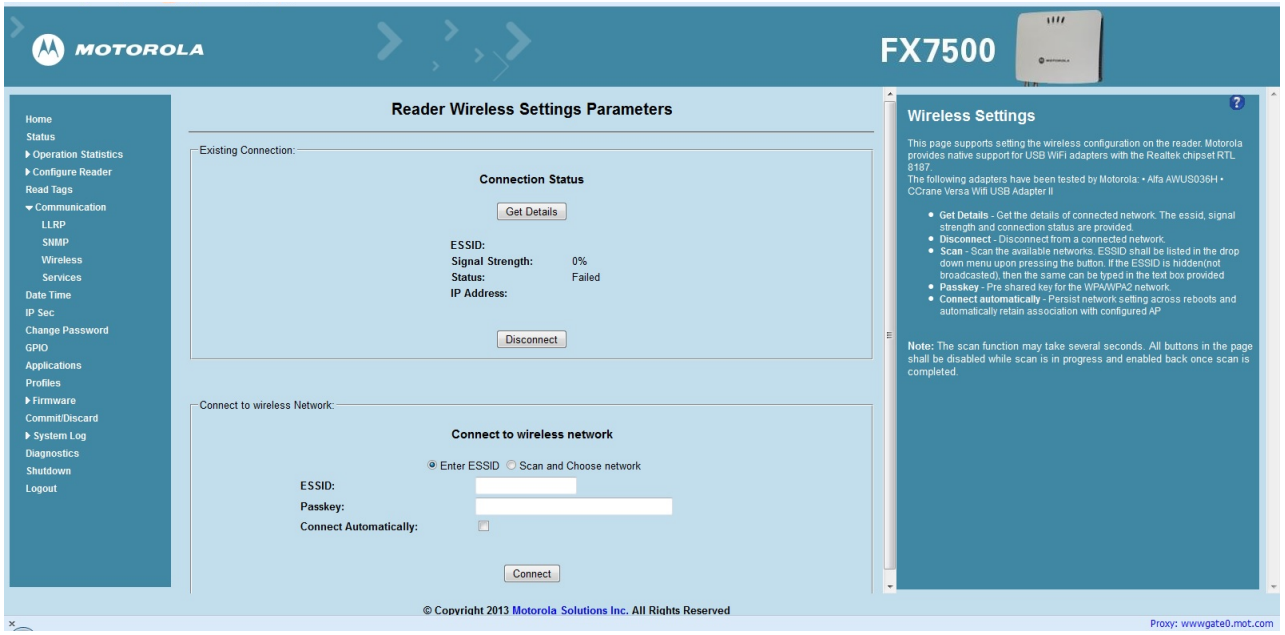


Figure F-3 *Wireless Settings*

The WiFi dongle can connect to the wireless network in one of two ways:

- Manually entering the ESSID (if known).
- Scanning the current list of APs and choosing the correct one to connect to.

4. Once the APs are scanned, enter the appropriate passkey and enable **Connect Automatically** (if required to connect to the AP automatically if the connection is lost).

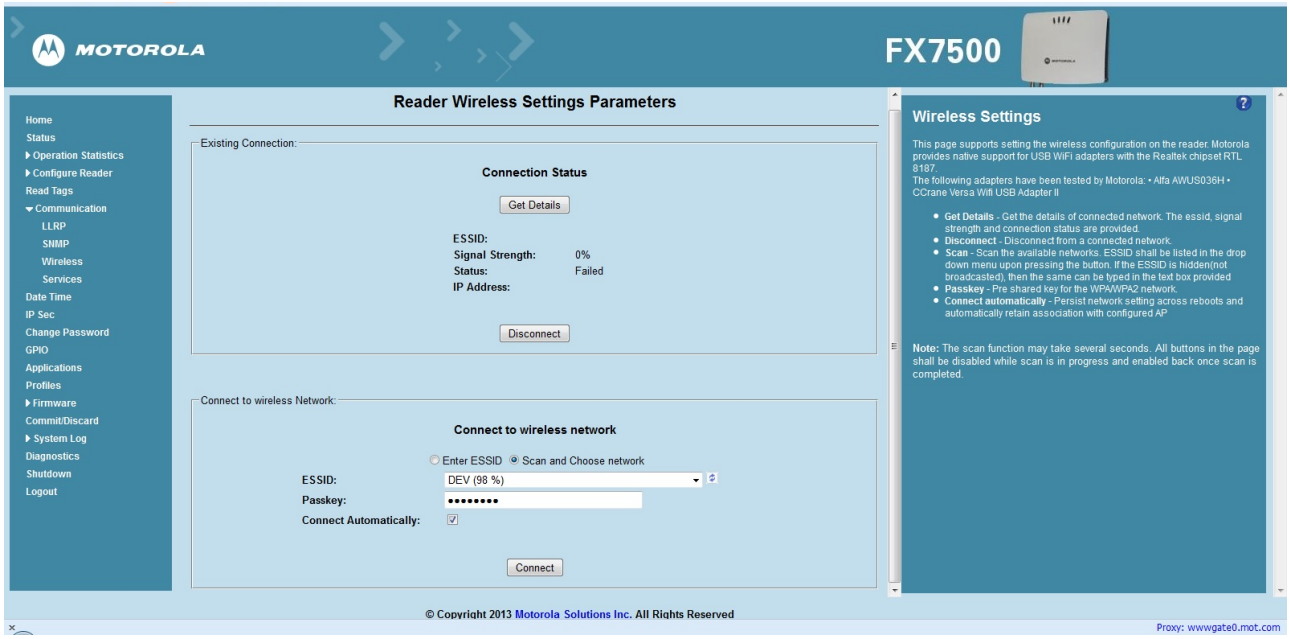


Figure F-4 *Entering Connect Information*

5. Select **Connect**. When the connection to the AP succeeds, an IP is assigned and appears in the **IP Address** field.

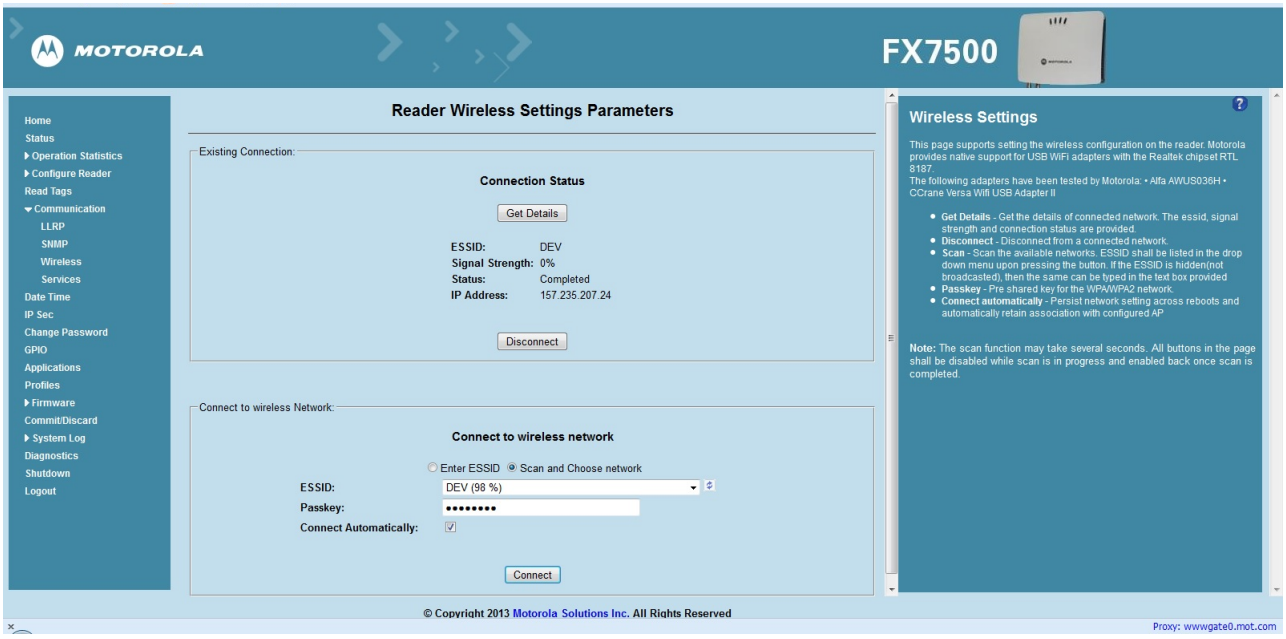


Figure F-5 *Assigned IP Address*

The reader is now accessible using the wireless IP shown in the **IP Address** field (157.235.207.24 in this case). The WiFi interface supports dynamic addressing mechanisms for both IPV4 and IPv6. There is no provision to set a static IP address.

For wireless IP address details, select **Communication > Wi-Fi** tab.

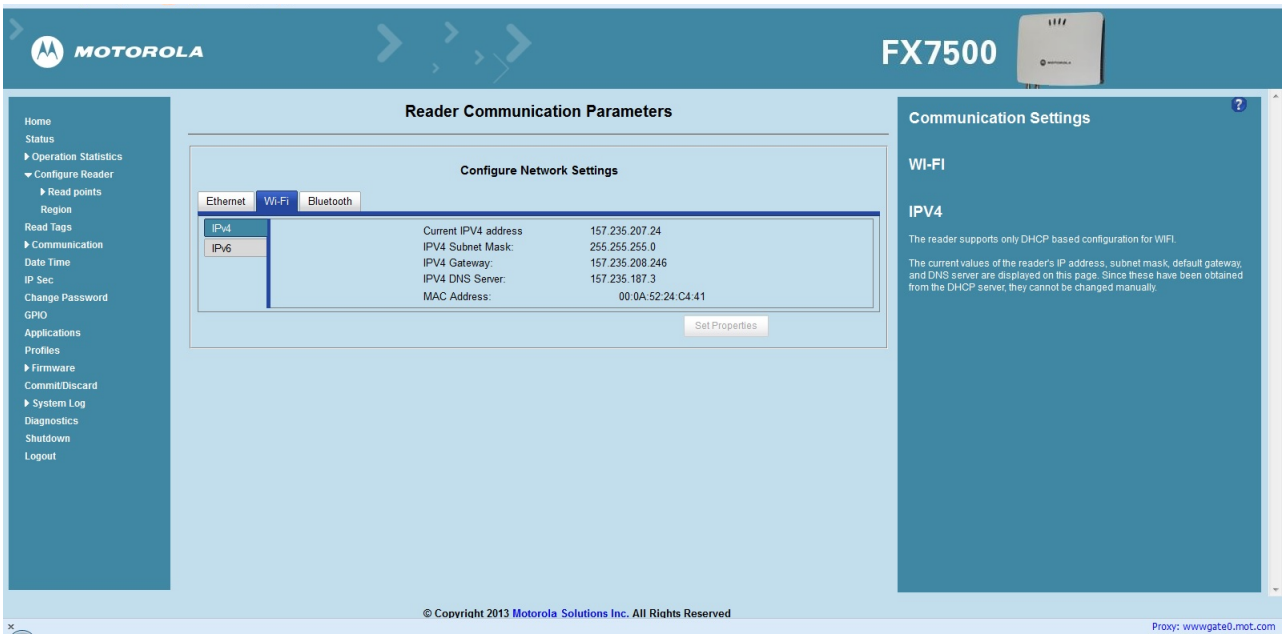


Figure F-6 *Wi-Fi Tab - IPV4*

The reader can also be accessed via Wi-Fi using an IPV6 address if supported by the network to which the API is connected.

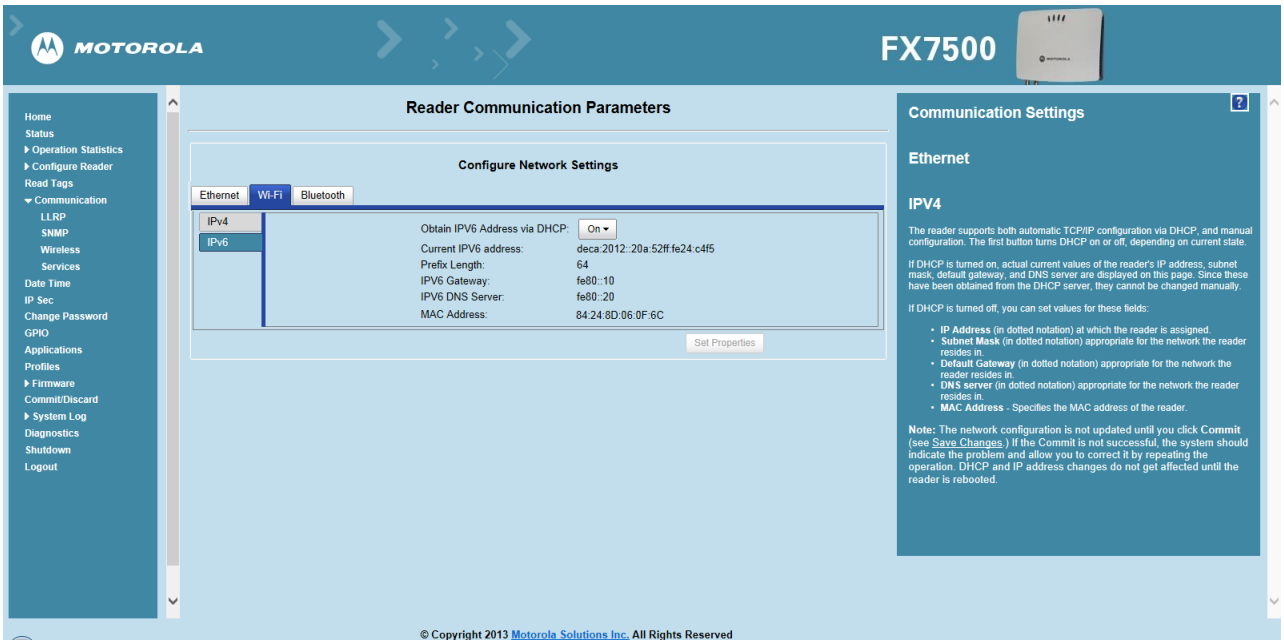


Figure F-7 *Wi-Fi Tab - IPV6*

Connecting to a Peer Device over Bluetooth Using a Bluetooth Dongle

To connect to a peer device over Bluetooth using a USB Bluetooth dongle on the FX7500:

1. Plug the supported Bluetooth dongle into the USB host port on the FX7500. The following Bluetooth dongles are supported on the FX7500:
   - Asus Mini Bluetooth Dongle USB-BT211.
   - MediaLink Bluetooth Dongle MUA-BA3.

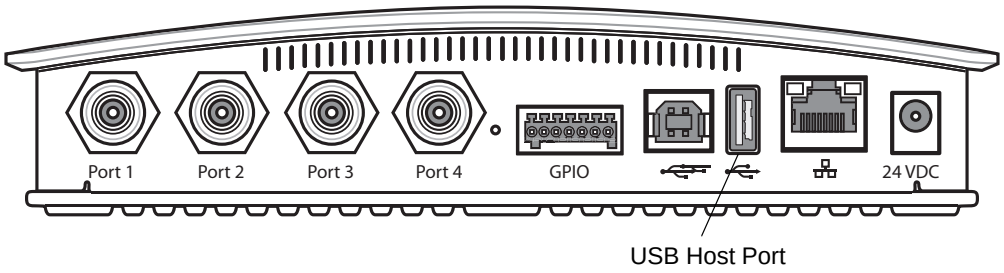


Figure F-8 *USB Host Port Location for Dongle*

2. To confirm that the Bluetooth dongle is detected properly, log in to the reader Administrator Console. On the **Home** page ensure the **USB Port Status** displays **Device Connected**. Hover the mouse pointer over this link to display the Bluetooth dongle information.

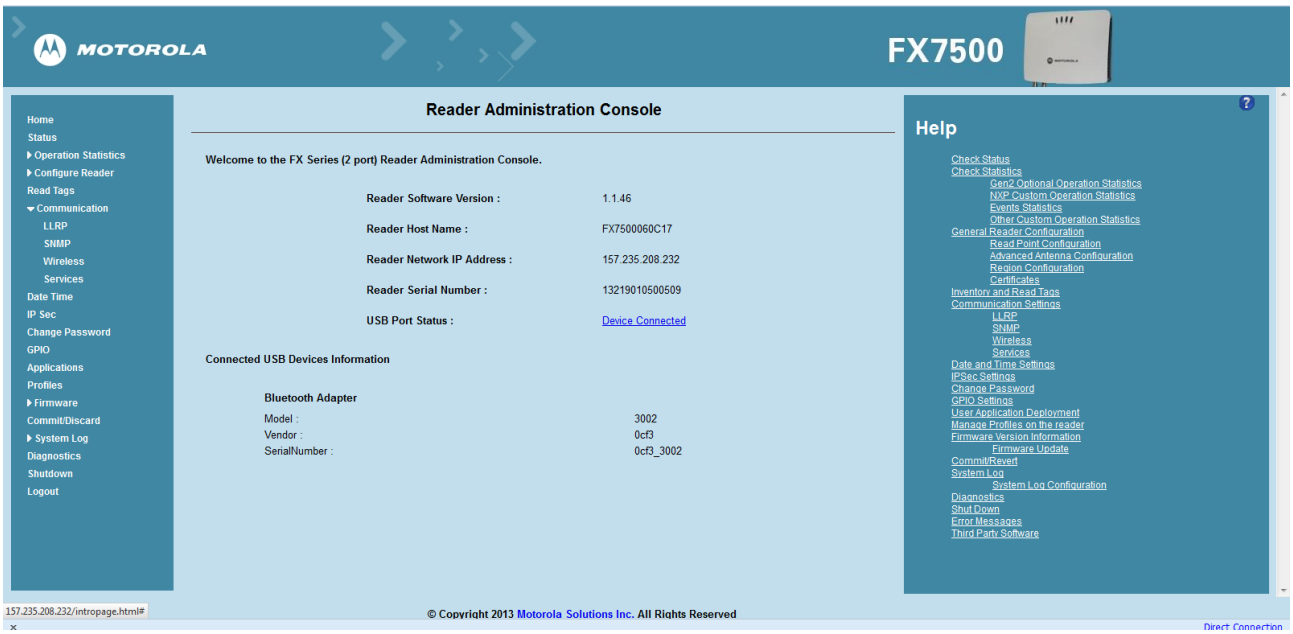


Figure F-9 *Bluetooth Dongle Connected*

3. Select **Communication > Bluetooth**.

4. Change the **Discoverable** and **Pairable** properties to **On**.

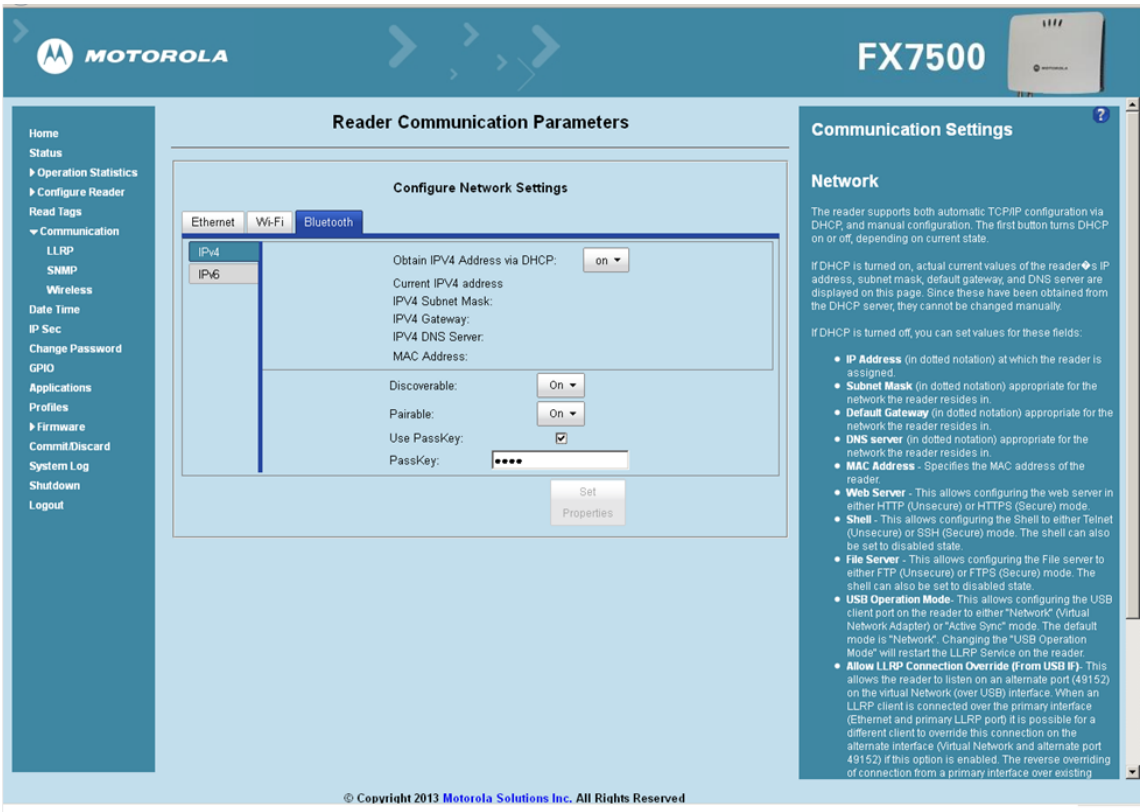


Figure F-10 *Changing Discoverable and Pairable Properties*

5. Optionally select **Use Passkey** and enter a passkey to validate the Bluetooth connection. The default passkey for the FX7500 is **0000**.

6. Discover the reader from a Bluetooth-enabled device (such as a laptop). Use the host name to identify the reader among the discovered devices (e.g., **FX7500060C17**).

7. After a successful connection, right-click the reader icon (e.g., **FX7500060C17**) in the list of Bluetooth devices and select **Connect using > Ad hoc network**. This establishes the network connection for later.

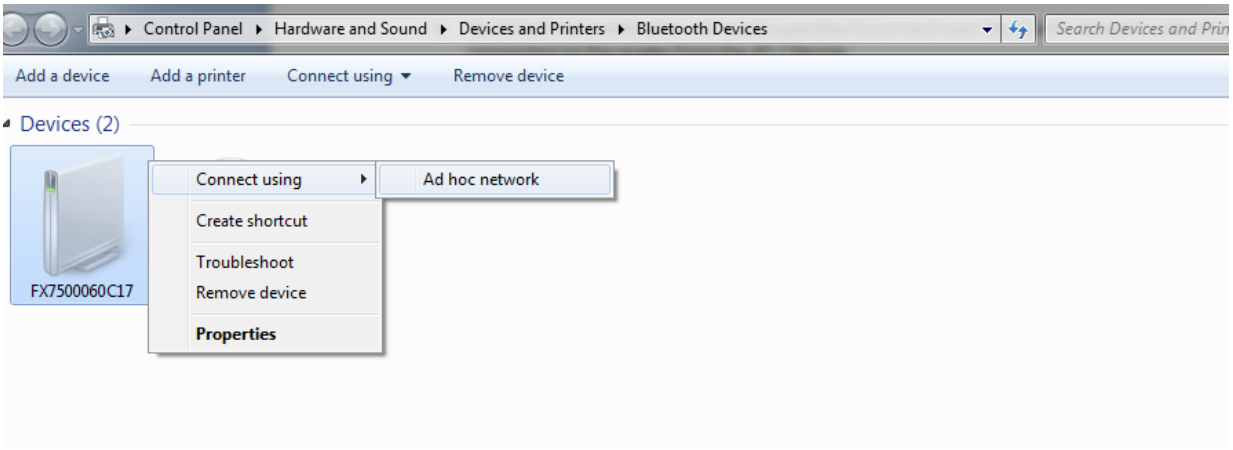


Figure F-11 *Connecting to the Reader*

8. The IP address assigned to the Bluetooth interface is 192.168.XX.XX. The last 2 octets are the last 2 octets of the Bluetooth MAC address (found in the **Properties** window on the PC once the Bluetooth connection is established). Also find this in the **Communication > Bluetooth** page. Both IPV4 and IPV6 based IP address are supported for adhoc Bluetooth connection between the reader and the client.

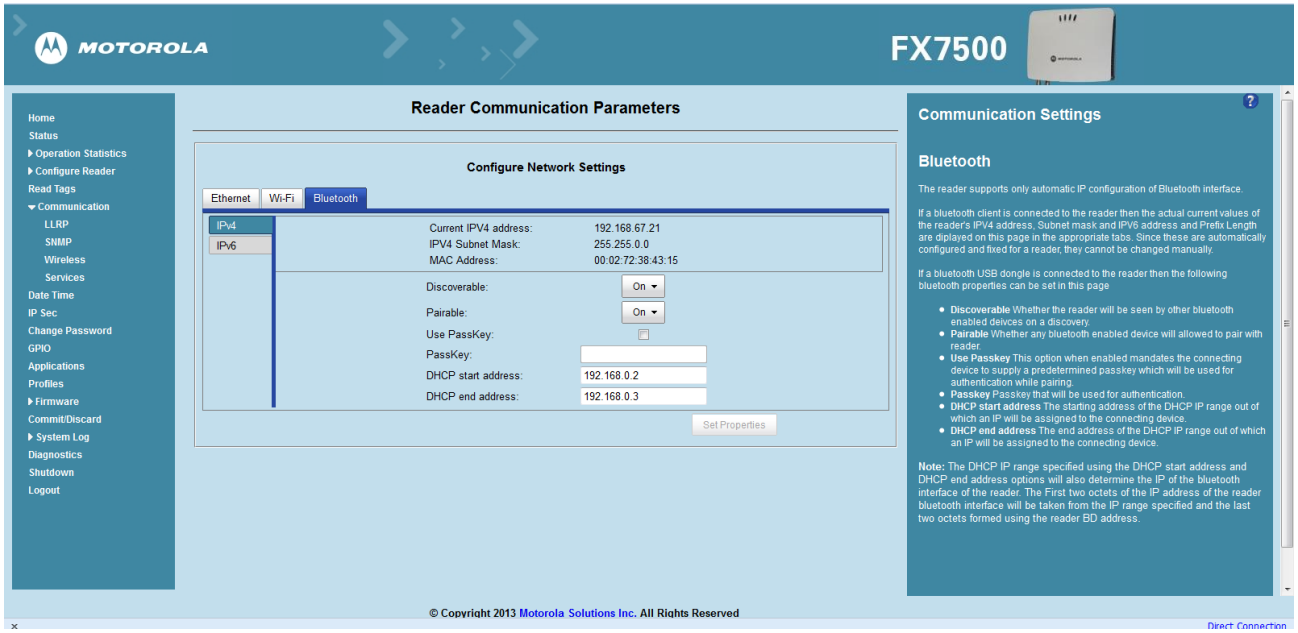


Figure F-12 *Communication Bluetooth Tab*

9. Open the web page or sample application to connect to the Bluetooth IP (192.168.67.21 in *Figure F-12*) and read tags.

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