

Installation of a WilsonPro Cell Booster Kit

Communicating with Syntech's Fuel Management Units (FMUs) via a 4G cell signal is the preferred method of connecting those units to *FMLive*. However, not all locations have a reliable connection to either Verizon or AT&T's cellular network. In these cases, a WilsonPro Cell Booster helps create a strong connection where it may be difficult to do so. The WilsonPro Cell Booster Kit (STS #: 191F0240) may be used in one of two approaches, depending on the existing quality of signal available. Approach #1 makes use of only the cell booster itself, whereas Approach #2 adds directional antennas to concentrate the reception in a certain direction.



This kit comes in five varieties, depending on the length of cable required. The extra length may be helpful to extend the antennas to a higher or more effective mounting location for cell service:

Part Number	Description
191F0240-10	FMU Cellular Booster Kit (3-foot cable)
191F0240-20	FMU Cellular Booster Kit (25-foot cable)
191F0240-30	FMU Cellular Booster Kit (50-foot cable)
191F0240-40	FMU Omni Booster Kit (17-foot cable)
191F0240-50	FMU Omni Booster Kit (35-foot cable)

Parts List

Approach #1: Cell Booster Only



Quantity	STS Part #	Description
2	266586	12-inch SMA-F to SMA-M Bulkhead Cable
1	267294	WilsonPro 4G Cellular Booster

Approach #2: Cell Booster and High-Gain Directional Antennas



Quantity	STS Part #	Description
2	266586	12-inch SMA-F to SMA-M Bulkhead Cable
2	267292	Wilson Outdoor Directional Antenna
2	26730(0, 1, or 2)	RG-58 to SMA-M Cable
1	267294	WilsonPro 4G Cellular Booster
1	267295	40-inch Antenna Mount
4	267296	.250-20 x .500-inch Hex Head Screw
4	210609	5/16-inch Crescent Washer
4	210161	1/4-20 Crescent Hex Nut

Needed Tools (Other Than Common Hand Tools)

- 13/32 socket or pliers
- Drill
- 1/4-inch drill bit
- 3/4-inch drill bit
- Unibit or drill bit in the 5/8 to 1 inch range

Needed Supplies

- 4 - Bolts, 1/4-20 x 1.75 inch
- 8 - Washer, Flat, .265 inch Inside Diameter
- 4 - Hex Nuts, 1/4-20

Installation

Assumptions

This tutorial assumes

- The FMU is powered off.
- You have access to the tools listed above.

NOTE

Unless otherwise advised by Syntech personnel, we recommend attempting to resolve communication issues with Approach #1 first, as the installation steps for both approaches begin nearly identically.

Approach #1

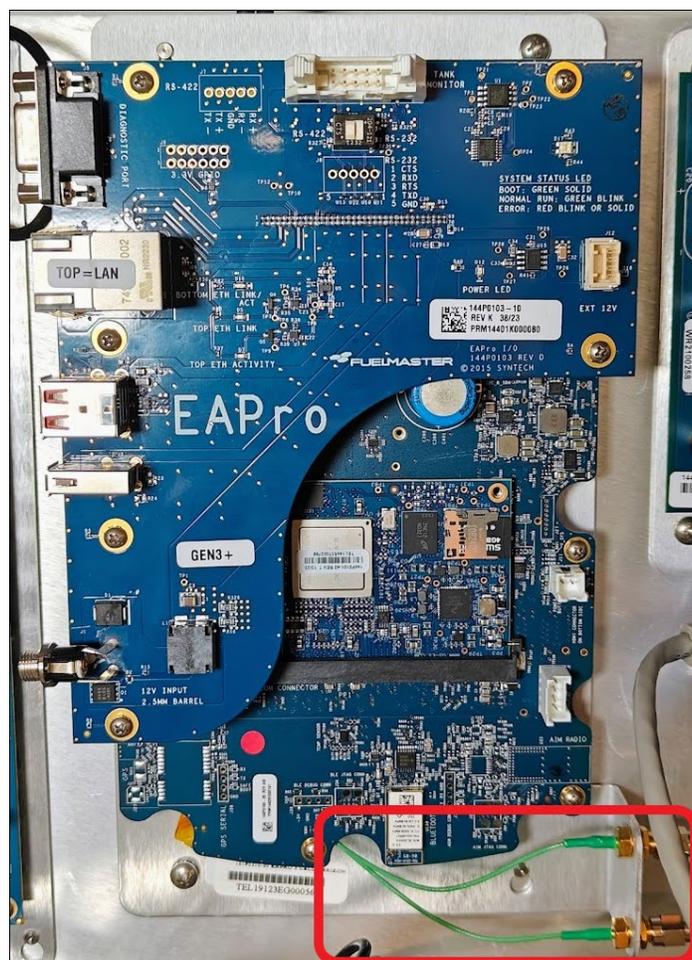
Installation

1. In the FMU's top portion (head), locate the EAPro.

TIP

We recommend taking pictures of all cable connections prior to disconnection.

2. Disconnect all cable connections from the EAPro, aside from the antennas.

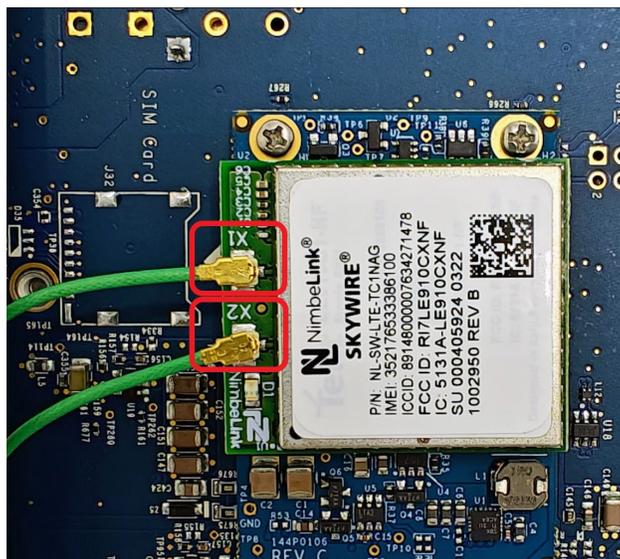


Antenna Leads

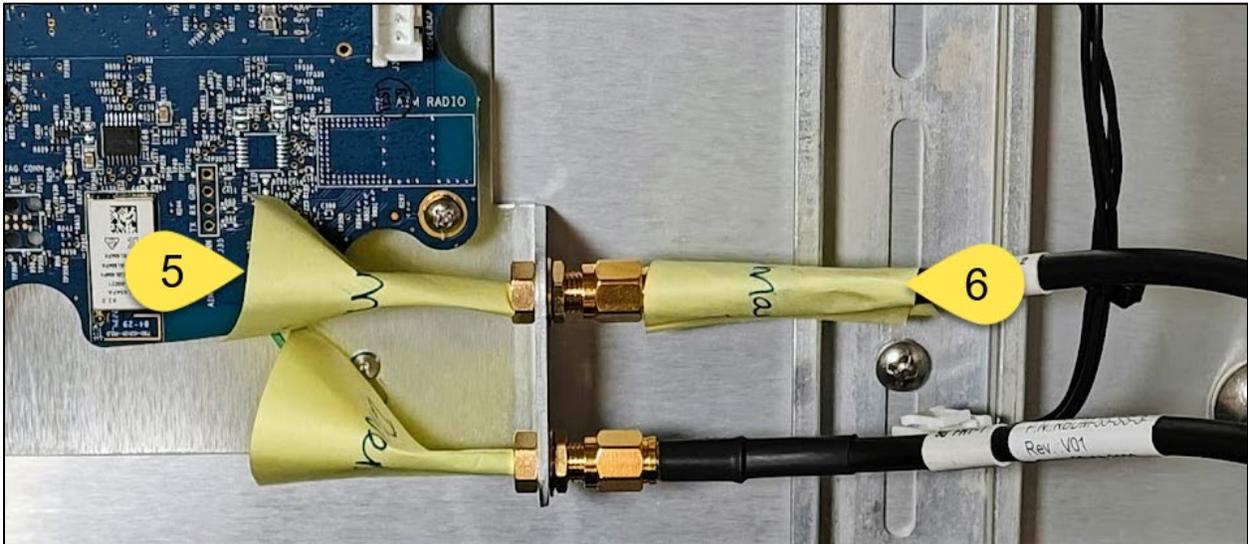
3. Loosen the screws at top-right and bottom-left and lift the EAPro out of the FMU.



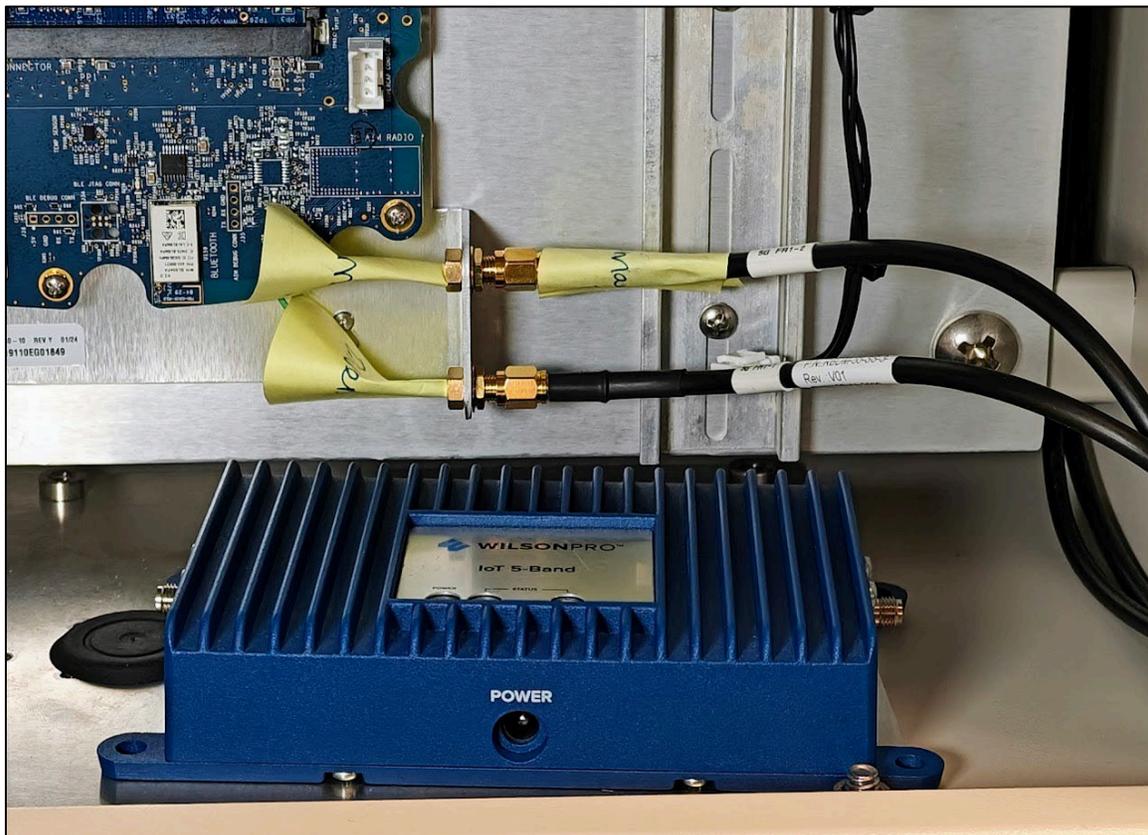
4. Find the X1 and X2 connections (these may be upside-down, as seen below) where the antenna leads connect to the back of the EAPro.



5. Mark or flag the lead connected to *X1* as the *Primary Antenna*.
6. Also mark or flag the cable connected to the FMU antenna as the *Primary Antenna*, so you can identify it later.



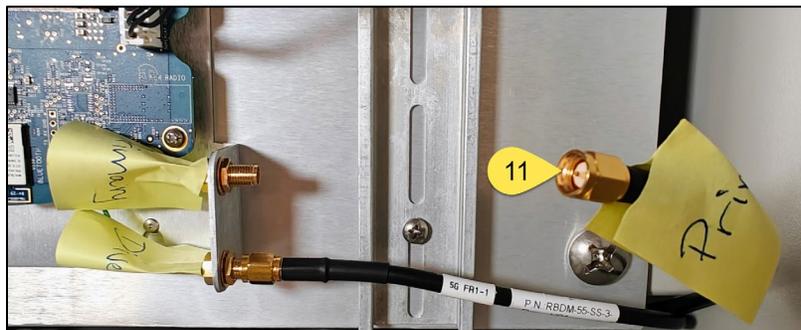
7. Reseat the EAPro on the pegs and screws and tighten the screws at top-right and bottom-left.
8. Place the WilsonPro Cell Booster inside the FMU head where you have room.



9. Connect the barrel connector end of the power cable to the Power input.
10. Connect the plug end of the power cable to the outlet in the FMU head.



11. Disconnect the existing external Primary Antenna cable from the EAPro's Primary Antenna lead.



12. Connect the WilsonPro's included SMA cable to the booster's Data Device port.
13. Connect the other end of the SMA cable to the EAPro's Primary Antenna Lead.
14. Connect the existing external Primary Antenna cable into the WilsonPro's Outside Antenna port.



15. Reconnect all cable connections to the EAPro.
16. Turn on the FMU.

Testing

CAUTION Only certified distributors and Syntech Customer Satisfaction Engineers should access the FMU Operating System to test the connection. If you do not fall into these groups, or if you are a certified distributor and feel uncomfortable running commands, contact Syntech's Customer Satisfaction Center (CSC) at 1-800-888-9136 x2 or at support@myfuelmaster.com.

1. Access the FMU's Operating System through either a direct connection to the EAPro serial port (distributor) or Nagios (CSC technician).
2. Run the sig.sh command:

```
cthorpe@CLEVELANCONCPS1639068789:~$ sig.sh
state: monitor
rsrq: 22
rsrp: 42
```

3. Compare the RSRQ and RSRP numbers to the following table:

Signal Quality	RSRQ	RSRP
Unreliable	255 or 0-5	255 or 0-20
Poor to Fair	6-9	21-41
Good	10-19	42-61
Excellent	20-34	62-97

TIP The *Poor to Fair* category is considered the minimum for connection. If Approach #1 does not at least meet this minimum, proceed to Approach #2. Syntech has found that connections that make the *Good* category see significantly improved connection stability over a *Poor to Fair* connection.

4. If cell signal is still not adequate, turn the FMU off and move to Approach #2.

Approach #2

Adjust Antenna Direction

Assumptions

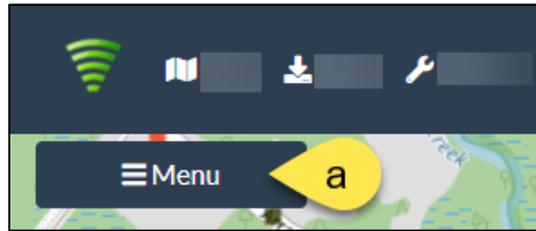
This tutorial assumes

- You know the address of the site or are on site.
- You have access to the internet.

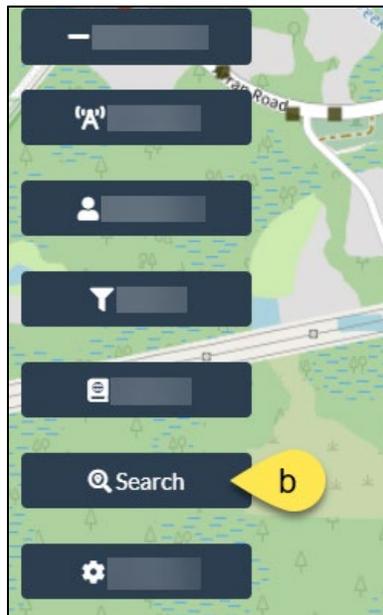
TIP Steps #1-8 may be done prior to on-site installation. If so, you must tell Cell Mapper the address or manually zoom to the address on the map.

1. On an internet browser, browse to cellmapper.net.

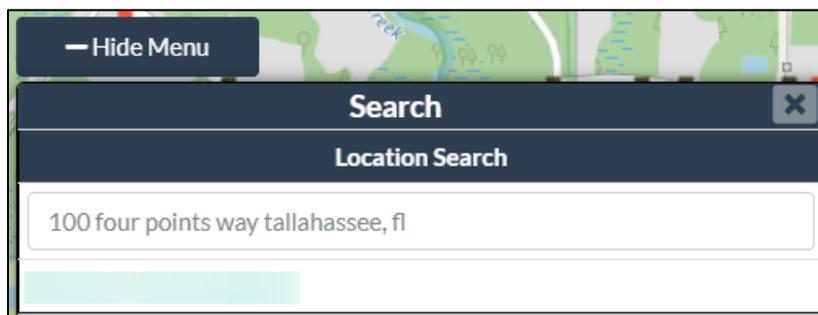
- 2. If not on site, do the following to find the site:
 - a. Select the Menu option



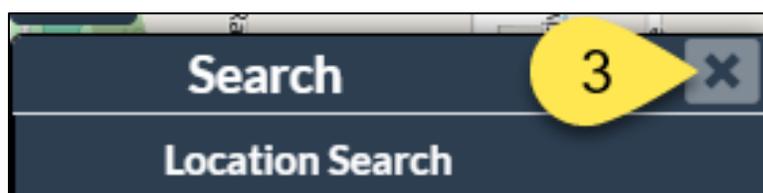
- b. Select the Search option.



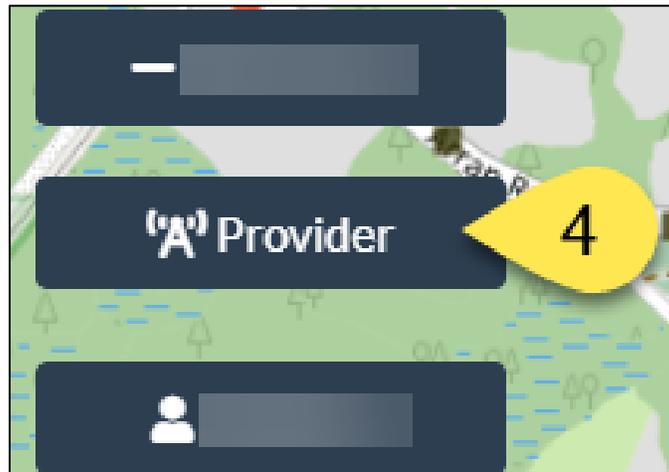
- c. Type the address, city, and state in the Location Search text box; then hit enter.



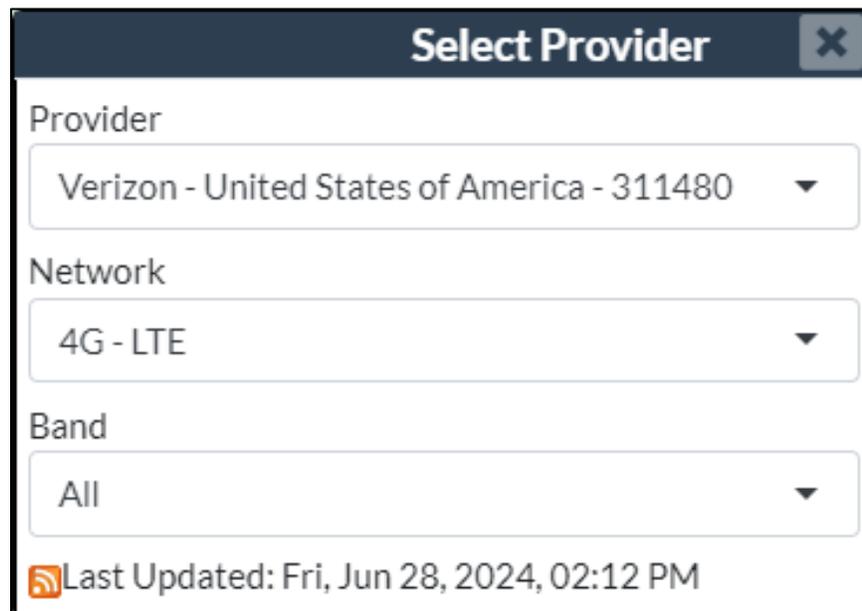
- 3. Select the X at top-right to close the search.



4. Select the **Provider** menu option.



5. In the *Select Provider* modal, find the cellular provider. Most FMUs use Verizon, but some may use AT&T. Contact Syntech's Customer Satisfaction Center if you are unsure of which is being used for a given customer.
 - a. AT&T Mobility - United States of America - 310410
 - b. Verizon - United States of America - 311480



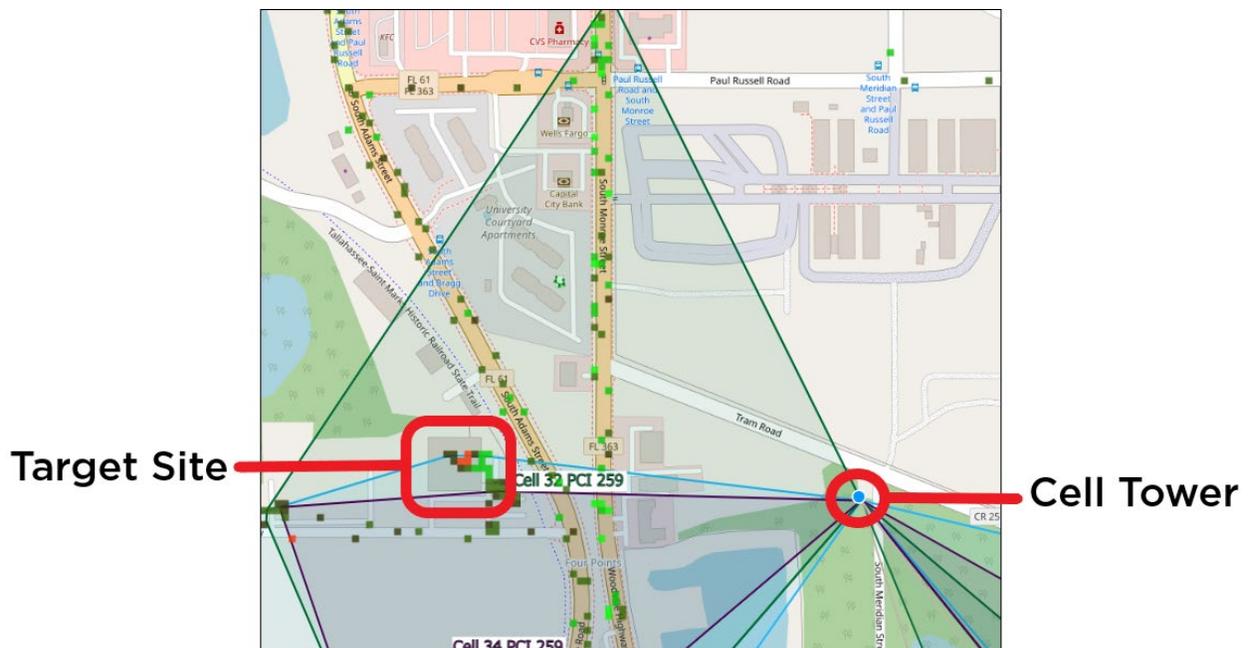
6. Select the X at top-right to close the modal.



- Zoom out on the map until you see a cell tower symbol. These may be green or red. Tower color does not matter for this application.



- Select one Cell Tower at a time until you find one whose cell coverage includes the site.



Attach Bracket to FMU Cabinet

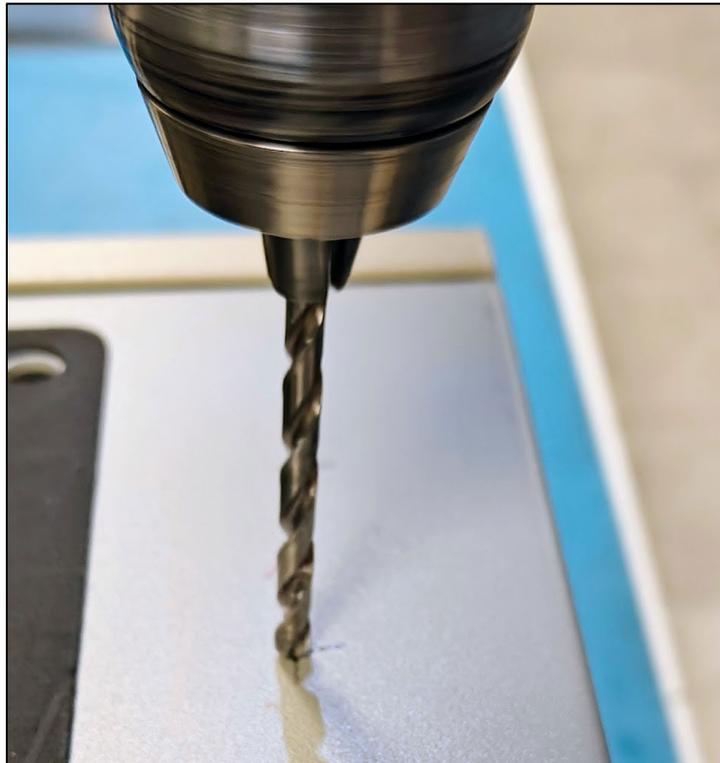
NOTE

If not mounting to the FMU, follow Steps #1-3 as written, then follow Steps #4-9 as if referring to your chosen mounting location.

1. Find a spot on the right underside of your FMU head to not disturb any hardware inside. The best spot to mark will depend on the installed parts in the FMU head. Our installation was about 1½ inches from the side of the cabinet and about 3 inches and 5 inches from the front of the cabinet.



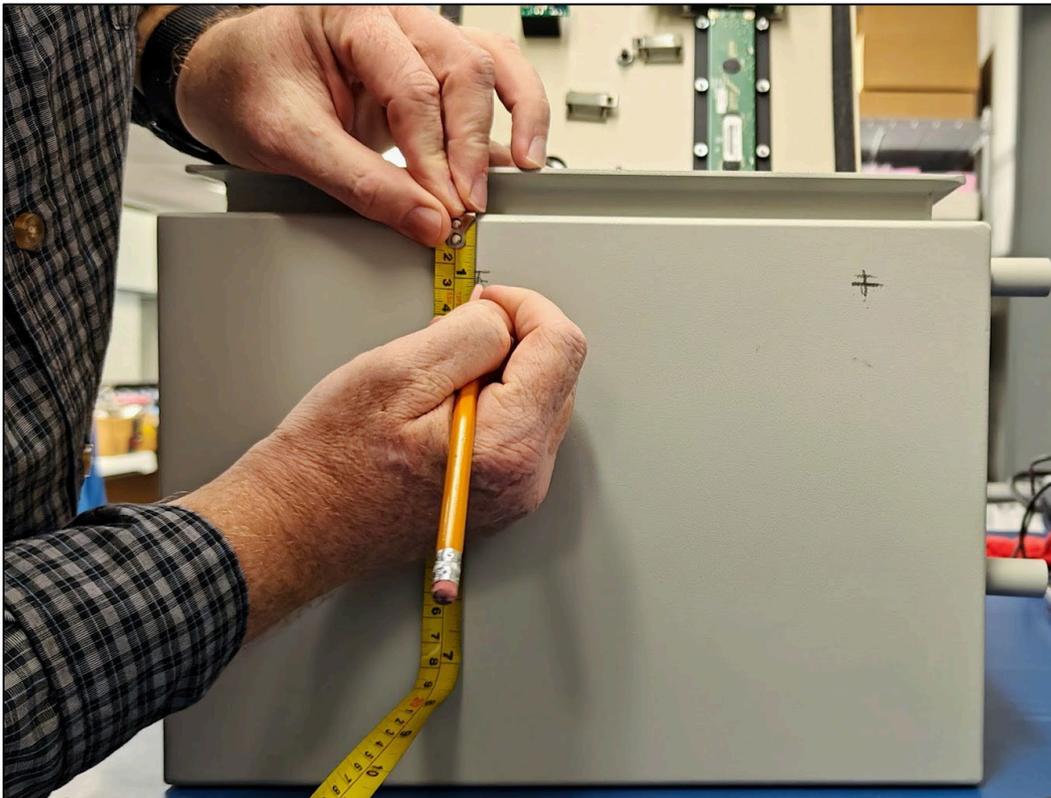
2. Drill out two ¼-inch holes - large enough to insert the threaded portion of the bulkhead connector but not the whole connector.



3. Determine where on the FMU head works best to mount the Bracket to not disturb any hardware inside. The best spot to mark will depend on the installed parts in the FMU head. Our installation was about 2 inches and 8 inches from the top of the cabinet and about 1 7/8-inch and 5 5/8-inches from the front of the cabinet.



4. Mark each of the four locations you'll need to drill out.



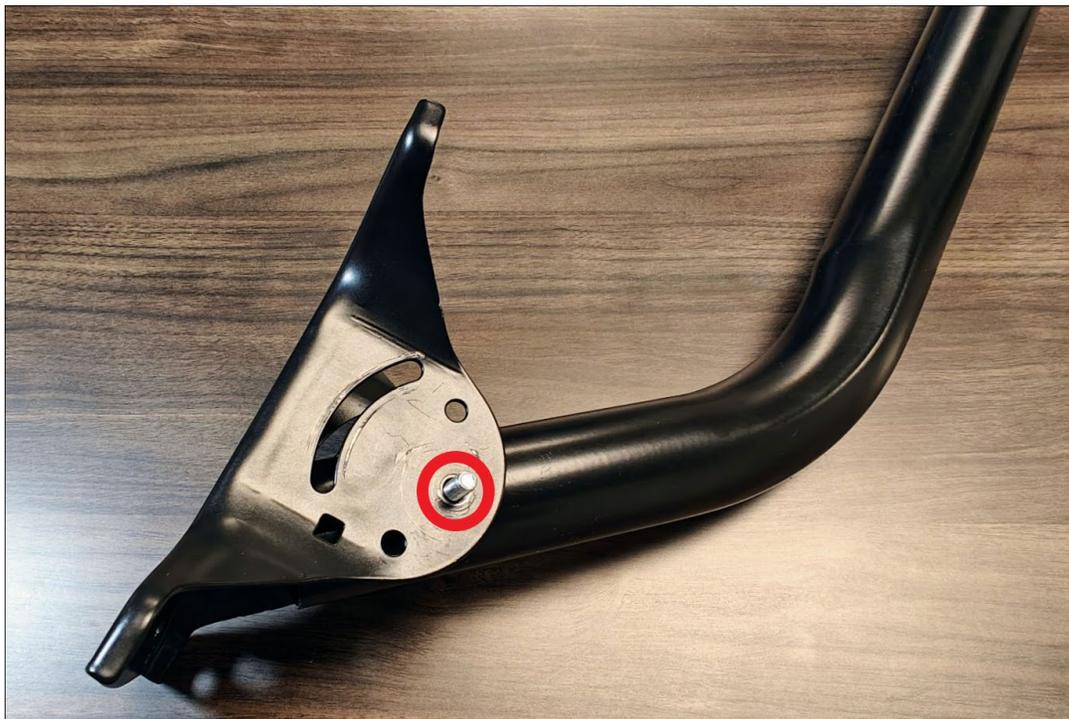
- Using a 1/4-inch drill bit, drill each of the four holes needed to mount the bracket.



- Insert a bolt through a washer from the outside of the FMU head.
- On the inside, add a washer, and tighten it with a nut.
- Apply waterproofing sealant to the mounting bracket holes to prevent water intrusion.

Attach Antenna Mount to Bracket

- Insert the 60mm bolt through the central hole of the bracket and mount.



2. Use one of the hex nuts to lightly secure the bolt. Do not fully tighten.



3. Insert one of the 12mm bolts through the bottom of the Mount so that it also protrudes through the arc of the Bracket.
4. Secure to hand-tight with a hex nut.



5. Flip the Bracket over and repeat Step 4.
6. Tighten all hex nuts.

CAUTION

While the Antenna Mount is rated for outdoor use, you may find it helpful to weatherproof the top opening to prevent corrosion, especially if the Mount will be exposed to the elements.

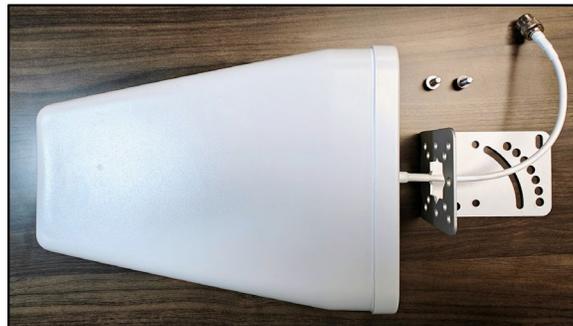
Attach Antennas to Antenna Mount

TIP

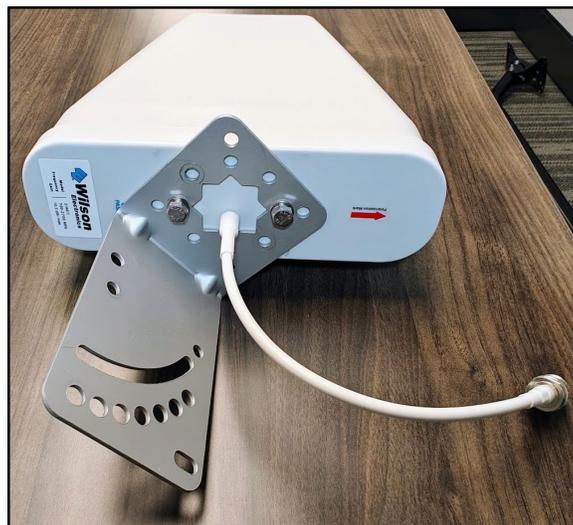
The antennas are directional; therefore, orientation matters. Above the back of each antenna's L-Bracket is a sticker with an arrow labeled *Polarization Mark*. This arrow will point upwards at a 45° angle once mounted.



1. Unscrew the 2 bolts, as well as the associated washers, holding the L-Bracket to the antenna.



2. Rotate the antenna 45° to one side and reattach the L-Bracket with the bolts and washers.



- Repeat Steps 1 and 2 with the other antenna, taking care to rotate the L-Bracket 45° in the opposite direction.



- Take a U-Bolt and its bracket, along with 2 nuts, a crescent washer, and a regular washer.
- Sandwich the Antenna mount between the U-Bolt and its bracket.
- Thread the U-Bolt through the mounting holes on the Antenna L-Bracket. Choose holes that will aim your antenna at the cell tower.
- Lightly secure the Antenna in place with a washer, a lock washer, then the nut.
- Repeat Step 7 for the other leg of the U-Bolt.



- Repeat Steps 4-8 for the other Antenna.



- Measure six inches between the L-Brackets and tighten the Antennas to the mast, ensuring that the Antennas point in the direction of the cell tower.

Connect Antennas to FMU Hardware

- Attach one of the bulkhead cables to the WilsonPro's *Outside Antenna* port.



- Attach the other cable to the EAPRO *Diversity* antenna port.



3. Unscrew the nut from each of the bulkhead cables.
4. Feed the bulkhead cables through the holes in the FMU head.



5. Tighten the washer and nut from the outside of the FMU cabinet.



6. Attach the cables from the external antennas to the bulkhead connectors on the bottom of the FMU head.



7. Turn the FMU on and test the connection. The final product inside the FMU head should appear similar to the below picture.



TIP

If any questions arise, contact Syntech Systems, Inc.'s Customer Satisfaction Center (CSC) at 1-800-888-9136, ext. 2, or email support@myfuelmaster.com.

Change History

Date	Description
08/15/2024	Originally published.