Lantern™ 5G Outdoor FWA Installation Instructions

Airgain, Inc

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- SEVERE DAMAGE WARNING. The Lantern 5G FWA must be powered by the Airgain Lantern Ethernet Injector (Lantern-EI) or equivalent cURus and CB certified ethernet injector.
- HOT. Do not touch the Lantern 5G FWA while operating. Power it off and allow it to cool down for 30 minutes to a safe temperature after use before touching it.
- MAINTAIN A SAFE DISTANCE. Stay 25 cm (10 inches) or more away from the Lantern 5G FWA during normal operation.

FCC RF Radiation Exposure Statement

To comply with the FCC RF exposure compliance requirements, this device must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 25 cm between the device and the nearest person during normal use.

For more information on consumer issues, visit the FCC's Consumer Help Center at www. fcc.gov/consumers.

Table of Contents

1. Overview

The Lantern 5G FWA is a high-performance outdoor cellular modem with built-in directional antennas. It provides high-speed data over 5G and 4G LTE networks using Airgain's world-class antennas.

The Lantern 5G FWA has an environmental rating of IP67 for water and dust ingress.

The Lantern 5G FWA can operate within a temperature range of -30°C to 60°C (-22°F to 140°F).

2. Tools Required

Required for installation:

- As appropriate, use a ladder, bucket truck, or scissor lift to safely install the device.
- A smart phone or laptop to connect to the signal strength and quality gauge over Wi-Fi.
- An activated SIM card (4FF nano)
- Torx screwdriver
- Drill
- Rachet wrench
- AC Extension Cord
- Two M8 wrenches for tightening inner mounting bracket joints
- Appropriate tool for M6 socket head cap screws
- If mounting to a pole (up to 5" diameter)
    - Appropriate tools if using M8 nuts and hex head screws
    - Flat head screwdriver if using hose clamps
- If mounting to a wall
    - Four appropriate M8 or 5/16" diameter screws depending on the wall material
        - These screws are not included
    - As well as any relevant tools
- If routing cables through a wall
    - Drill
    - Silicone sealant

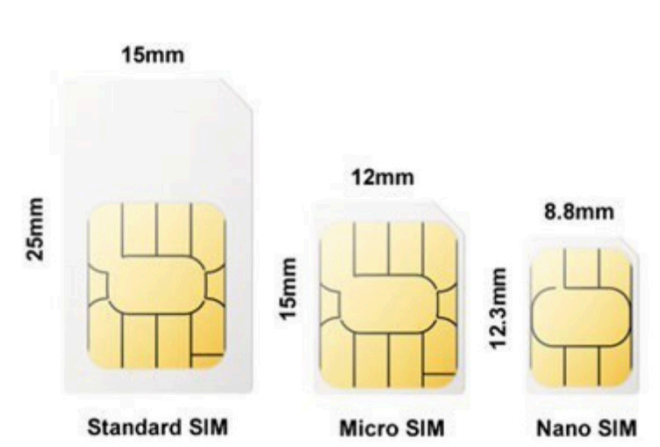
Optional tools:

- Flexible cable clips or vinyl siding clips
- AC extension cord (if needed for testing different locations with CPE)

3. Prior to Installation

1. Verify all contents are included in the box. The box should include:
    A. The Lantern 5G FWA.
    B. A quick-start card with a QR code.
    C. A multi-use mounting bracket.
    D. Four M6 x 20mm socket head cap screws to attach the mounting bracket to the Lantern FWA as well as four M6 flat washers.
    E. Four M8 x 140mm hex head screws for attaching the mounting bracket to a pole as well as four M8 nuts, four M8 split lock washers, and eight M8 flat washers.
    F. Two hose clamps for attaching the mounting bracket to a pole.
    G. An optional Ethernet Injector. This device provides power through the Ethernet cable to the Lantern 5G FWA device.
    H. A set of tweezers for inserting or removing the SIM card.
    I. A T-10 Security Torx screwdriver for opening and closing the SIM card door.
2. Perform a bench power up with the ethernet injector connected to the chosen device (laptop, Wi-Fi router, or other).
    A. It is much easier to troubleshoot on a bench prior to installation.
    B. Install the **ACTIVATED** SIM card.
        a. Unscrew the protective shield over the SIM slot using the included torx screwdriver.
        b. Ensure that the SIM card is in the correct orientation before inserting it as shown in the picture below. When looking from the rear (heatsink) side of the device, the metal contacts should face toward you, with the notch on the left side.

c. Use the included tweezers to push the SIM into the slot until it clicks in place.
   - Be careful not to use excessive force.
   - Note, this device ONLY supports Nano SIM cards.



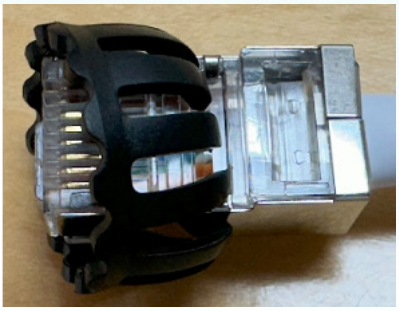
d. Re-attach the SIM cover with the two provided Torx screws hand-tight.

e. Install the PoE cable and bulkhead connector.
   - Make sure you use the PoE cable that was supplied with your Lantern 5G FWA. This cable has the correct dimensions and ratings for use with Lantern. If using your own cable, there must not be a protective rubber boot around the ethernet connector that attaches to Lantern. (The rubber ethernet cable boot over the connector will NOT fit inside of the bulkhead connector).Ensure that you have the components shown in the picture below. Components of the bulkhead connector are:

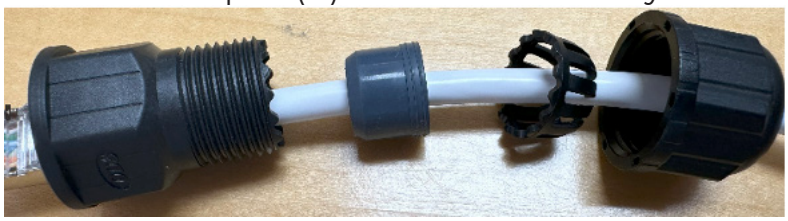
A. The bulkhead cap
B. The bulkhhead coupler
C. 2-piece rubber water seal
D. Cable strain reilef cage

- First, insert the non-booted ethernet connector into bulkhead cap (A) shown above. Notice that the bulkhead cap has square cut-outs. When inserting the cable into (A), align the square cut-outs to the edges of the ethernet connector as shown below.

- Next, insert the cable through the cable strain relief cage (D) as shown here:



- Next, assemble the 2-piece rubber water seal as shown in (C) above onto the cable. Then insert the cable through the bulkhead coupler (B). The final assembly should look like this:



- Next, screw the bulkhead coupler (B) onto Lantern as shown here:

- Next, push the 2-piece rubber water seal (c) into the bulkhead coupler (B) as shown here. Notice the orientation of the rubber water seal. The smaller tapered end of the water seal should face the bulkhead coupler (B):

- Next, push the cable strain relief cage (D) onto the bulkhead coupler (B) as shown here:

- Lastly, screw the bulkhead cap (A) onto the assembly (hand-tight) as shown here:

C. Connect the Ethernet injector

- Insert the booted end of the PoE cable into the ethernet port labeled “POE” on the Ethernet Injector. Plug the Ethernet Injector into an AC outlet.

- Next, connect your computer, laptop, or Wi-Fi router to the LAN port on the PoE injector.

D. It is highly recommended to connect the Lantern 5G FWA to any router it may be deployed with and verify the configuration on a bench-top BEFORE final installation.
   a. Ensure a proper data connection to a device directly connected to the Ethernet port on the Ethernet Injector.

E. Note: The provided optional Ethernet Injector's AC cable can be plugged into 90 to 264VAC at 47 to 63Hz.

F. Even though the Ethernet Injector includes 6kV of lightning surge protection and is tested to UL60950-1, Airgain recommends using a surge protector strip for extra protection.

G. The Ethernet Injector's LED is green when it is powered on.

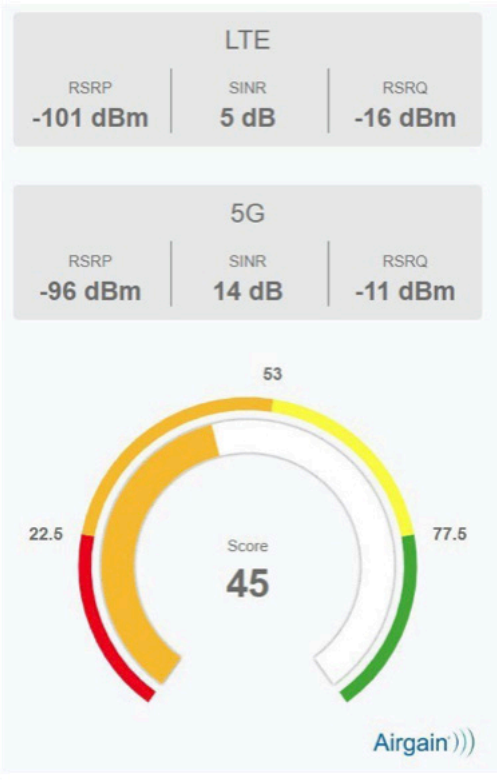
H. Turn on the EZ Installation Wi-Fi Access Point.
   a. Connect a computer to the "LAN" port on the Ethernet Injector.
   b. Open a web browser on your computer and log in to the Lantern 5G FWA's GUI interface
      - In your web browser, type in: http://192.168.15.1
   c. Username: Operator
   d. Password: (refer to the label on the inner carton box)
   e. Click on Wi-Fi, then Basic.
      - Note: This Wi-Fi interface does NOT have connection to the internet. This Wi-Fi interface is only used during installation to access the signal strength and quality meter. This is used to point the FWA in the best direction to obtain optimum signal strength and quality.
      - Check the box to "Enable 2.4GHz Wi-Fi" as shown below.
      - Type in your preferred network name (SSID) and password. Record this information.

      - Click "Apply" to save changes. You may now disconnect your computer from the Ethernet connection.

4. Prior to Mounting

1. You are now ready to determine the mounting direction:
    A. Power up the Lantern 5G FWA in the general location of where you want it installed.
    B. Connect your phone or laptop to the Wi-Fi SSID that you chose above.
    C. Once connected to the Wi-Fi access point, open a web browser and type in http://192.168.15.1 and hit <ENTER>.
    D. The browser will automatically show the following gauge on the web page.
        a. The gauge shows the 4G LTE and 5G bands that the device is connected to (or not). The gauge also shows a Red → Orange → Green status bar. Green is best.
    E. The gauge will update once every 3 to 5 seconds.
        - Note, a table is shown below that can also be used to evaluate the signal coverage:
            - RSRP = Reference Signal Received Power
                - RSRP is a metric used to measure the power of the signal that is received.
            - SINR = Signal to Interference plus Noise Ratio
                - SINR measures ratio of the desired signal power to the power of interfering signals and noise.
            - RSRQ = Reference Signal Received Quality
                - RSRQ measures the quality of the reference signal received by the device.
        - A gauge is also displayed with a "Score." This is meant to provide a quick-reference for the combined measurement of RSRP, SINR, and RSRQ.
            - Red means a "low power or poor quality" cellular connection.
            - Orange and yellow means "medium power or quality" cellular connection.
            - Green means a "Good power and good quality" cellular connection.
            - A speed test (available from many sources online) can also be run to measure the throughput and latency of the connection.

	RSRP (dBm)	SINR (dB)	RSRQ (dB)
Excellent	Above -80	Above 20	Above -10
Good	-80 to -90	13 to 20	-10 to -15
Mid-Cell	-90 to -100	0 to 13	-15 to -20
Cell Edge	Below -100	Below 0	Below -20



F. Over the next minute (or longer), change the alignment position (pointing direction of the front panel of the Lantern 5G FWA) and pause for 10 seconds to read the signal strength and quality gauge.
   a. Take note of the direction that has the highest / best “Score.”
   b. This is the direction you want to mount the FWA for the permanent installation.

5. Select the Mounting Location

1. Mount the Lantern 5G FWA in a location:
    A. Where there are no (or minimal) obstacles blocking the line-of-sight in the direction you determined in the previous step.
    B. At least 18 inches away from other antennas.
    C. At least 2 meters above ground level and out of reach of children.
2. The Lantern 5G FWA must:
    A. Be at least 1 meter from any electrical light, electrical panel, electrical line, or electrical plug.
    B. Be installed at least 7 meters from overhead power lines.
    C. Meet all applicable local, state, and federal codes. Avoid running the PoE cable along other conduit lines for AC-power or Cable TV. These lines can cause interference.
    D. Adhere to all FCC (or applicable regulatory body) rules and regulations.
3. Mounting considerations
    A. Ensure silicone is used to seal any holes drilled to route the PoE cable into a building.
    B. If mounting on a roof:
        a. Always seal any mounting holes with tar or Bishop tape.
        b. Ensure that the mounting surface can support the weight of the unit (even under wind load).
        c. Try to mount on an overhang, if possible, to minimize holes drilled through shingles.
    C. If mounting on a wall:
        a. Ensure that the mounting surface can support the weight of the unit (even under wind load).
    D. Cabling requirements:
        a. If the included Ethernet cable is not used, the cable that connects the outdoor Lantern 5G FWA unit and the indoor Ethernet Injector must be outdoor rated and shielded Cat5e or better ethernet cable.
        b. We recommend using no longer than 75 meters total length of cable, including the cables inside the building.
        c. After attaching the ethernet cable to the outdoor unit, ensure that the cable is angled downward into a loop before being curved up and into the building. This will help prevent water ingress through the ethernet bulkhead connector.
        d. Secure the cable to the building or mounting pole using wire ties, cable clips, or other exterior cable attachment method.

Notes:

- The Installer may encounter various obstacles with individual installations that may require different placement, routing of cables or drilling of holes to complete the mounting procedure.
- When routing cables, do not pull on the connectors. Pulling directly on connectors may cause damage.

6. Attach the Mounting Bracket

1. Mounting to a pole with M8 screws:
    A. Torque each M8 screw to 10 Nm (88 in-lbs)
    B. Avoid over tightening as this may damage or distort the mast tube section
2. Mounting to a pole with hose clamps (less secure than M8 screws)
    A. Fit both pieces of the rear mounting bracket around the mast (not to exceed 5" diameter) and secure at desired height with the hose clamps
        a. Avoid over tightening as this may damage or distort the mast tube section
3. Mounting to a wall
    A. Ensure there are no obstructions or utilities behind the mounting surface
    B. Align rear mounting bracket on the wall in desired position
    C. Secure bracket to wall with appropriate M8 or 5/16" diameter screws (not provided in package)
4. Fitting to the Lantern FWA
    5. Ensure the mounting bracket is securely fixed to the Lantern FWA.
    6. Align the 100x100mm VESA pattern on rear of the Lantern FWA with the front mounting bracket such that the cables extend down towards the ground.
        a. If necessary, the front mounting bracket can be separated from the rear mounting bracket at the inner joints to ease installation
    7. Secure the Lantern FWA to front mounting bracket with the included M6 screws
        a. Torque each M6 screw to 8 Nm (70 in-lbs)
    8. Adjust the horizontal and vertical angles as desired by loosening and tightening the inner mounting bracket joints
        a. Both joints can be adjusted 5° for each tooth, and a total of 40° in either direction
        b. Torque each M8 joint screw to 20 Nm (15 ft-lbs)

7. Troubleshooting: No Connectivity

- Is the Ethernet Injector LED lit? If not then there is a power problem.
    - Verify the wiring between the Ethernet Injector and the AC source.
    - Ensure the power cable is connected properly
    - If none of the above result in the EI powering on, contact Airgain support
- Was the SIM card inserted?
- Was the SIM card activated prior to insertion into Lantern 5G FWA?

The LEDs can also indicate the device's status. On the back of the unit there are 2 LEDs next to the "5G" and "4G" next to the SIM card door.

LED Indicator	Status	Description
5G	Steady Blue	5G Signal Strong
	Steady Green	5G Signal Medium
	Steady Yellow	5G Signal Weak
	Blinking Blue	5G trying to register with the network
	OFF	4G Only
4G	Steady Blue	4G Signal Strong
	Steady Green	4G Signal Medium
	Steady Yellow	4G Signal Weak
	Blinking Blue	4G trying to register with the network
	OFF	5G Only
Both LEDs Off		The unit has no power.
Both LEDs steady with light Blue		The unit is booting.
Both LEDs steady with Red		No SIM card, or a SIM card issue.
Both LEDs blinking Red		PUK / PIN Code Not Correct for SIM
Both LEDs alternate Blue		Scanning for signal
Both LEDs blinking Yellow		Disconnected
Both LEDs alternate Green		Firmware upgrading - do not power down
Both LEDs alternate Yellow		Reset to default

If problems continue, there is a manual reset hole next to the SIM card slot (underneath the SIM card door).

- Press the reset button for less than 5 seconds to reboot.
- Press the reset button for more than 5 seconds to restore to factory settings.

If your problems persist, please contact Airgain Support: support@airgain.com