

Installation Guide

5G High Power mmWave Outdoor CPE



Doc No. IG01319

Important notice

This device, like any wireless device, operates using radio signals which cannot guarantee the transmission and reception of data in all conditions. While the delay or loss of signal is rare, you should not rely solely on any wireless device for emergency communications or otherwise use the device in situations where the interruption of data connectivity could lead to death, personal injury, property damage, data loss, or other loss. Casa Systems accepts no responsibility for any loss or damage resulting from errors or delays in transmission or reception, or the failure of the Casa Systems 5G High Power mmWave Outdoor CPE to transmit or receive such data.

Safety and hazards



Warning –

Do not connect or disconnect cables or devices to or from the SIM card slot or Ethernet port in hazardous locations such as those in which flammable gases or vapours may be present, but normally are confined within closed systems; are prevented from accumulating by adequate ventilation; or the location is adjacent to a location from which ignitable concentrations might occasionally be communicated.

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Note – This document is subject to change without notice.

Document history

This document relates to the following product:

Casa Systems 5G High Power mmWave Outdoor CPE (CFW-2591)

Ver.	Document description	Date
v0.9	First draft release	February 19, 2021
v0.91	Updated images and steps	March 9, 2021
v0.92	Updated images	March 17, 2021
v0.93	Added Appendix A: Safety and compliance	May 6, 2021
v0.94	Updated product name	May 18, 2021
v0.95	Various minor additions	June 30, 2021

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1 Overview

1.1 Introduction

This document provides a detailed guide to installing the Casa Systems CFW-2591 5G High Power mmWave Outdoor CPE, hereon simply referred to as the AurusAI.

1.2 Target audience

This document is intended for experienced hardware installers who understand telecommunications terminology and concepts.

1.3 Prerequisites

Before continuing with the installation of the CFW-2591 5G High Power mmWave Outdoor CPE, please confirm that you have:

- ▲ an Android-based smartphone with the Aurora Pro application installed.
- ▲ a Casa Systems Installation Assistant with sufficient battery charge to complete a site survey.
- ▲ a working SIM card in 3FF format.
- ▲ RJ45 heads and enough Cat6 Ethernet cable to connect the AurusAI to the PoE injector inside the premises.
- ▲ a torque screwdriver set.
- ▲ a pair of tweezers.
- ▲ read the entire Safety and product care section of this document and RF Exposure information.

You may also require other screws and fasteners depending on your circumstances.

1.3.1 Notation

The following symbols may be used in this document:



Note – This note contains useful information.



Important – This is important information that may require your attention.



Warning – This is a warning that may require immediate action in order to avoid damage or injury.

2 Product introduction

2.1 Product overview

Rural and regional homes and businesses, remote commercial sites and metropolitan fringe districts located beyond the reach of fixed line infrastructure rely on mobile networks to access broadband Internet.

Designed to optimize signal strength in weak signal areas, the 5G High Power mmWave Outdoor CPE is positioned on the exterior of the premises to overcome distance limitations and geographical obstructions and deliver high-speed 5G broadband connectivity to wired and wireless clients in the property via an indoor router.

2.2 Package contents

The CFW-2591 in-box contents include:

- 1 x 5G High Power mmWave Outdoor CPE (CFW-2591)
- 1 x Assembled mount bracket.

Accessories used in this solution (packaged separately):

- 1 x Antenna Power Supply (30W PoE Injector) – used to power the 5G High Power mmWave Outdoor CPE during normal operation.

If any of these items are missing or damaged, please contact your sales representative immediately.

3 Physical dimensions and interfaces

3.1 Physical dimensions

Below is a list of the physical dimensions of the CFW-2591.

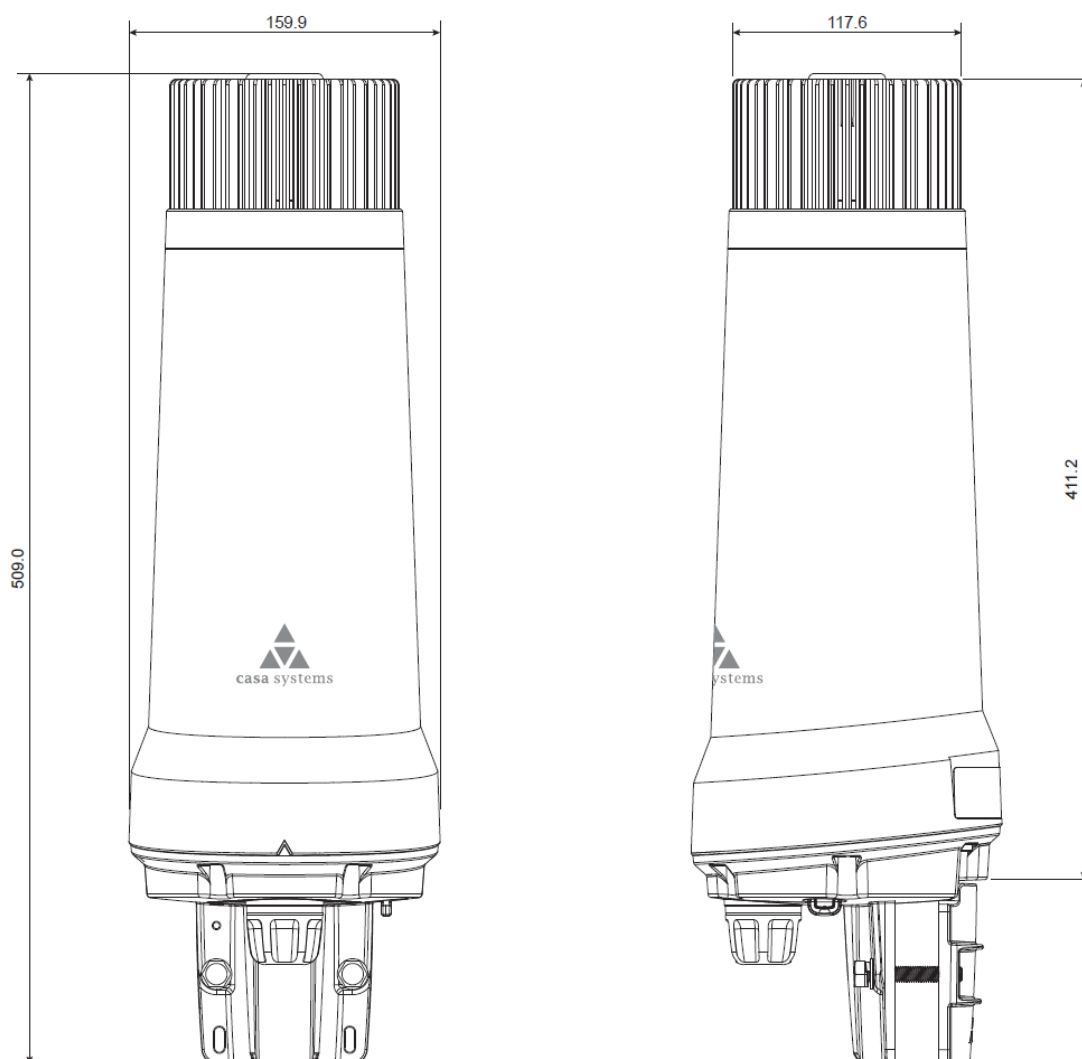


Figure 1 – 5G High Power mmWave Outdoor CPE Dimensions

CFW-2591 Dimensions

Width	159.9mm
Height	509mm (including mounting bracket)
Weight	3.20kg

Table 1 - Device Dimensions

3.2 Interfaces



Figure 2 – Interfaces

Item	Description
SIM card slot	Push the SIM card in here to lock it in place. The SIM card is held in place by a retaining clip.
Antenna Power Supply port (PoE)	Provides power and data connectivity to the 5G High Power mmWave Outdoor CPE with Ethernet cable.

Table 2 – Interfaces

4 Site assessment pre-screen

At the distribution centre, the telecommunications provider should check site and local area coverage/tower locations to determine suitable site install locations. This can be done through the telco's tower database, modelling data, and satellite maps. The operator may provide data from the pre-qualification system, but this is a guide only as to possible best sides of the property to install the device. You should still conduct a site survey to obtain the best signal.

5 Preparation before attending customer premises

To minimize the time spent at the customer's premises, and depending on the specific requirements of each installation, you might consider performing the following before arrival.

- Most importantly, you should ensure that the Installation Assistant and the smartphone used to perform the installation have enough battery charge to allow you to complete the installation.
- Ensure that the smartphone to be used for the installation has the latest version of the Aurora app installed.
- If you are going to use the CPE device as the survey device, you can unbox it and affix it to the survey pole.
- You can insert the SIM card if the CPE has not already had it inserted.

6 At the customer premises

6.1 Installation site inspection

Review the suitability of the suggested installation locations as determined from the site assessment pre-screen at the telco distribution center and consider any other suitable new locations.

Consider routing of Ethernet cable and location of PoE inside premises as part of suitable installation location criteria.

Note suitable installation locations for "Site Survey".

6.2 Ethernet / SIM cover assembly and SIM card insertion

The AurusAI Ethernet / SIM cover must be properly attached to prevent dust and water from entering the AurusAI's housing. The steps to follow will depend on whether the unit you have received has had the SIM card pre-inserted at the distribution centre.

Note – To prevent the AurusAI from moving and potential damage to the unit, we recommend leaving the AurusAI in the pulp packaging when preparing it.

6.2.1 Preparing a unit with a pre-inserted SIM card

Assemble the Ethernet cable gland as shown below when finalizing the installation.



Figure 3 – Ethernet cable gland assembly

When performing a site survey, loop the survey cable around the hook which is attached to the mounting bracket to provide strain relief. The hook can be removed from the mounting bracket and disposed of thoughtfully when the site survey is complete.



Figure 4 - Ethernet cable strain relief loop

When you have mounted the unit and are finalizing the installation, hand tighten the Ethernet locking nut to avoid dust/water ingress.



Figure 5 - Ethernet cable gland tightened

6.2.2 Preparing a unit requiring SIM insertion

Units shipped from the factory without a SIM card pre-inserted require the installer to remove the Ethernet / SIM card cover and insert the SIM card. The Ethernet cable gland comes shipped in a separate bag and must be assembled at the end of the installation.

- 1 Using an M4 Phillips head screwdriver, remove the screws that secure the Ethernet / SIM card cover. Remove the Ethernet / SIM card cover and SIM card retaining clip.



Figure 6 - SIM card retaining clip

- 2 Insert the SIM card in the orientation shown below.



Figure 7 - Correct SIM orientation

- 3 Push the SIM card in until it locks into place. You will hear a click when the SIM card is locked in place. You may need to use tweezers or something similar to assist in pushing the SIM card all the way in.
- 4 Replace the SIM card retaining clip and Ethernet / SIM card cover then re-tighten the screws. The screws should be tightened with a torque driver to 0.4Nm.



Figure 8 - Ethernet / SIM card cover re-assembled

- 5 If you are using the customer unit for the site survey, connect the survey cable to the Ethernet port. Loop it around the hook attached to the mounting bracket to provide strain relief.



Figure 9 - Ethernet cable strain relief loop

When finalizing the installation, remove the hook from the mounting bracket and dispose of it thoughtfully.

- 6 Assemble the Ethernet cable gland as shown below.

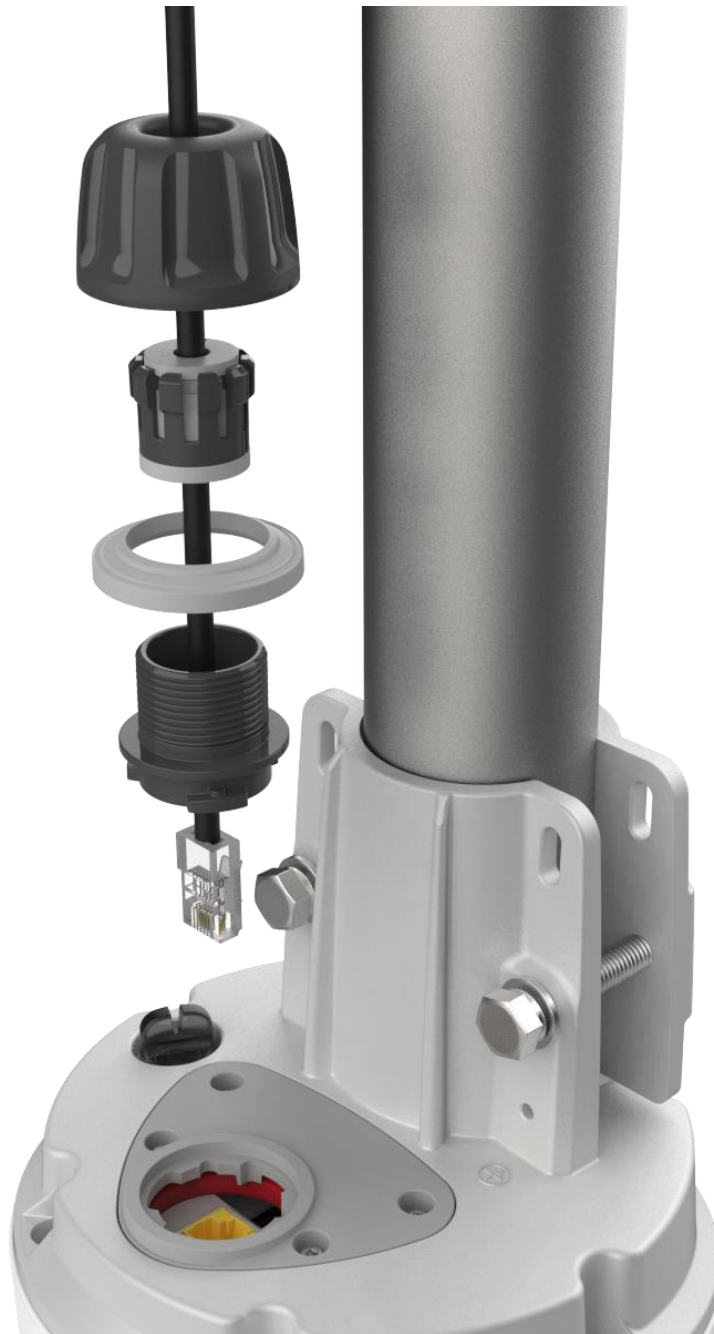


Figure 10 – Ethernet cable gland assembly

Note that the rubber seal has a split down the middle allowing you to slide it over the Ethernet cable.



Figure 11 - Rubber seal split

- 7 To finalize the installation, hand tighten the Ethernet locking nut to prevent water/dust ingress.

7 Installation considerations

As the 5G High Power mmWave Outdoor CPE is aligned specifically for each individual property, please take note of the following when installing the equipment:

- After alignment, do not move, place anything in front of, or adjust the position of the 5G High Power mmWave Outdoor CPE since this will likely have a negative impact on the signal quality and performance of the wireless service. When the antenna is in the 'home' position, the mmWave antenna is located as shown below.

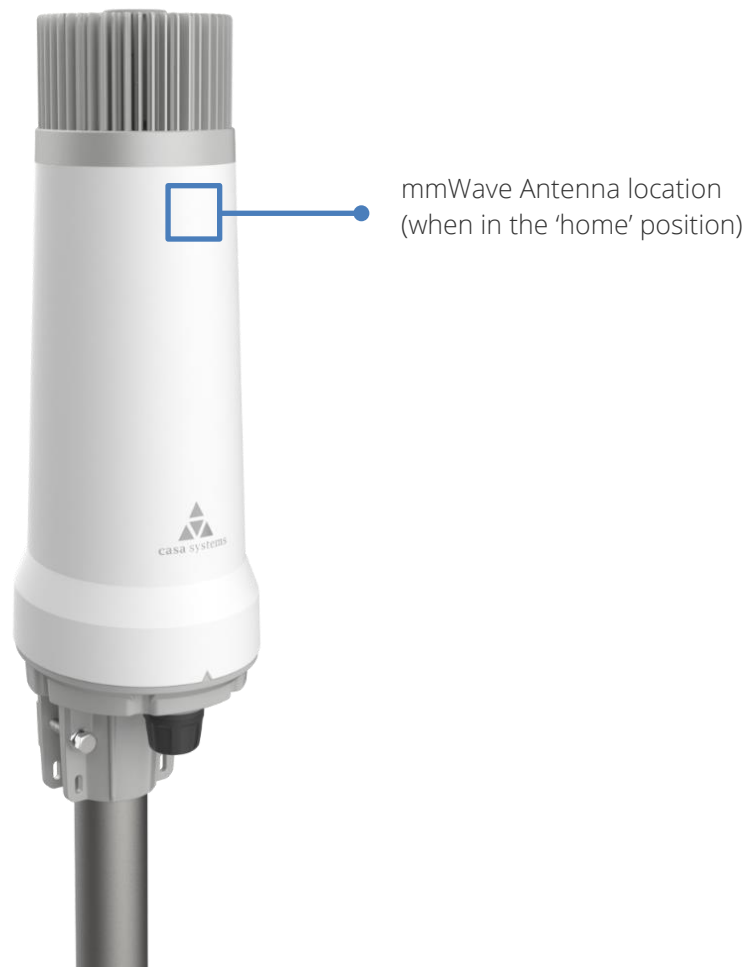


Figure 12 - mmWave Antenna location

- Keep the AurusAI away from trees, branches and power lines or communications cables.
- The Antenna Power Supply (30W PoE Injector) and Wi-Fi Gateway must be installed in a well-ventilated area and near a dedicated power outlet which allows easy visibility of the indicators.
- If construction work has been carried out on the exterior of the property, the antenna may need to be re-aligned to ensure the installation is still operating at peak performance.

8 Site survey

8.1 Overview

To perform a site survey, you will need to mount the AurusAI to a survey pole and carry it around the site with both the Installation Tool and a smartphone.

- 1 On the ground, mount the AurusAI to the survey pole.
- 2 Connect the Installation Assistant to the AurusAI via the survey cable and ensure power is being delivered.
- 3 Load the Aurora App and begin survey so that the app is indicating signal strength.
- 4 Perform the site survey with everything connected and operating and locate the position with the best signal strength.

8.2 Performing a site survey

8.2.1 Mounting the AurusAI to the survey pole

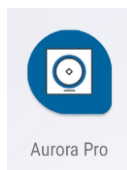
Attach the AurusAI to your survey pole. We recommend a pole of approximately 1.5 metres in length. To fix the AurusAI to the survey pole, follow the instructions in the [Assembling and attaching the AurusAI to the mounting bracket](#) section. Ensure that the AurusAI is properly secured to the survey pole so that it does not come off the during the site survey.

8.2.2 Connecting the Installation Assistant

Connect one end of the included 3 metre Ethernet cable to the power supply port of the AurusAI then connect the other end of the cable to the CPE (blue) port on the Installation Assistant. Take up any slack in the cable so that it does not present a tripping hazard. You can use the Velcro strap attached to the Installation Assistant to help hold the cable in place.

8.2.3 Loading the Aurora Installation App

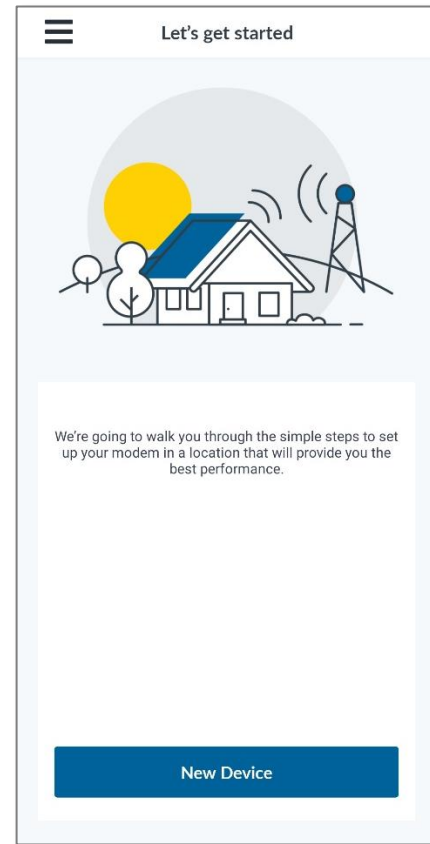
On the smartphone that you will use for the installation, open the Aurora Pro installation app.



When the app opens, the Casa Systems splash screen is displayed and then the **Let's get started** page.



Casa Systems splash screen



Select New Device button

To commence the site survey for a new customer, tap on the **New Device** button. For further instructions on how to perform the site survey using the app, refer to the Aurora Installation App User Guide (document UG01271).

8.2.4 Performing the site survey

When you have the Aurora app at the point where it is ready for you to perform the site survey, you should walk around the installation site holding the AurusAI on the survey pole along with the Installation Assistant and smartphone and find the location with the best signal. The Aurora app provides both a visual cue through bars indicating RSRP for each cellular technology type as well as an audible beep which increases in frequency as the 5G signal gets stronger.

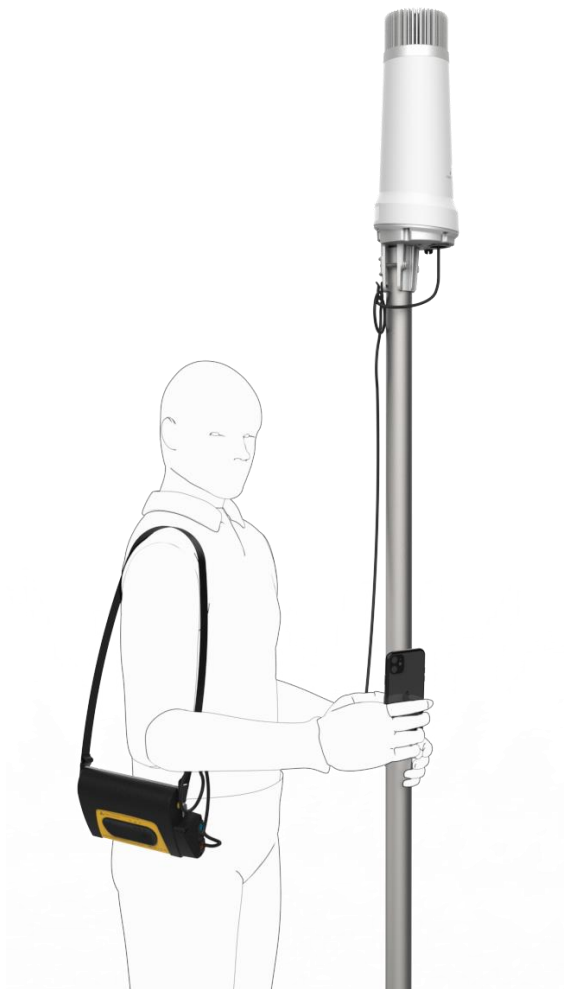


Figure 13 - Performing the site survey

When walking around the site, you should also rotate the AurusAI to locate the best signal since the AurusAI will not automatically swivel during the survey. When you have found the most suitable location, taking into consideration the signal strength and the aesthetics of the installation location, remove the cable from the Ethernet port of the AurusAI and remove the AurusAI from the survey pole. Mount the AurusAI in accordance with the steps in the next section.

9 Mounting the AurusAI

9.1 Removing the locking pin

Before proceeding any further, you must remove the locking pin from the unit. You can perform this task while on the ground to reduce time spent on the roof/ladder.



Figure 14 - Locking pin location

- 1 Turn the locking pin anti-clockwise until it can be pulled out from the AurusAI. Remove the warning label from the locking pin.



Figure 15 - Locking pin removal

- 2 Break the pin at the narrow point just below the bottom of the screw cap.

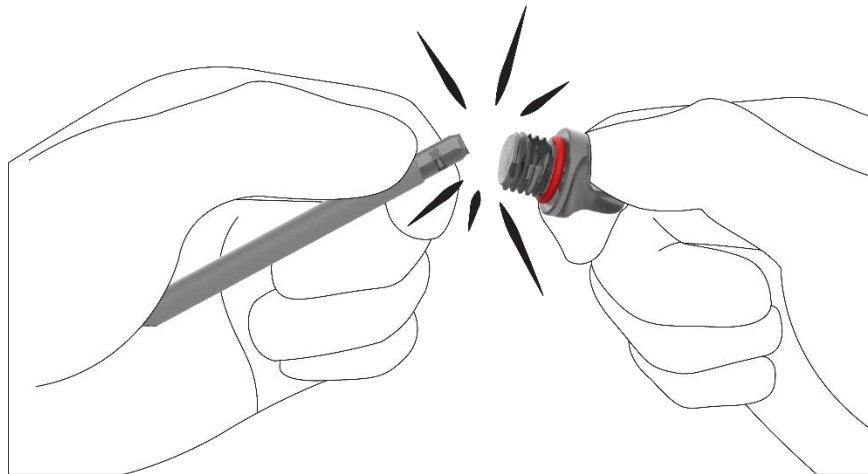


Figure 16 - Breaking the locking pin

- 3 Replace the locking pin screw cap to the bottom of the AurusAI, turning it clockwise so that it is secured tightly to ensure that there is no water or dust ingress.



Figure 17 - Replacing the locking pin cap

9.2 Prepare your chosen mounting solution

When you have found a suitable location to install the AurusAI, install the mounting bracket to the wall or chosen location on the building.

9.3 Assembling and attaching the AurusAI to the mounting bracket

Place the antenna over the mounting pole and alternately tighten the left and right bracket bolts to 7 Nm / 65 in-lbs.

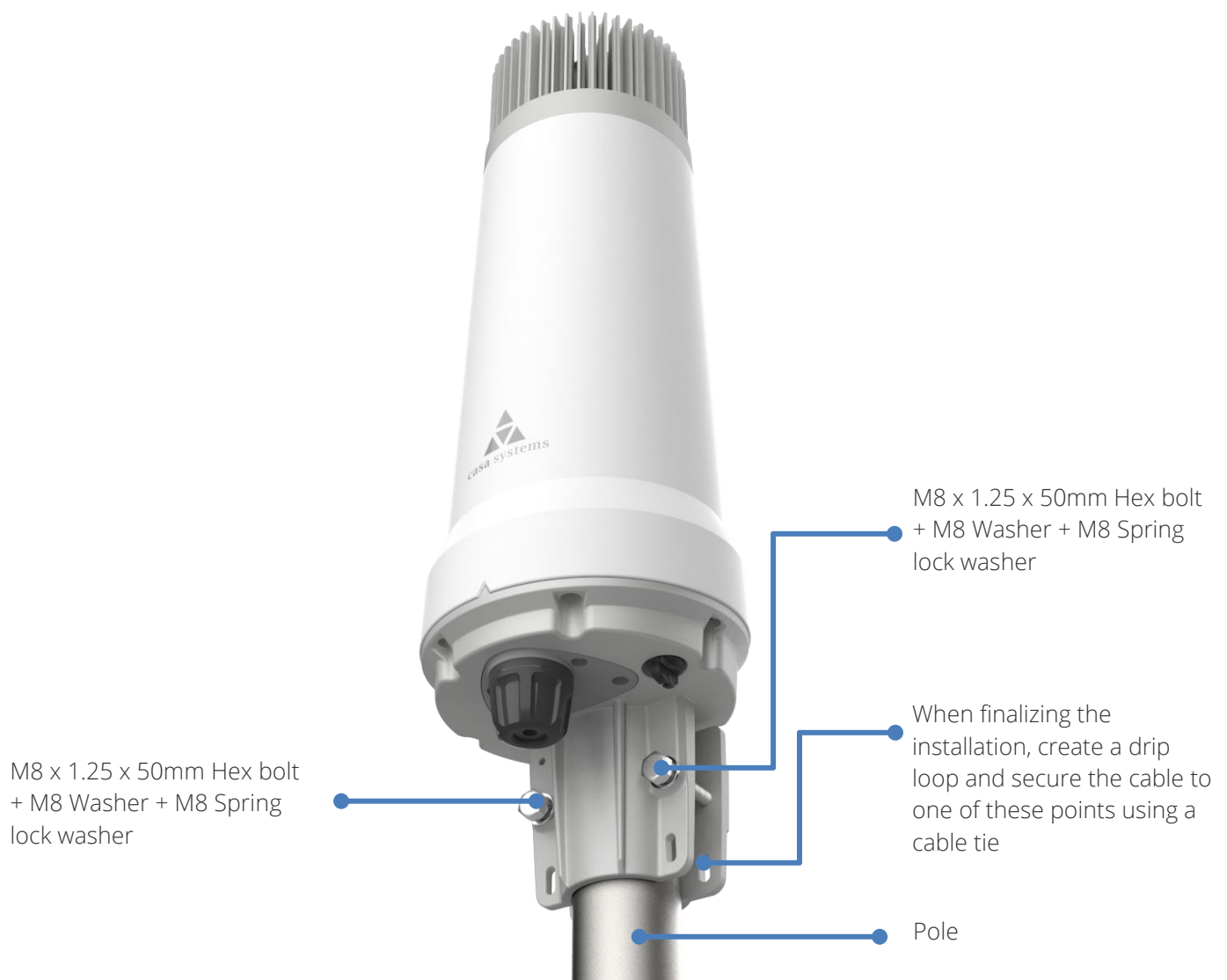


Figure 18 - CFW-2591 mounting bracket and bolts

Notes on mounting:



- Use a standard 13mm socket wrench
- Tighten the bracket bolts to 7 Nm / 65 in-lbs
- Do not over tighten bolts

9.4 Perform alignment of customer device

Connect the survey cable between the customer device and the Installation Assistant. On the smartphone, go back to the Aurora app again. If you did not close it earlier, it should be ready to align the customer device.

- 1 When the customer device's external enclosure direction is entered in the app, select **Auto Scan** in the Aurora app to initiate the Automated scan. The customer device will scan for the direction of the strongest mmWave signal strength.
- 2 The app displays progress as the AurusAI rotates to find the best signal.
- 3 During auto scan, if the AurusAI detects it cannot rotate (by way of not reaching end limit sensors in timeout period), it will report an error to the app and advise you to check if the locking pin has been removed. When the auto scan is complete, the app records the results and returns to the "Site Survey" Screen.
- 4 The **Site Survey** screen displays the current signal strength. If you are happy with the results, you can proceed to the next step or conduct a speed test (optional).
- 5 Complete the Power over Ethernet installation. See the next section.
- 6 Use the Aurora app to capture photos of the installation and take down any relevant notes about the installation.
- 7 The Aurora app collates the installation data for you to email back to headquarters.
- 8 Disconnect the survey cable from the customer device and turn it off.

10 Power over Ethernet installation

Discuss with the customer about a suitable indoor location for the PoE injector. When a suitable location has been found, crimp RJ45 connectors to a cable long enough to run from the power port of the AurusAI to a wall socket or directly to the PoE injector inside the property. The configuration of the pins is a standard “straight-through” connection.

Connect the Ethernet cable to the AurusAI and complete the weather seal assembly as described in the [Ethernet / SIM cover assembly and SIM card insertion](#) section. Connect the other end of the Ethernet cable to the blue “WALL” port on the PoE injector. The customer can connect their wireless gateway to the “ROUTER” port of the PoE injector.



Figure 19 - Power over Ethernet injector

Below is an overview of how everything is connected.

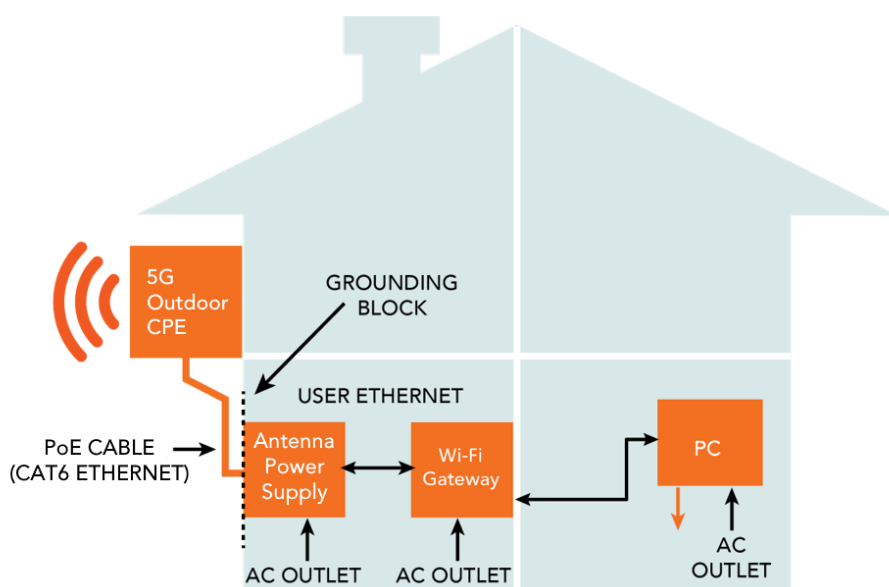


Figure 20 - Connection overview

Appendix A – Safety and compliance

RF Exposure

Your device contains a transmitter and a receiver. When it is on, it receives and transmits RF energy. When you communicate with your device, the system handling your connection controls the power level at which your device transmits.

This device meets the government's requirements for exposure to radio waves.

This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

This equipment complies with radio frequency (RF) exposure limits adopted by the Federal Communications Commission for an uncontrolled environment. This equipment should be installed and operated with minimum distance 57cm between the radiator & your body.

FCC Statement

This device must be professionally installed.

FCC compliance

Federal Communications Commission Notice (United States): Before a wireless device model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government-adopted requirement for safe exposure.

FCC regulations

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

Operating temperature

- -40°C to 55°C

Company details

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<https://www.casa-systems.com/contact-us/>

Product details

Product: 5G High Power mmWave Outdoor CPE

Model No: CFW-2591