Celona AP11, AP21and Edge Installation Guide

Feb 2024

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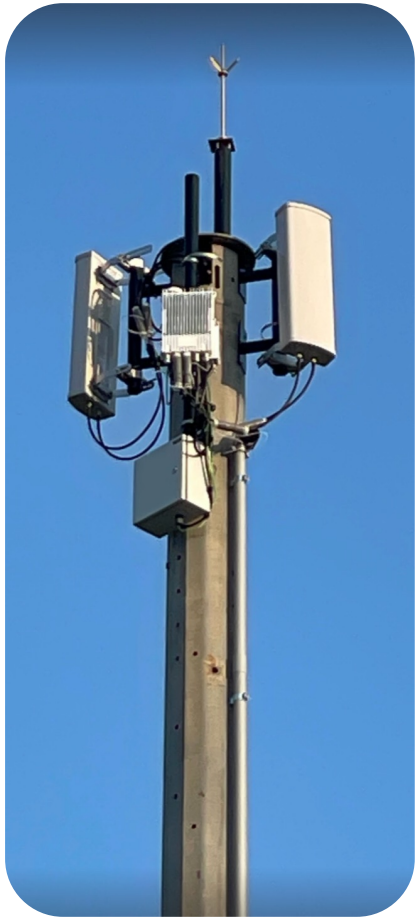
AP and Antenna Installation at Customer Sites

Omni-directional antenna



Sector antenna

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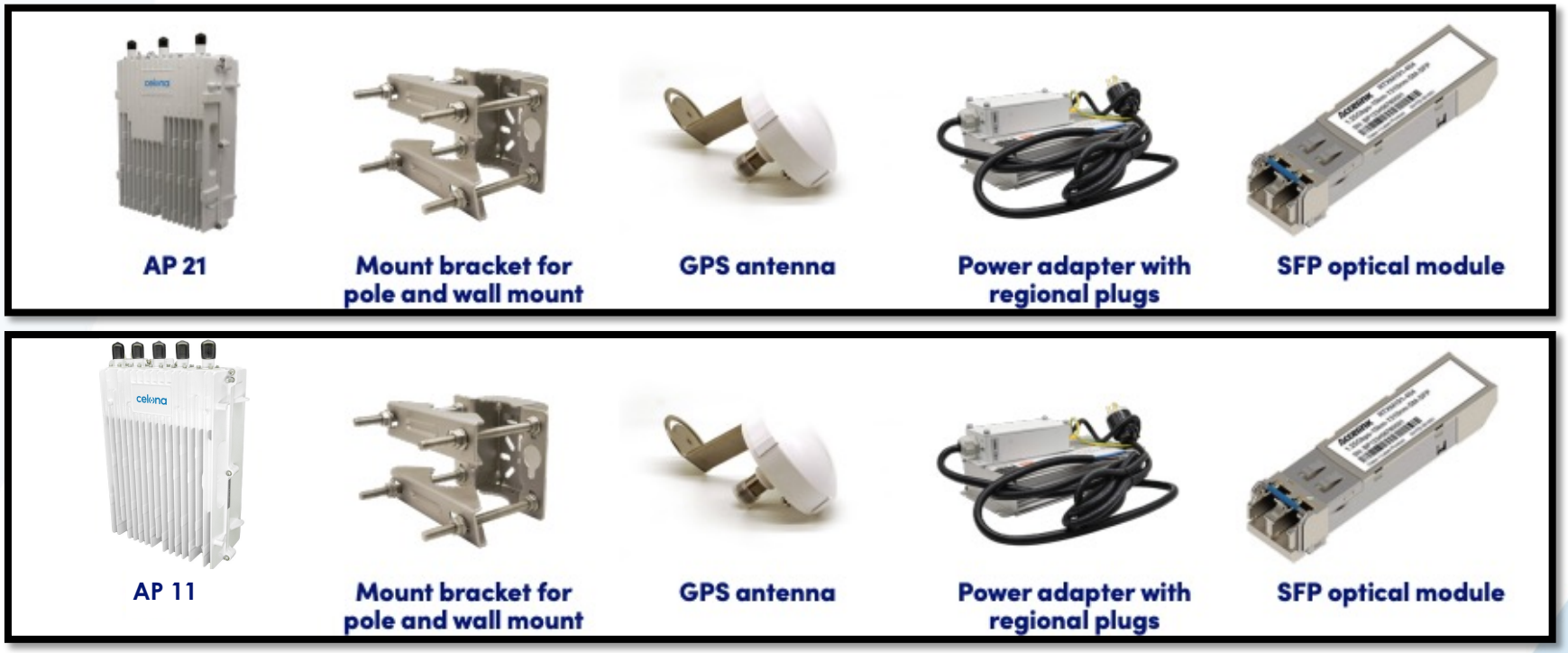
Access Points – What's in the box



- GPS cables (3ft.), weather proofing, screws are included in AP box
- SFP optical module is single mode

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What is not included

- Ground cable
- Single-mode fiber cable or Ethernet cable (CAT 6)
- Managed switch
- Extended Power Cables with 2 Conductors/wires, AWG14
- Compass for antenna placements and azimuth direction
- NEMA enclosure for AC power input, power inverter
- Wrenches / Screwdrivers / Tapes/ Workshop Tools

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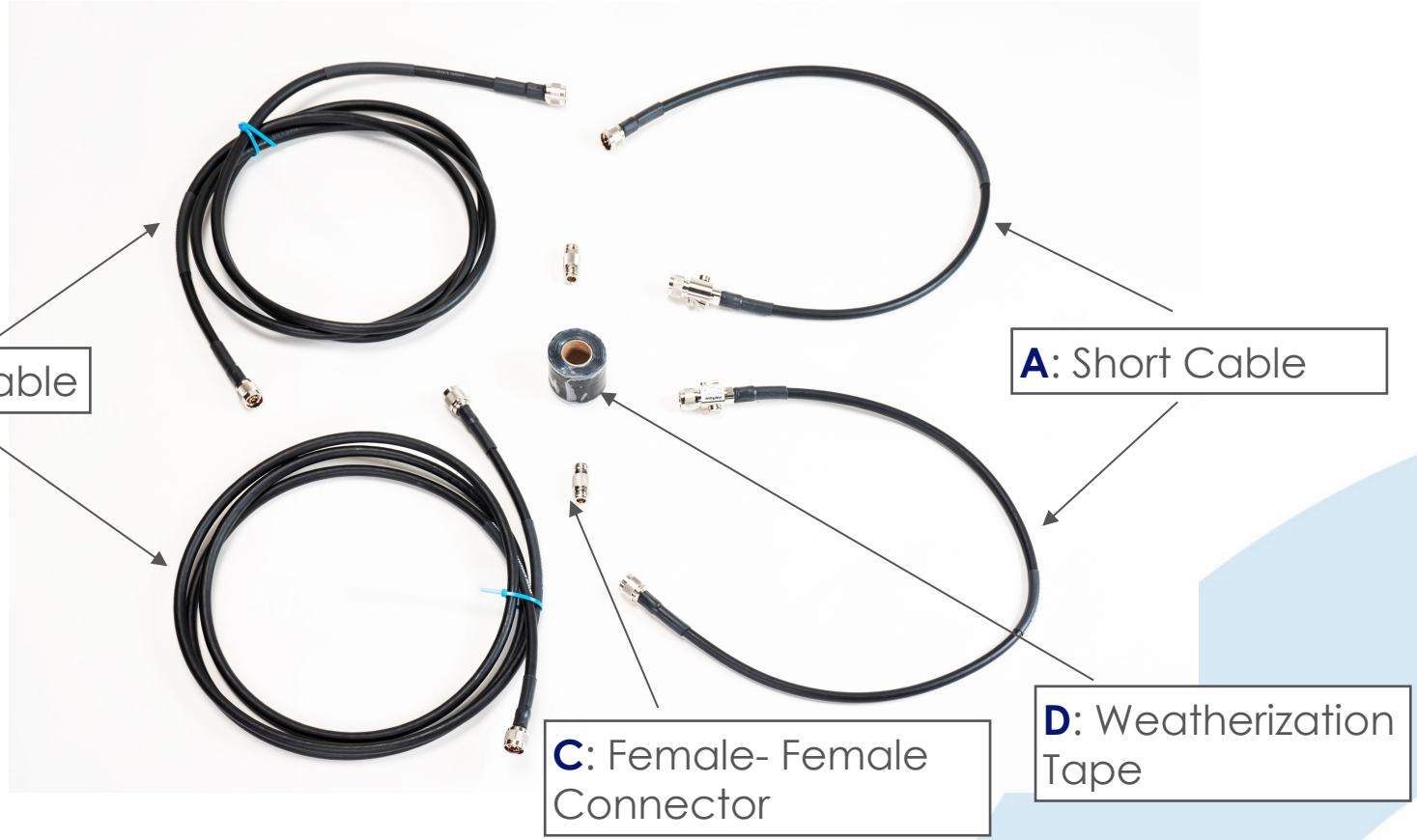
Omni Antenna – What's in the box

E: Antenna to pole accessories



B: Long cable

A: Short Cable

C: Female- Female Connector

D: Weatherization Tape

A – Short Cable: 3ft cable with surge protector
B – Long cable: 10ft extension Cables

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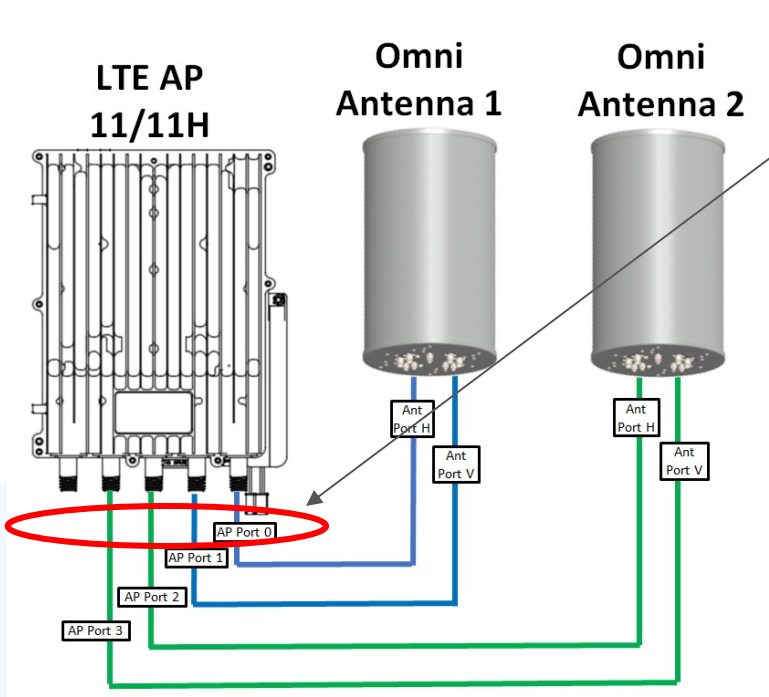
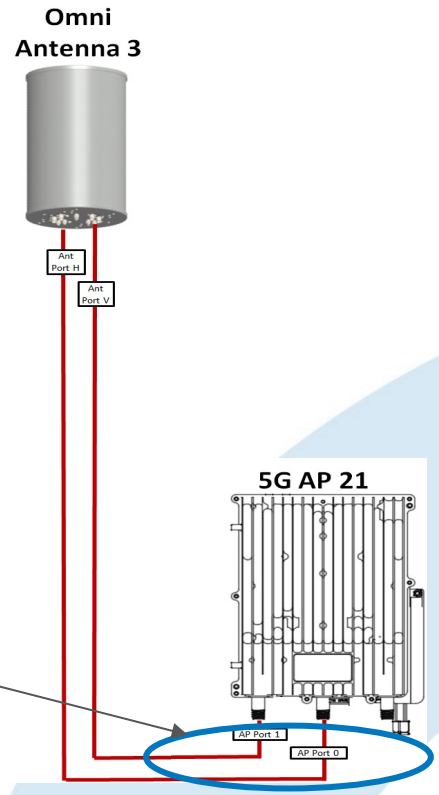
NOTE: Omni antennas can withstand a windspeed of 130mph

AP11/AP21 to Omni Antenna Logical Diagram



AP11 has two sectors and 4 ports – 0, 1, 2 and 3

- Port 0 is connected to antenna-1 port H
- Port 1 is connected to antenna-1 port V
- Port 2 is connected to antenna-2, port H
- Port 3 is connected to antenna-2, port V



- AP21 has one sector and 2 ports – 0 and 1.
  - Port 0 is connected to antenna 1, port H
  - Port 1 is connected to antenna1, port V

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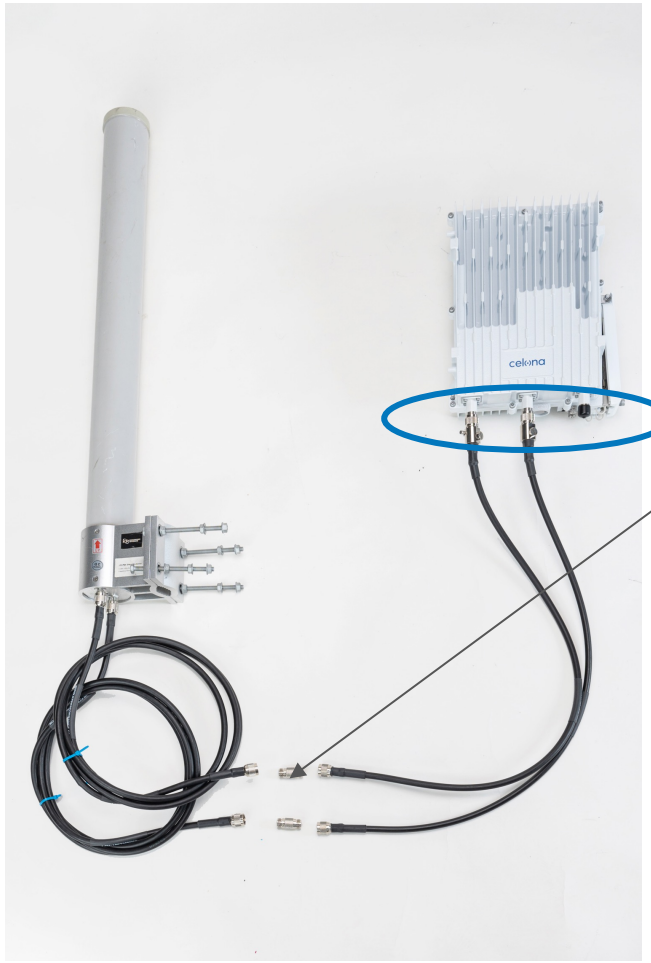
AP21 with Omni antenna



- Surge protector side of the short cable to be plugged into each AP port.
- The female-to-female connector is used to connect the short and long cables
- Long cables can be 10ft., 25ft. or 50ft. extension cables

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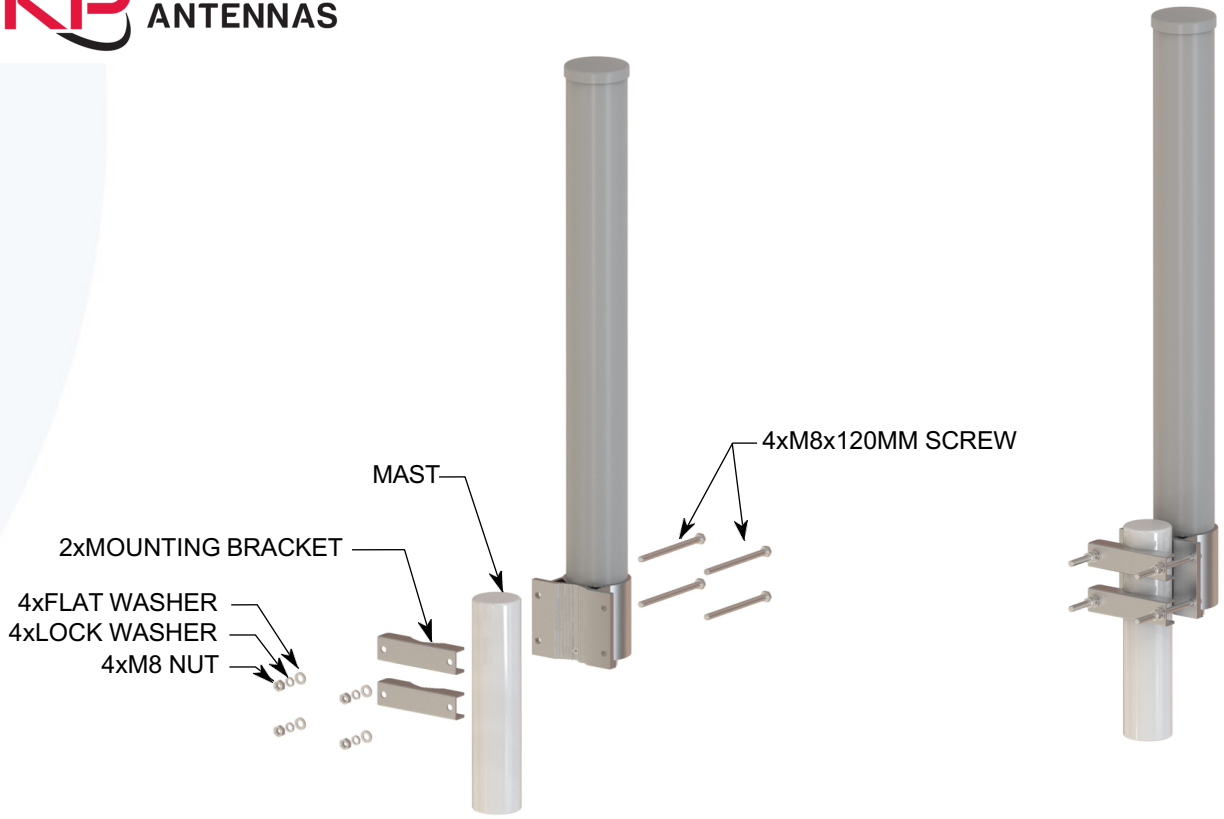
Omni Antenna Mounting Bracket Diagram

PERFORMANCE ANTENNAS

KPPA-3GHZ-DPOMA-WC INSTALL SHEET



NOTE: RADIO CASE NOT SHOWN

Mounting pipe diameter of 1.6” to 2.4”

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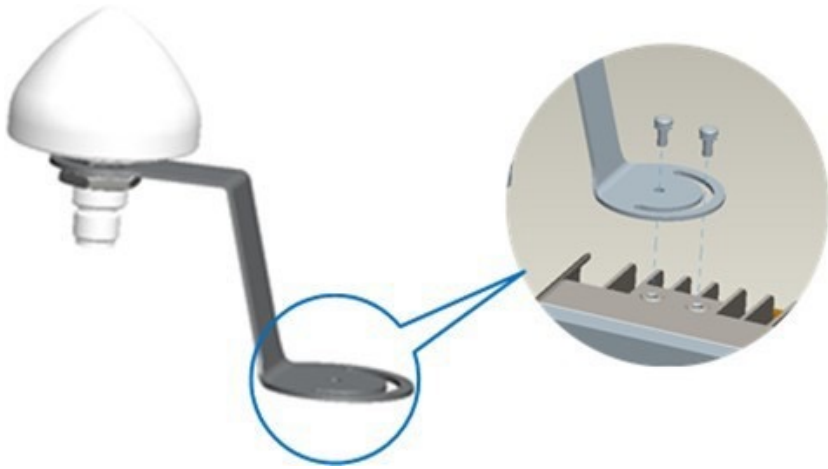
GPS installation on AP11 or AP21



Outdoor APs ship with 3-ft GPS cables. Recommendation is to use 3-ft. cables by default for all deployments. Ensure that APs with the GNSS antennas are deployed above obstructions with at least 180-degree sky exposure t o the top of the pick dome for GNSS satellite signals for accurate timing.

For locations without 180-degree sky exposure, Celona can ship a 10-ft GPS cable and pole clamp accessories fo r placement next to the cellular antennas. Celona supports GPS cable extensions up to 150 feet. For extended ca ble runs (>10ft), Celona advises using LMR400 or cables with equivalent specifications with N-male to N-male con nector.

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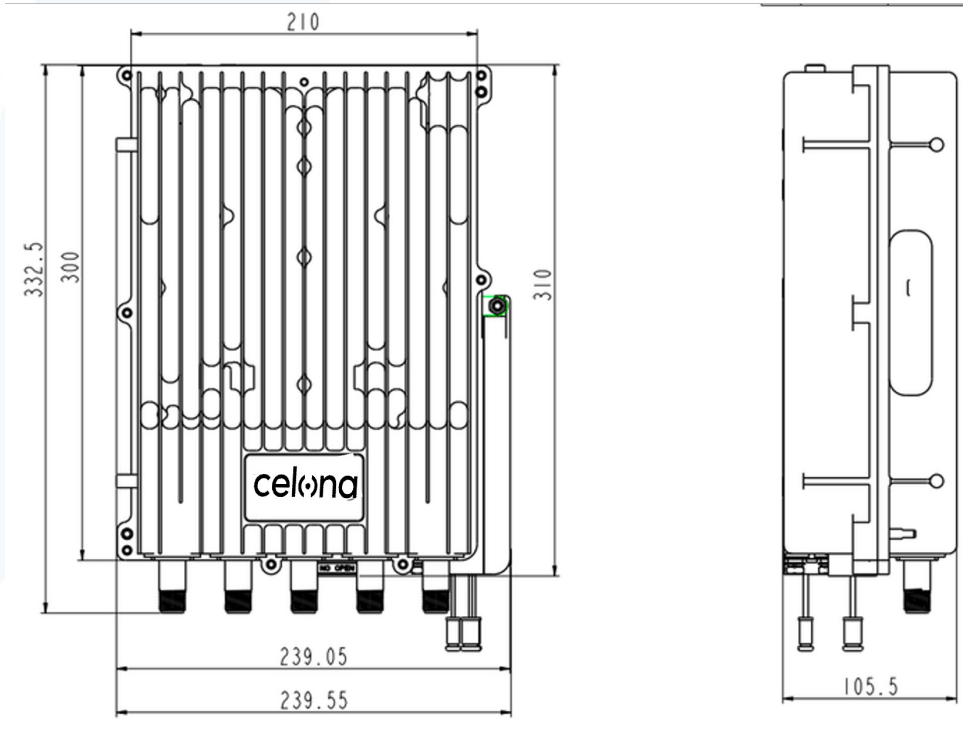
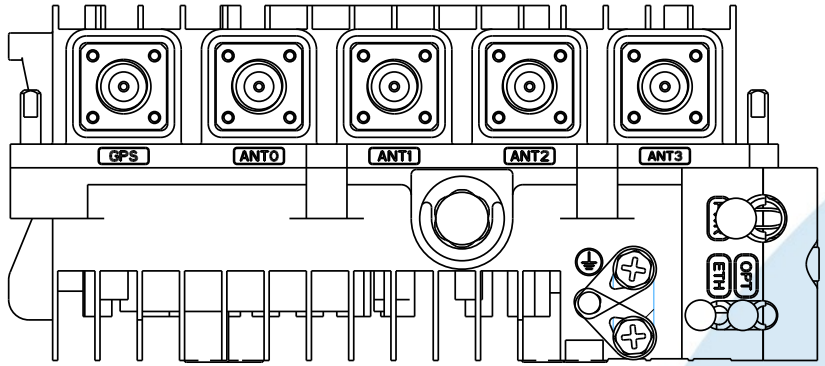
AP11 CAD Diagram

Units in millimeter (mm)



GPS and Antenna Ports



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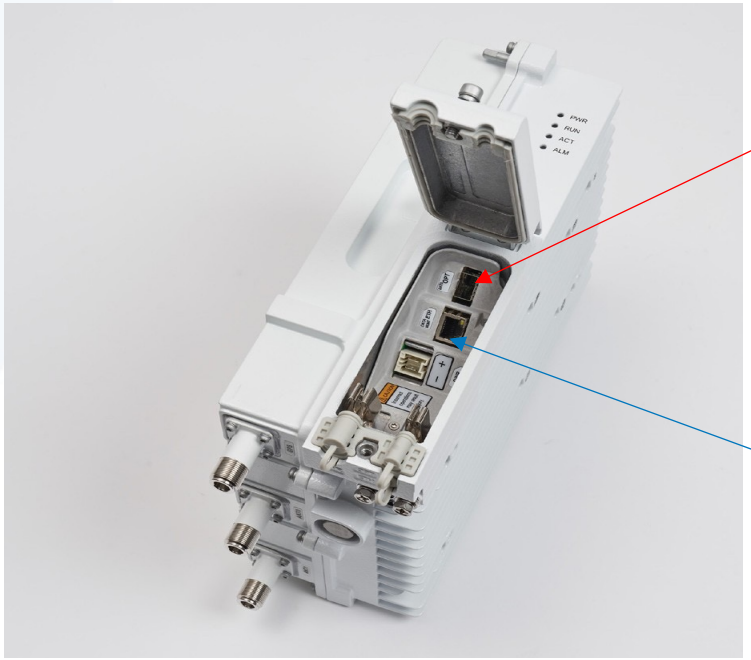
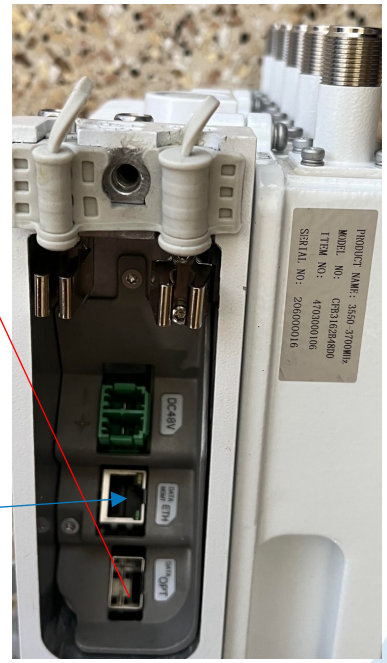
AP 11 and AP21 Ethernet or Fiber Connectivity



AP21

Fiber
/Optical

Ethernet



AP11

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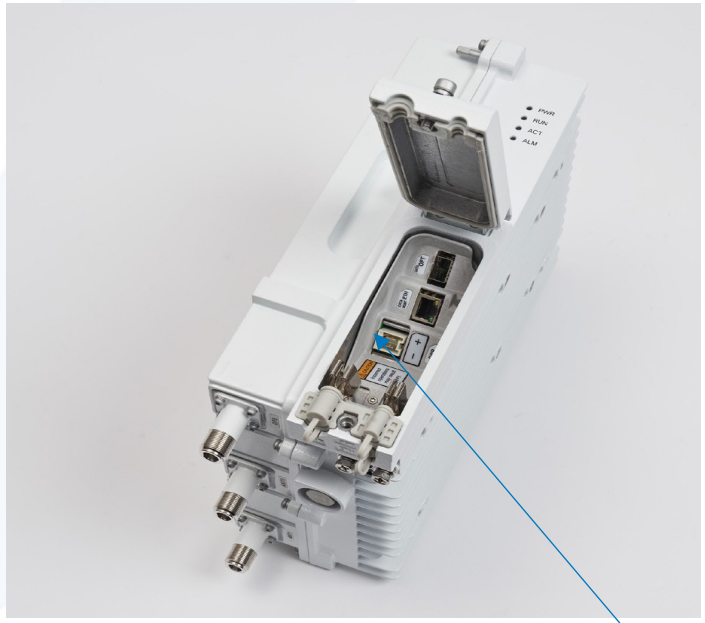
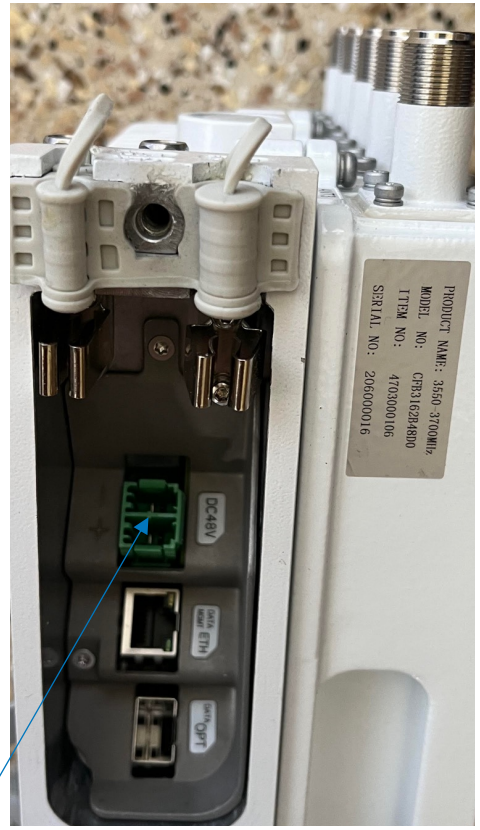
AP 11 and AP 21 Power Connectivity



AP21

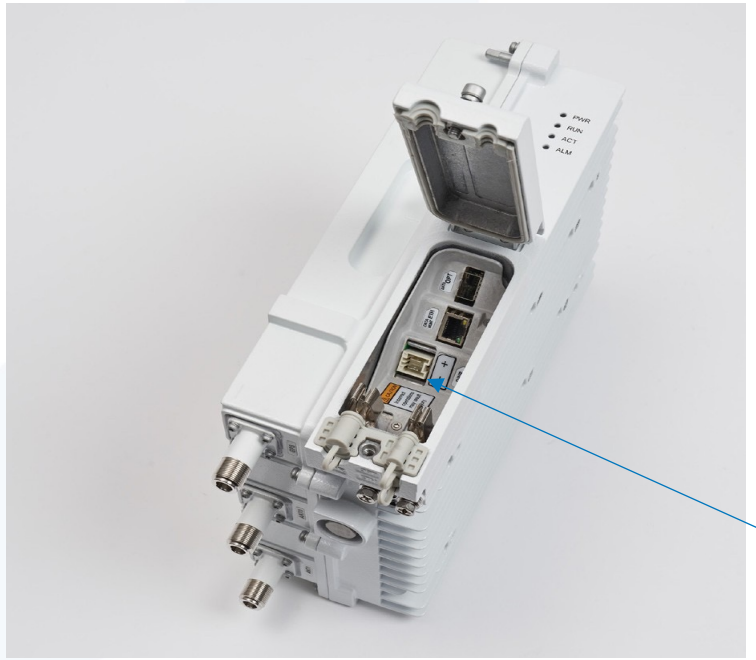


AP11

NEMA enclosure

DC power input goes to AP

AP Power Up



DC power input goes to AP

AC Power Adapter: 90 VAC to 264 VAC

NEMA enclosure

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Customer Deployments, Do we need a lightning rod at site for installation with these access points?

Lightning rods are needed for antennas deployed over 40ft, or as advised by professional installers.

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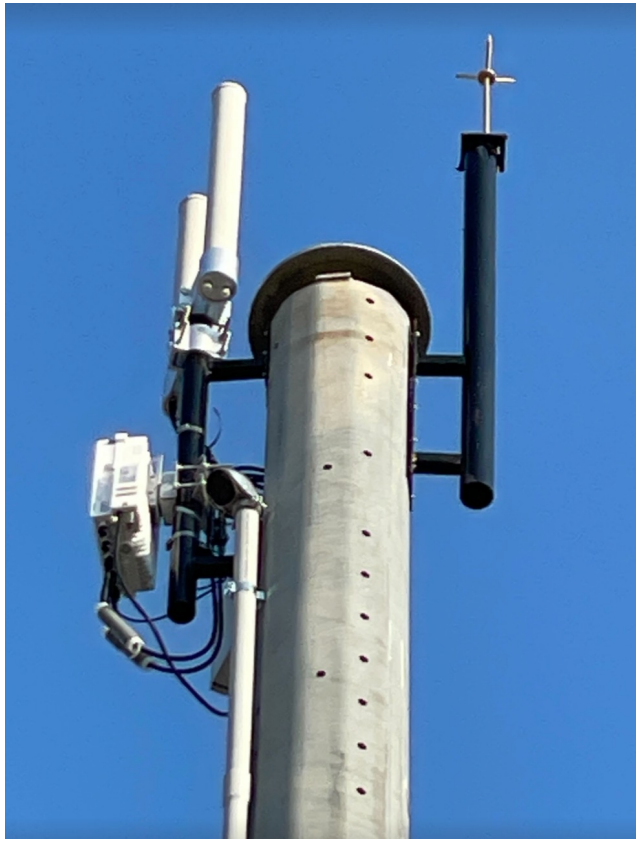
Sample install with Omni antennas



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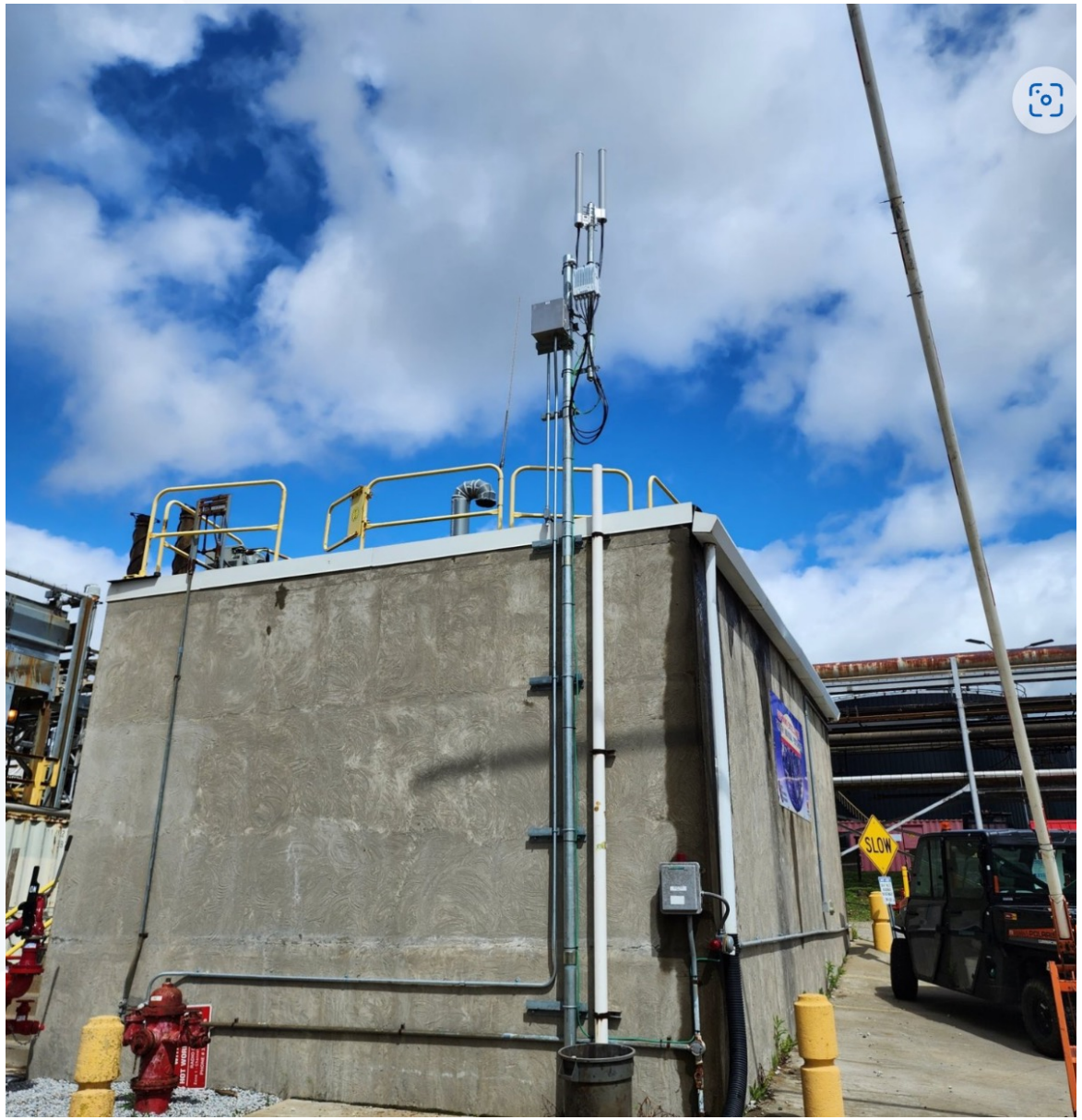
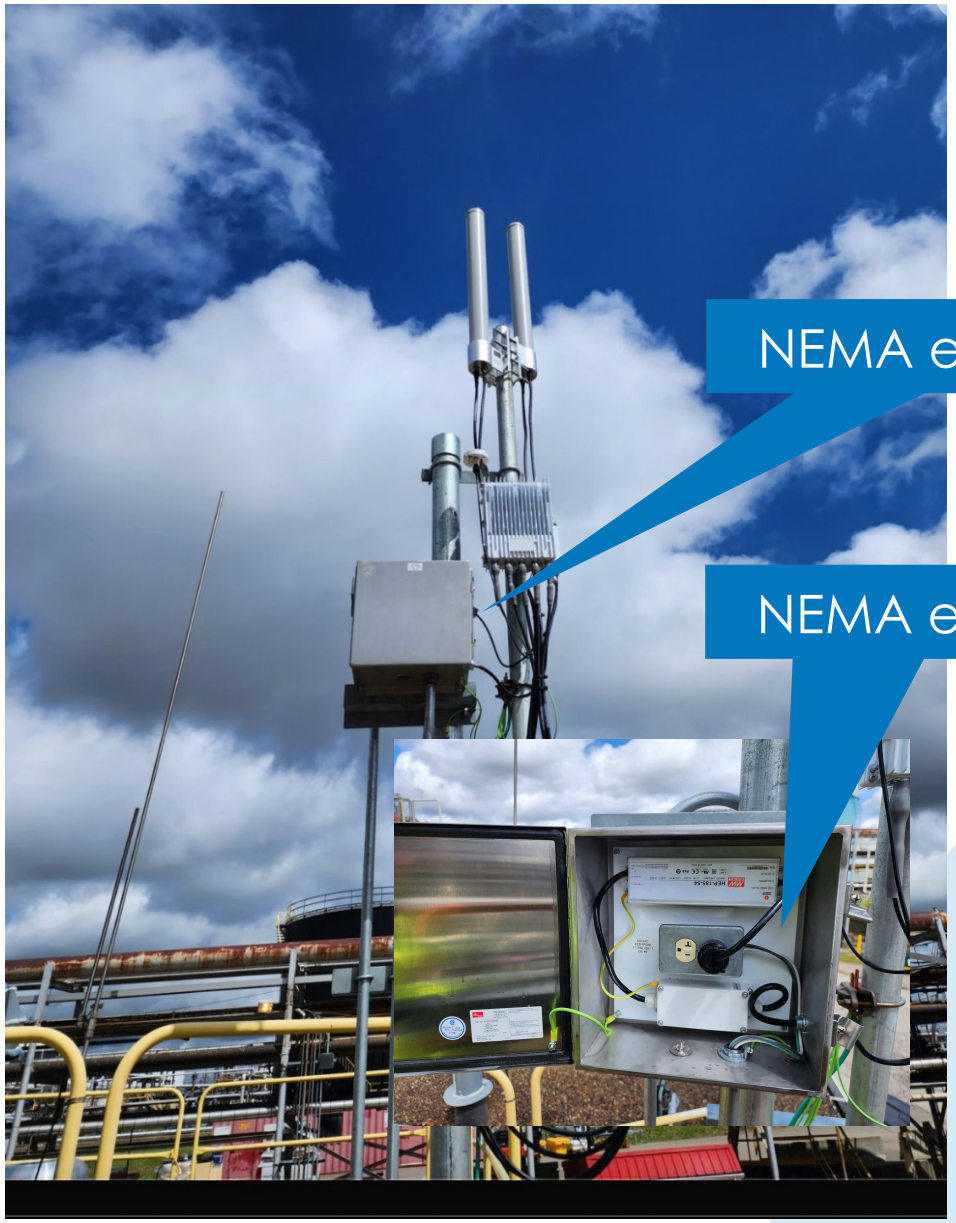
Best practices from sample deployments





What's in the Sector Antenna box ?

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90D Sector Antenna – What's in the box

E: Antenna to pole accessories

A – Short Cable: 3ft cable with surge protector
B – Long cable: 10ft extension Cables

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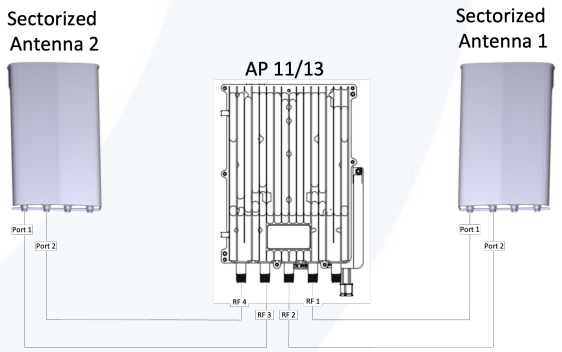
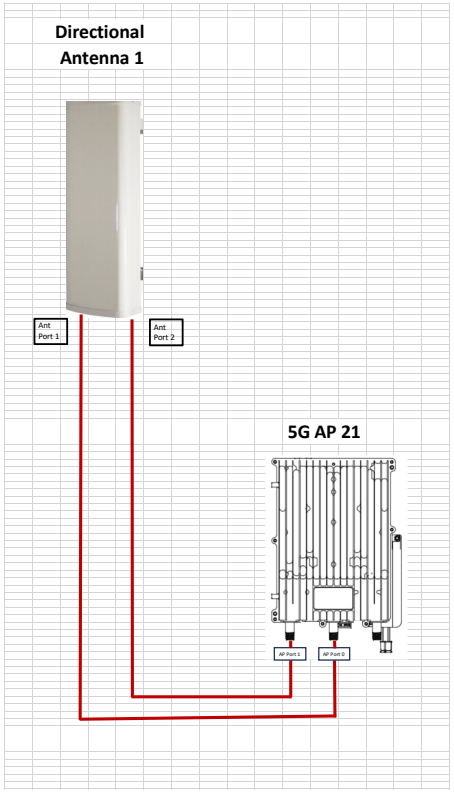
NOTE: All sectoral (33/65/90/120D antennas can withstand a windspeed of 150mph

AP11 (4G) and AP21 (5G) with Sector Antennas (90D)





- AP21 has one sector and 2 ports – 0 and 1.
  - Port 0 is connected to antenna 1, port 1
  - Port 1 is connected to antenna1, port 2
- AP11 has two sectors and 4 ports – 0, 1, 2 and 3.
  - Port 0 is connected to antenna-1 port 1
  - Port 1 is connected to antenna-1 port 2
  - Port 2 is connected to antenna-2, port 1
  - Port 3 is connected to antenna-2, port 2
  - Port 0 and Port 1 should be connected to the antenna-1 with the lower azimuth. Port 2 and Port 3 should be connected to the antenna-2 with the higher azimuth.

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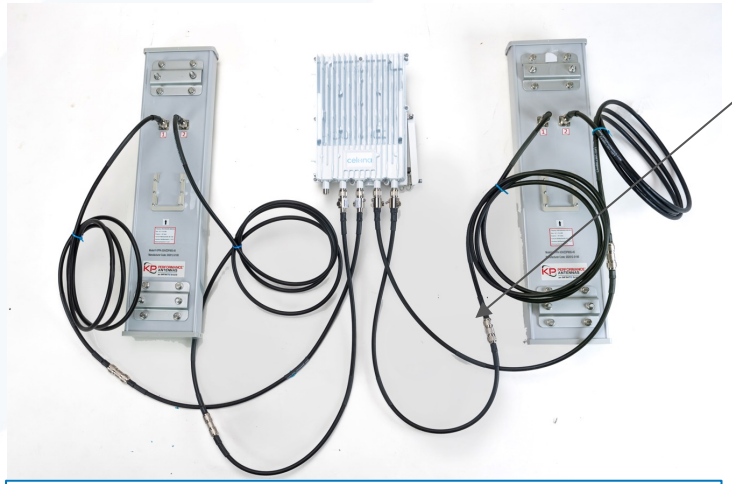
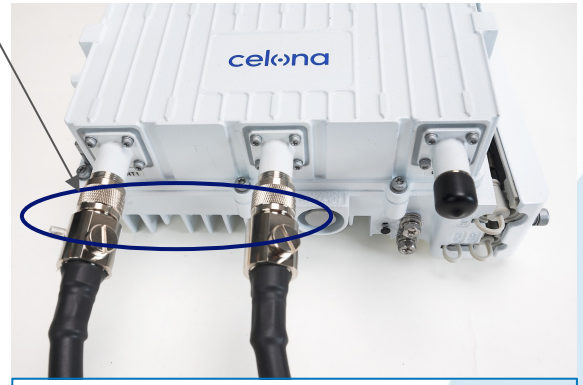
Connecting AP to sector antennas



AP11

- Surge protector side of the short cable to be plugged into each AP port.
- The female-to-female connector is used to connect the short and long cables
- Long cables can be 10ft., 25ft. or 50ft. extension cables



AP21

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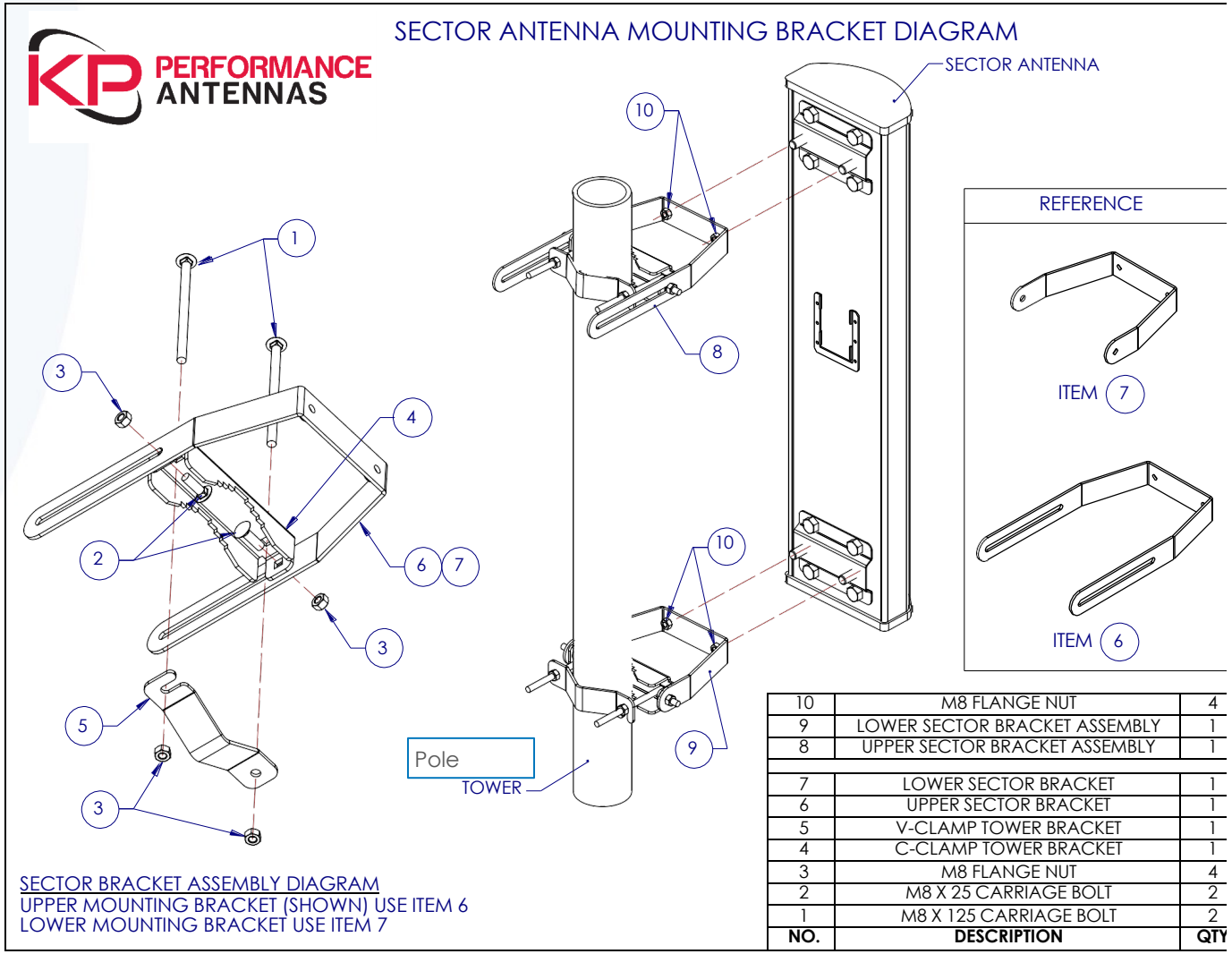
90D Sectoral Antenna Pole Mounting Bracket Diagram



NO.	DESCRIPTION	QTY
10	M8 FLANGE NUT	4
9	LOWER SECTOR BRACKET ASSEMBLY	1
8	UPPER SECTOR BRACKET ASSEMBLY	1
7	LOWER SECTOR BRACKET	1
6	UPPER SECTOR BRACKET	1
5	V-CLAMP TOWER BRACKET	1
4	C-CLAMP TOWER BRACKET	1
3	M8 FLANGE NUT	4
2	M8 X 25 CARRIAGE BOLT	2
1	M8 X 125 CARRIAGE BOLT	2

- Mounting pipe diameter of 1.25” to 3.5”

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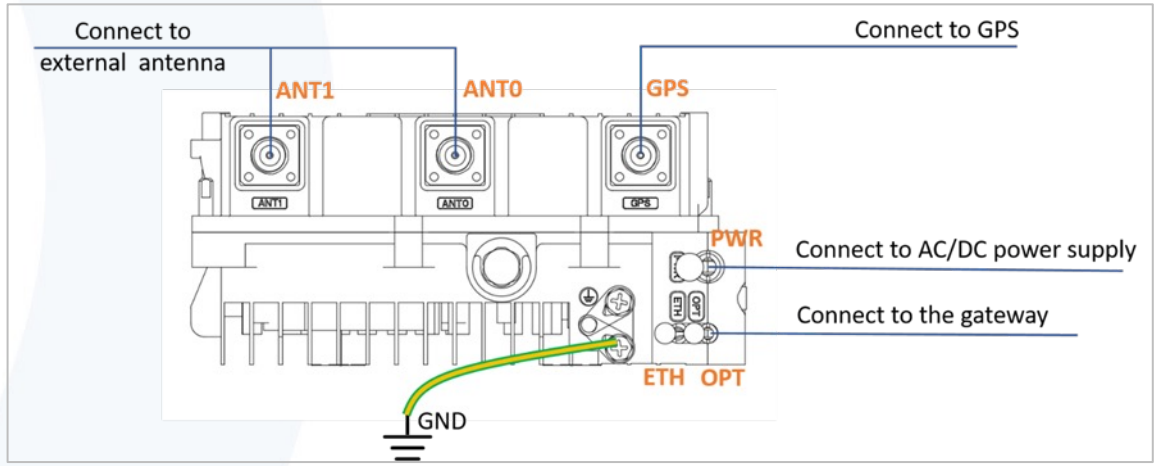
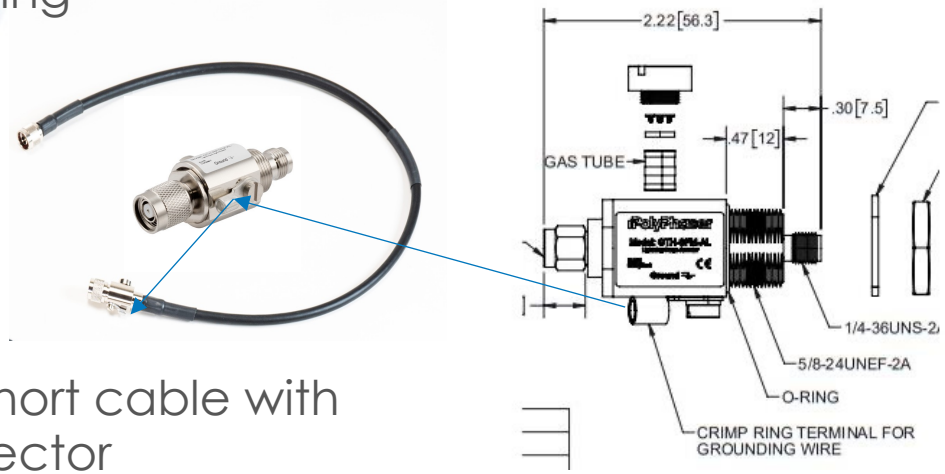
What specifications are necessary for grounding the antenna surge protector and the access point?



AP grounding

- Secure the ground cables to the AP by fastening it to the ground screws on the AP.



Antenna short cable with surge protector

- Use the surge protector ground point for grounding

Tap into the existing ground for the building or outdoors (typically done by electrician); use 6mm2 (#10AWG) ground wires for surge protector and AP grounding, antenna surge protector can be grounded to AP

Sample install with sector antenna

NEMA enclosure

Ensure cables are straight and fastened to the pole to avoid high wind stress

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Lessons Learned / FAQs

- GPS
  - What is the minimum required exposure to sky for GPS antennas for outdoor access points AP11 and AP21?
  - What is the standard GPS cable length for the AP11/AP21, and what additional lengths are compatible?
- AP/Power Supply
  - What's the power wiring diagram for AP11? Is it OK to detach a power supply receptacle from the units?
  - What are the power supply options for the AP11 and AP21 in hazardous environments?
- AP/Antenna Grounding
  - What specifications are necessary for grounding the antenna surge protector and the access point?
- AP/SFP Optical
  - Can both single-mode and multi-mode fiber cables be used with the AP11 and AP21 models?
- Antenna/Wind Rating
  - What is the wind protection rating for the antennas of these models, and what level of gust winds can they withstand?
- Site Lightning Rod
  - Do we need a lightning rod at site for installation with these access points?

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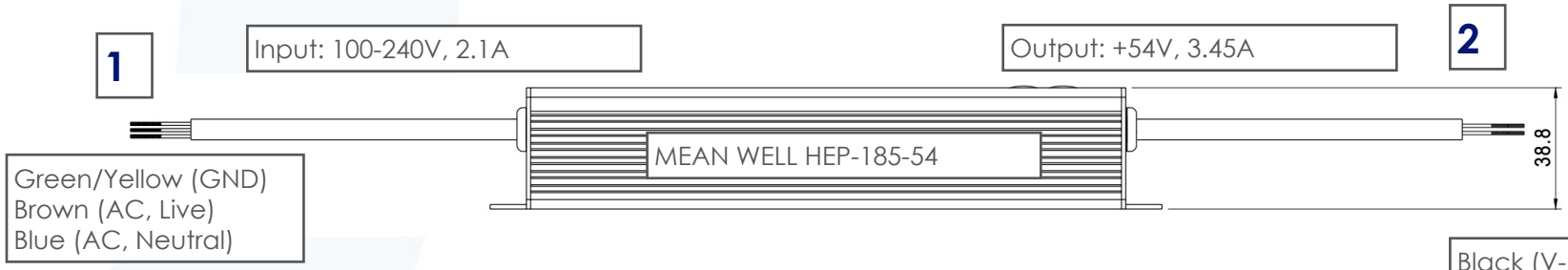
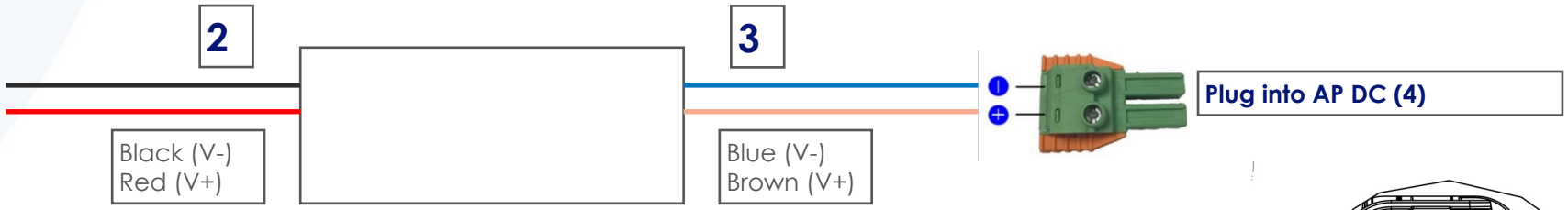
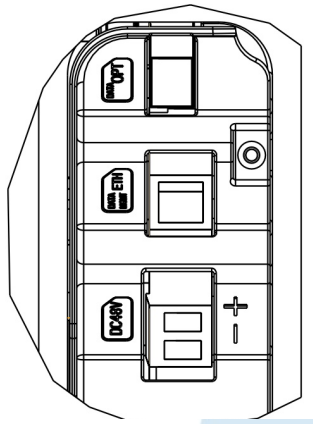
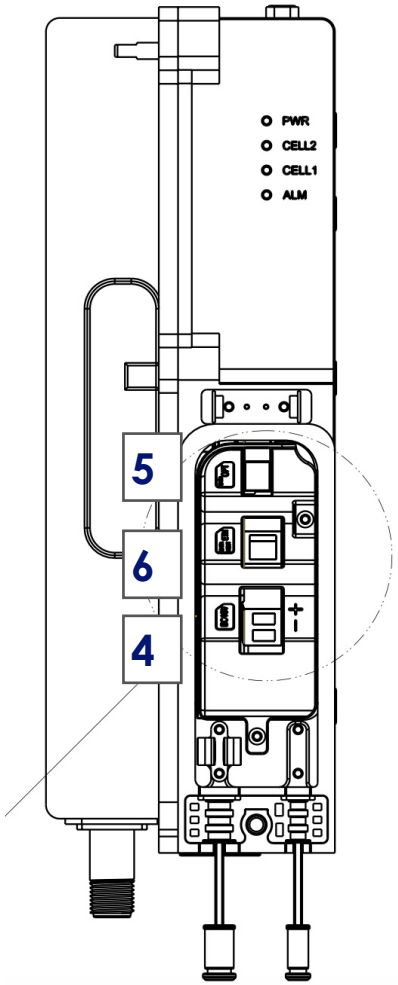
What's the power wiring diagram for AP11?









1: AC Input
2: DC Output (Black/Red)
3: DC Output (Blue/Brown)
4: DC Plug to AP
5: Optical fiber/SFP; single mode dual strand cable
6: Ethernet (not used)

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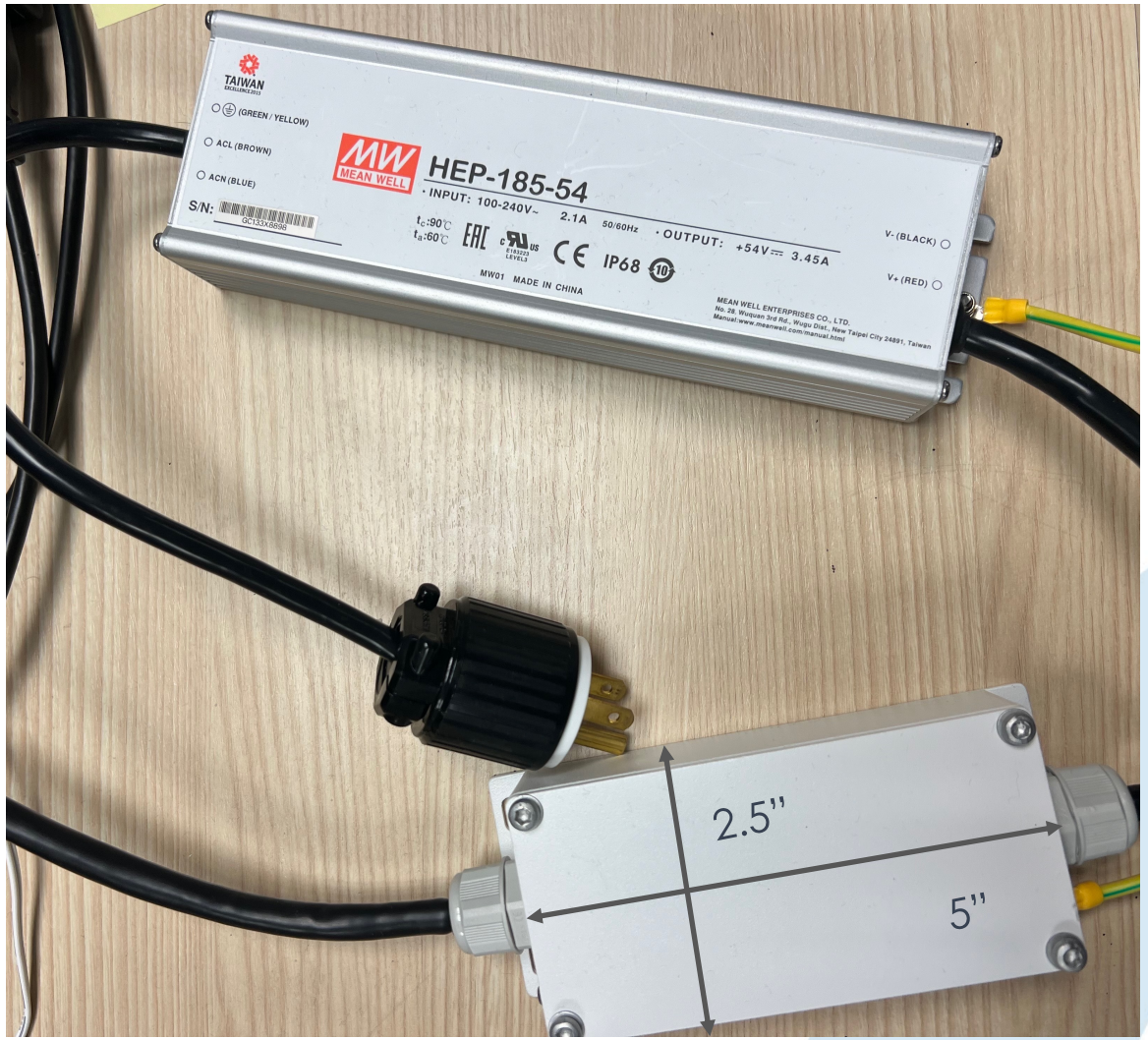
AP11 Power

2 3/4”

8”

Power Input:
8” x 2 3/4” x 1.5”



Power Adapter:
5” x 2.5” x 1.5”

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AP21 Power

Power Input:
9” x 4” x 1.5”

Power Adapter:
6” x 2.5” x 1.5”

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What are the power supply options for the AP11 and AP21 in hazardous environments?

- The power supply for AP11 and A21 are not Class 1 Division 2 (C1D2) rated.

- Options include housing the power supply in a NEMA-rated enclosure (NEMA7X) or placing it outside C1D2 areas and using extended DC cable runs.

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What is the minimum required exposure to sky for GPS antennas for outdoor access points AP11 and AP21?

- Time synchronization is essential for maintaining high device throughput and smooth handover performance in private networks. Access Points with GNSS antennas should be installed in locations free from obstructions, ensuring at least 180-degree exposure to the sky for reliable GNSS satellite signal reception. Celona ships outdoor APs with 3-foot GPS cables, recommended for standard installations to maintain accurate timing.
- To monitor GPS synchronization status and identify potential network issues, check the Events tab on the main Organization page. Synchronization failures, which can vary from a few times a week to multiple times an hour, signal possible network performance degradation.
- For sites lacking adequate sky exposure, Celona provides a 10-foot GPS cable and pole clamp accessories to facilitate closer positioning to cellular antennas. Celona supports GPS cable extensions up to 150 feet for greater installation flexibility. For cable lengths beyond 10 feet, it is recommended to use LMR400 or equivalent specification cables with N-male connectors to ensure signal integrity.

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References

- Celona 5G LAN Links
  - https://docs.celona.io/en/articles/8528584-link-of-links

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THANK YOU

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Celona Edge

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Celona Edge Appliances

Express Node

Enterprise Node

	Express Node
Network Interfaces	Two (2) 1G Base-T Two (2) 10G Base-T
Buttons	Power On/Off, System Reset
LEDs	Two (2) Network Activity LEDs Fan Fail/System Overheat LED HDD Activity LED Power Status LED
Power Supply (AC Power)	1U 200W Multi-output Power Supply Gold Level w/20pin

	Enterprise Node
Network Interfaces	Nine (9) 1G Base-T Two (2) 10G Base-T Two (2) 10G SFP+
Buttons	Power On/Off, System Reset
LEDs	Network Activity LED Hard Drive Activity LED System Information LED Power Status LED
Power Supply (AC Power)	500W High-Effiency Power Supply w/PMBus 1.2, 12C, and PFC

Physical & Environmental Specification

	Express Node
Form Factor	9.8" Mini 1U chassis
Dimensions (H x W x D)	1.7 x 17.2 x 9.8 (inches) 4.32 x 43.69 x 24.89 (cm)
Gross Weight	10 lbs | 4.54 kg
Operating Temperature	0° to 40° C
Storage Temperature	-40° to 70° C
Humidity	8% to 90%

	Enterprise Node
Form Factor	1U Rackmount
Dimensions (H x W x D)	1.7 x 17.2 x 15 (inches) 4.32 x 43.69 x 38.1 (cm)
Gross Weight	25 lbs | 11.34 kg
Operating Temperature	0° to 45° C
Storage Temperature	-40° to 70° C
Humidity	8% to 90%

Key Performance Specifications

	Express Node	Enterprise Node	Enterprise Cluster
Recommended Deployment	Branch or Small Offices	Large Branch or Medium Campuses	Large Campus
Recommended Number of APs	Up to 40 APs	Up to 125 APs Expandable by clustering with more Enterprise Nodes	Up to 300 APs Expandable beyond 3 nodes with additional Enterprise Nodes

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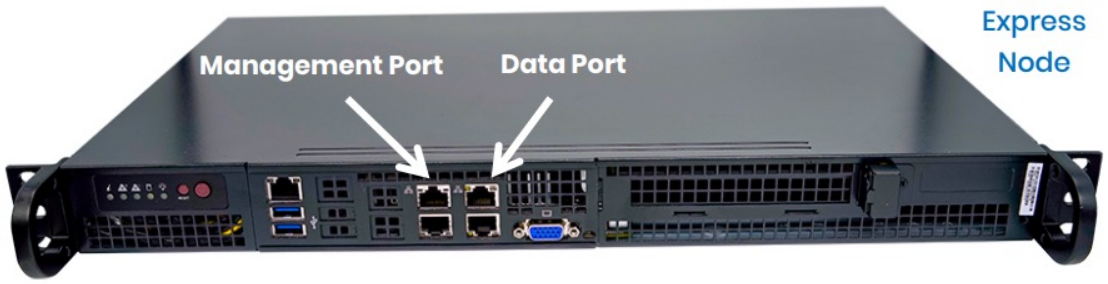
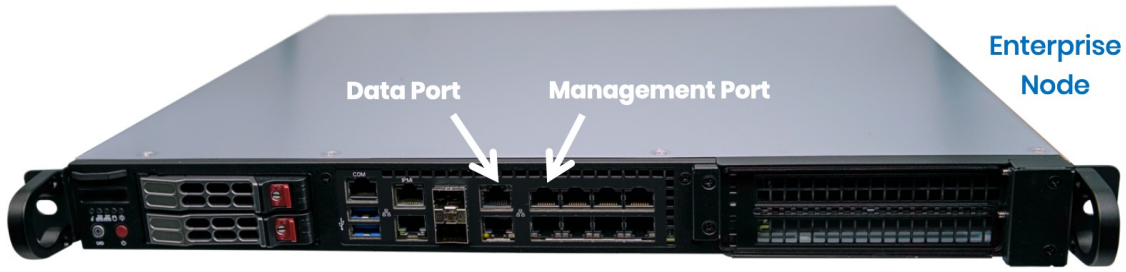
Edge Appliance – What's in the box?



Edge Express Includes
- Edge Express server
- US power cord 18AWG
- Screw and tie wrap kits



Edge Enterprise includes
- Edge Enterprise server
- Rack mount kits
- Power supply with regional plugs
- Screw and tie wrap kits

Management port is needed for initial provisioning with static IP addresses; If using DHCP, management port is not used.

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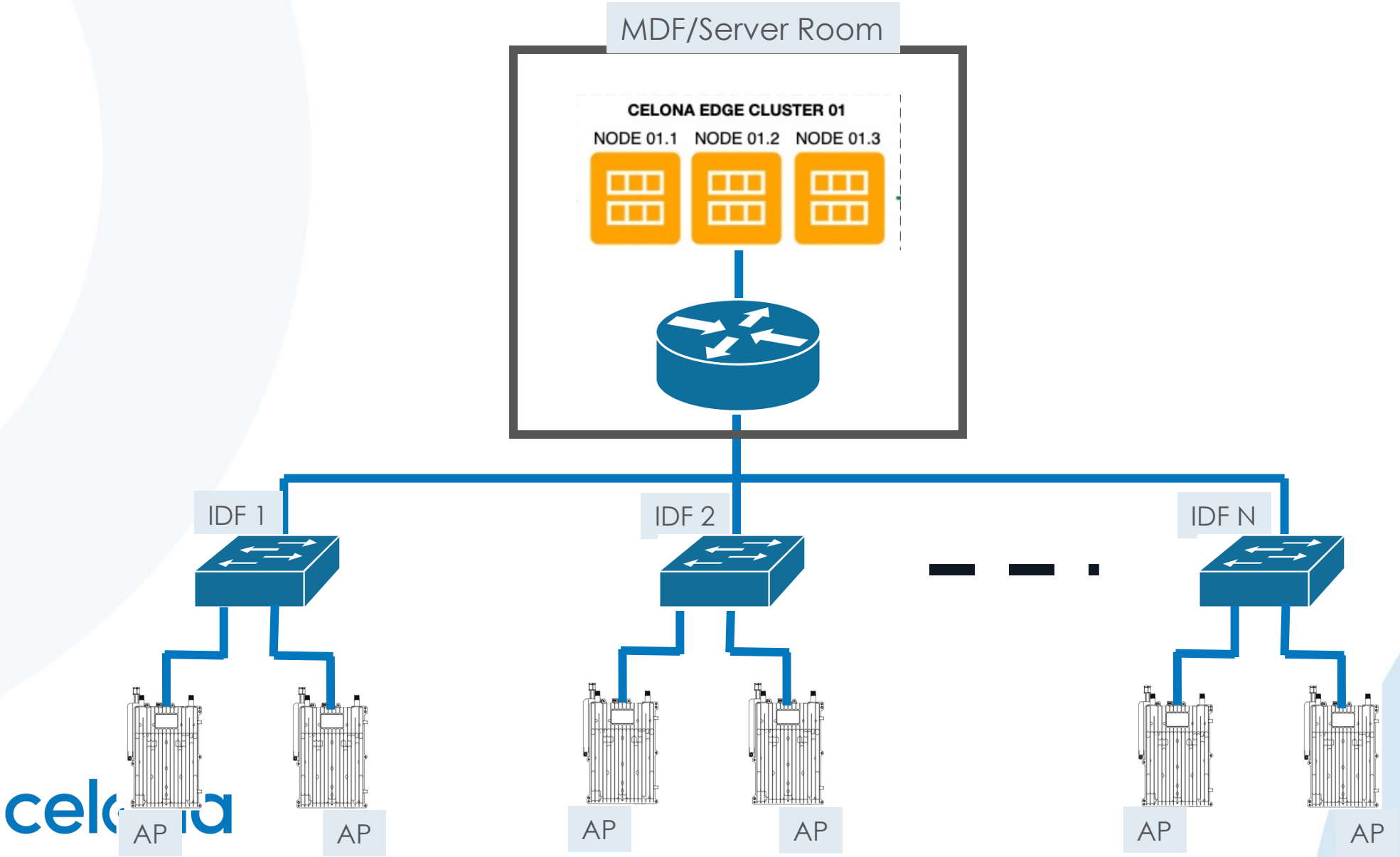
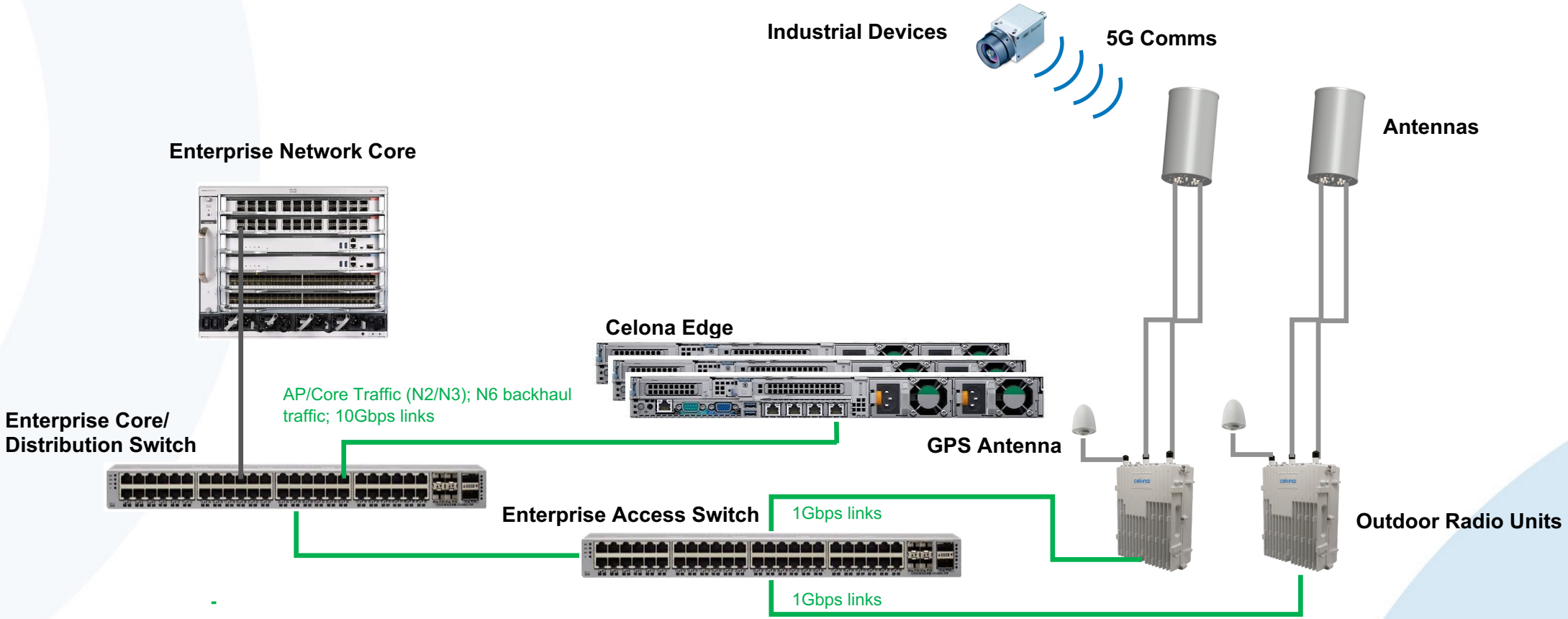
End-to-End Network Architecture



Logical Network Diagram – AP/Edge to Switch



- AP to Enterprise Switch Ports – 1Gigabit Switch Port
- Edge to Enterprise Switch Port
  - < than 5APs – 1G or 10G Switch Port; > than 5APs – 10G Switch Port

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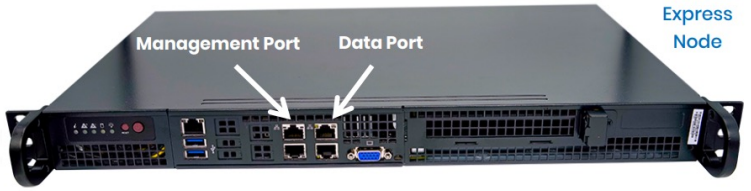
Celona Edge Express Rack Mounting

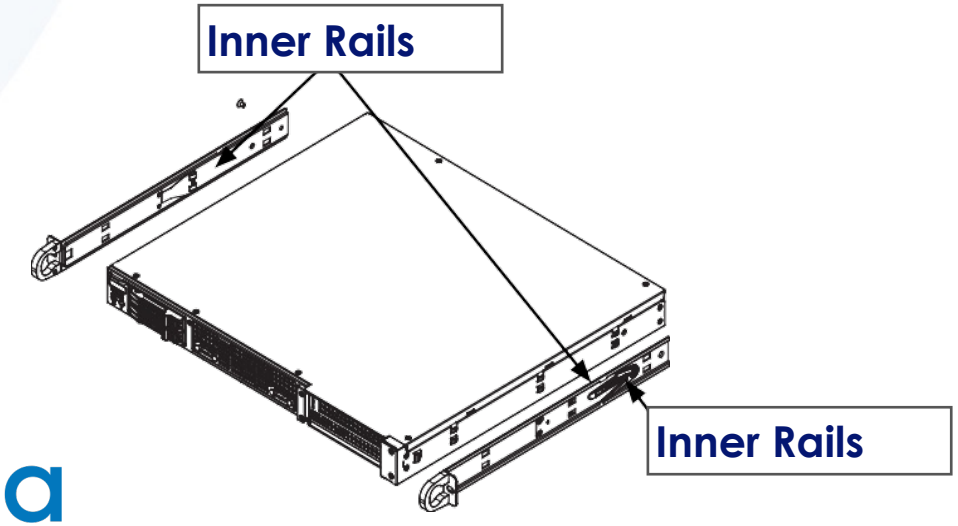
The Celona Edge express can be directly mounted to the server rack

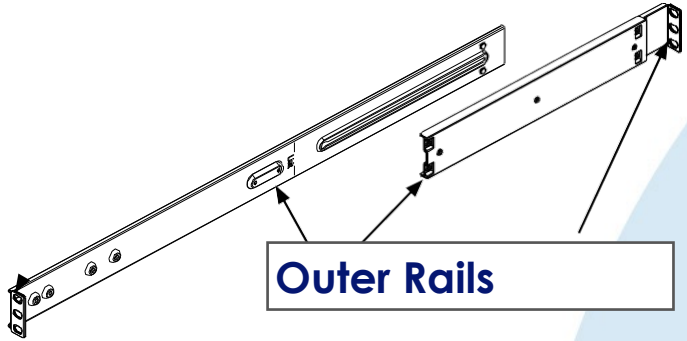
- Use the short rack mounts on the side of the unit.
- Fits standard 600/800/1000mm racks.



Celona Edge Enterprise Rack Mounting

- The Celona Edge Enterprise appliance includes the two rack rail assemblies
  - Inner rails are pre-installed on the chassis and secures to the server chassis
  - Outer rails secures directly to the rack
- The rack mount kits applies to the rack with **26 inches to 33 inches depth only**; For shorter depth, contact support@Celona.io





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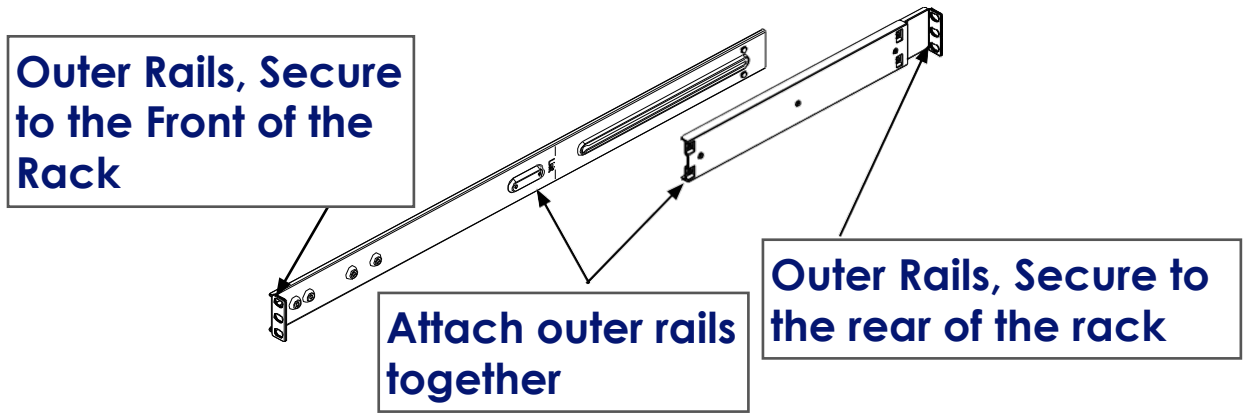
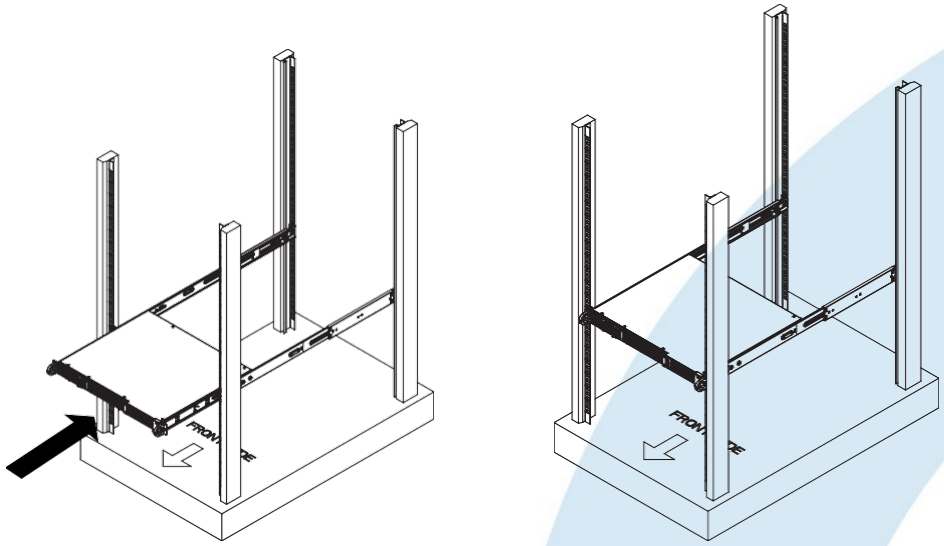
Installing Outer Rails to the Server Rack

- Attach short bracket to the rear of the rack and outside the long bracket.
- Align the pins of the outer rail with the slides.
- Secure the long bracket to the front side of the outer rail and the short bracket to the rear side of the outer rail with a M5 screw





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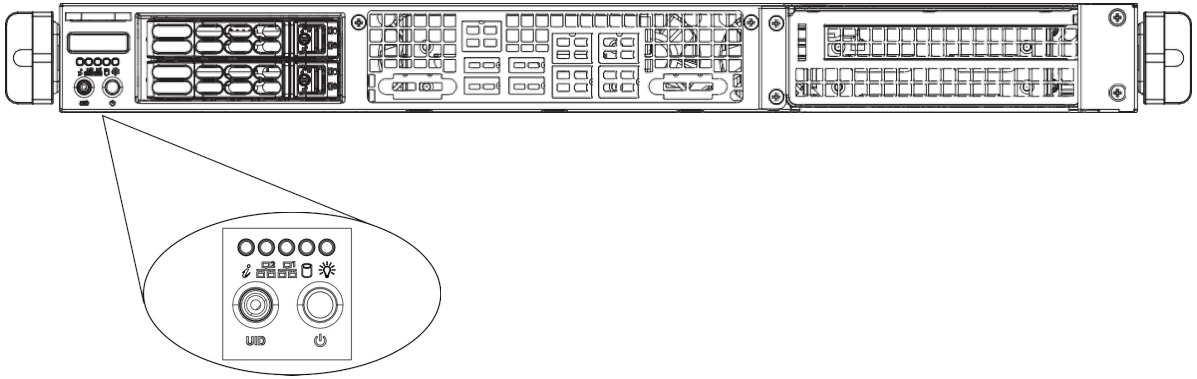
Celona Edge Power-On



Power is controlled by an on/off push- button on the control panel.

References

- https://docs.celona.io/en/articles/7132016-setting-up-your-edge-appliance-via-the-local-edge-manager

- https://uploads-ssl.webflow.com/5e3752187aa7cf8ed3ac0109/62602714acfe7027a1120af8_Celona%20Edge%20Appliance%20Install%20Guide.pdf

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THANK YOU

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