

# **R1220-048L O-RAN RADIO UNIT**

## **INSTALLATION GUIDE**



## Limitation of Liability

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## Purpose

The purpose of this document is to guide users in how to set up and configure WNC's R1220-048L RU.

## CE Marking Warning

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

## Safety Warning/NCC Warning

The R1220-048L RU should be operated from a minimum safe distance of 20 cm (7.87 inch).

## Radio Interference

The R1220-048L RU generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the technician is encouraged to try to correct the interference by performing one or more of the following:

- Re-orientate or relocate the RU
- Increase separation between the RU and/or end devices
- Connect the equipment to a circuit different to what the power source is connected to.

## RF Exposure Warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be operated in conjunction with any other antenna or transmitter.

## General Warning

- Only qualified/licensed personnel should install, replace, or service the RU. Failure to comply with this recommendation may void the product warranty and may expose the end user or the service provider to legal and financial liabilities.
- This RU may not be sold via retail channels, by mail order, or to the general public. It can only be sold to telcom operators.

## Important Safety Instructions

- Carefully read and follow these instructions during installation and operation.
- Failure to follow the instructions may result in physical injury and/or product failure.
- Static sensitive components inside – do not remove the lid or base: No user serviceable parts inside.

- Position the power cord to avoid possible damage; do not overload power circuits.
- Do not place the product near a direct heat source; avoid placing objects on the terminal.
- For cleaning, use a damp cloth. Do not use liquid or aerosol cleaners. Before cleaning, power off the product.
- The RU should not be located too close to power lines or other electrical power circuits, where it can come into contact with such power lines or circuits.
- The radio transceiver must be properly grounded to protect against power surges and accumulated static electricity. It is the user's responsibility to install this device in accordance with the local electrical codes.
- The product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. Consult appropriate regulatory agencies and inspection authorities to ensure compliance when necessary.

## Service information

Refer all repairs to qualified service personnel. Do not modify any part of the device, as this will void the warranty.

Disconnect the power to this product and return it for service if the following conditions apply:

1. The terminal does not function after following the operating instructions outlined in this manual.
2. The product has been dropped or the housing is damaged.

## FCC Statement

### Federal Communication Commission Interference Statement

This equipment 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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

FCC ID: 2BAMZGRBBU001I25001

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# 1. Introduction

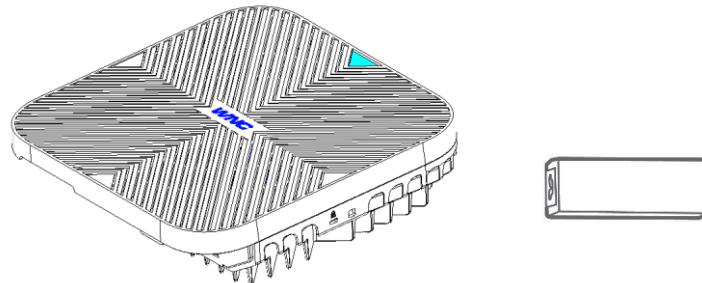
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WNC's R1220-048L radio unit (RU) is designed to provide 5G-NR Sub-6 GHz indoor coverage and optimal 5G network access at throughput speeds of over 1Gbps to satisfy the demands of enterprise, industrial, and commercial venues. The flexible vRAN solution reduces costs and increases connection speeds via split 7-2x fronthaul network implementation. The RU can be mounted on walls, poles or ceilings and utilizes internal 4T4R antennas to boost coverage and throughput.

This guide provides information and steps for installing the R1220-048L RU and its cables. The document is intended for installation personnel only.

## 1.1 Package Contents

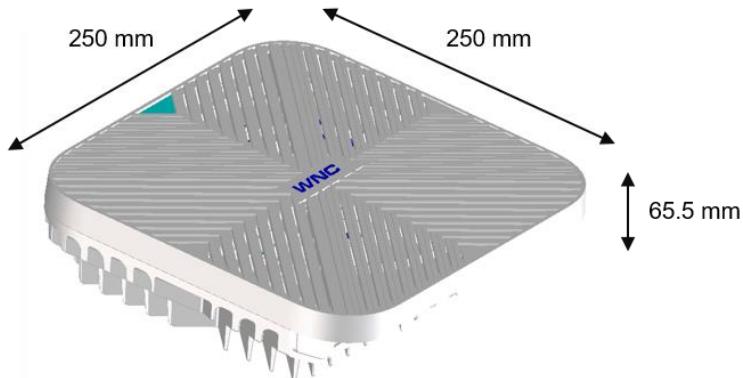
- R1220-048L RU
- PoE



## 1.2 Product Overview

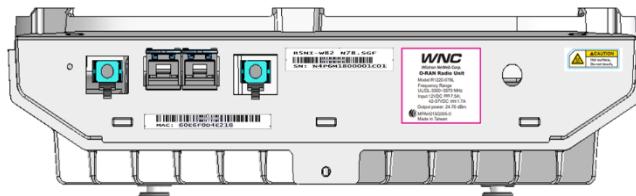
The RU is an indoor product with an operating temperature of between 0–40 °C.

Dimensions: 250 mm × 250 mm × 65.5 mm

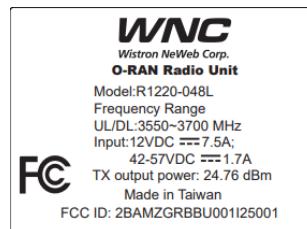


## 1.3 Product Labels

The following labels will be affixed to the bottom cover of the RU.



- Unit label: The unit label shows the product information of the RU.  
R1220-048L stands for N48 O-RU (3.55-3.7GHz)



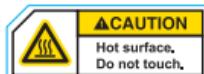
- Serial number label: Each product SKU has its own serial number for product traceability.



- MAC label: Each unit will be programmed with 2 MAC address.



- Heat warning label:



## 1.4 LED Lights

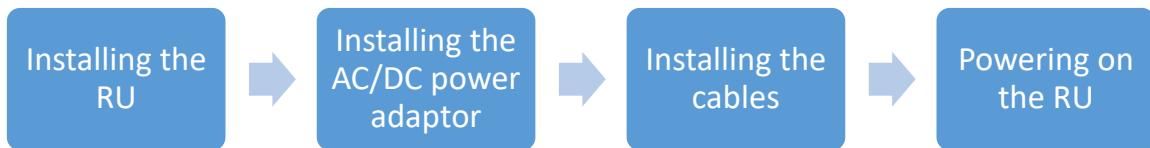
There is one multi-color LED on the top cover of the RU. The table below summarizes the LED color definitions.

LED color	Mode	Description
Off	Solid	System is powered off.
Green	Solid	System is powered on but not ready for service.
	Slow blinking	1. System is powered on but not ready for service. 2. Correct synchronization messages are received but not locked yet.
	Fast blink	1. System is powered on but not ready for service. 2. C/U plane eCPRI messages are received.
Blue	Solid	System is in service.
	Fast blink	1. System is in service. 2. C/U plane eCPRI messages are received.
Yellow	Solid	System is in service but performance issues were found.
	Fast blink	1. System is in service but performance issues were found. 2. C/U plane eCPRI messages are received.
Red	Solid	A fatal system issue was detected. (FH linkdown or overheating)

## 2. Installing the R1220-048L RU

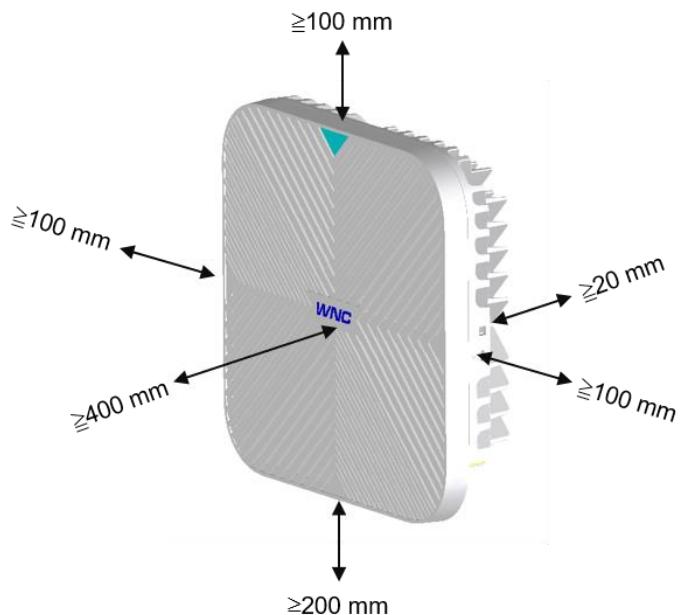
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This chapter covers the step-by-step installation procedures for assembling and installing the R1220-048L RU.



### 2.1 Installing the RU

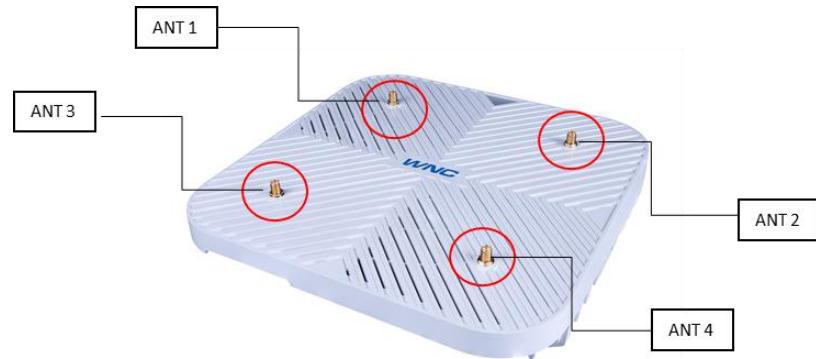
The RU can be installed on a wall, pole, or on the ceiling. The following section describes installation in different scenarios as well as the suggested space requirements.



When an antenna is required, the recommended clear space for installing a single RU is as follows:

- At least 100 mm above the RU;
- At least 200 mm under the RU;
- At least 100 mm on the two sides of the RU;

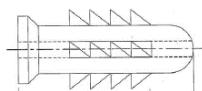
- At least 400 mm in front of the RU, and
- At least 20 mm at the rear of RU.



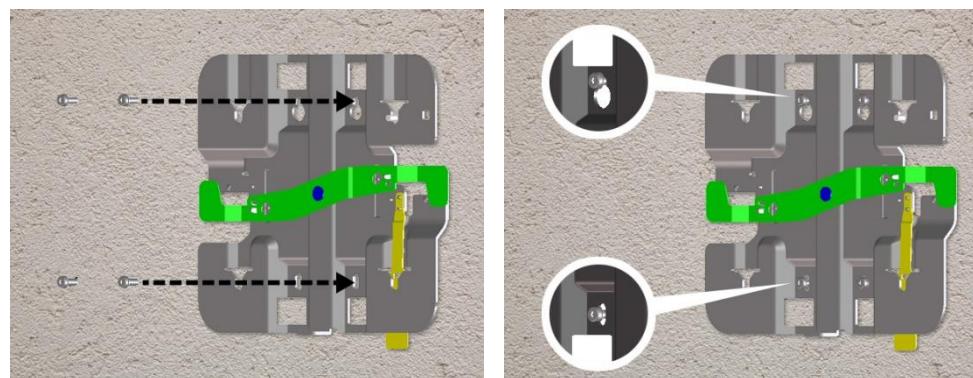
### 2.1.1 Wall Mount

Refer to the steps below to mount the RU to a wall.

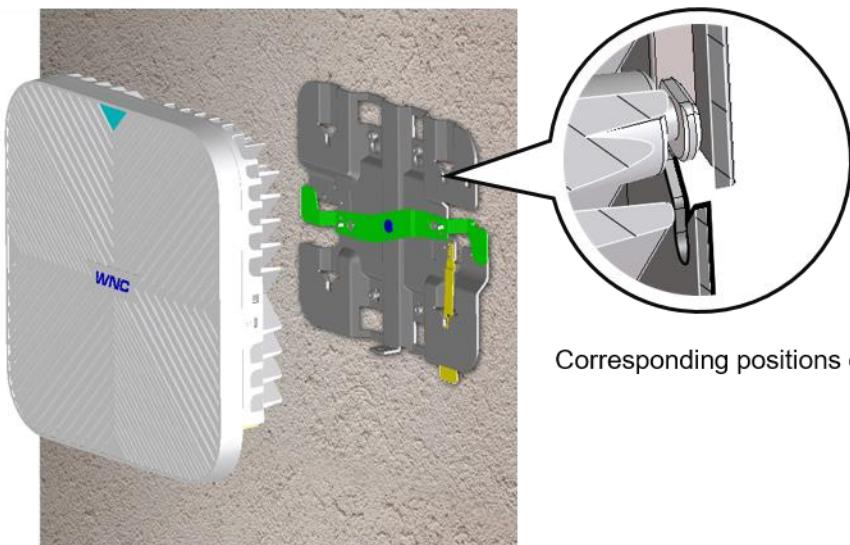
1. Use a power tool to drill four holes, then insert the wall anchors into the holes.



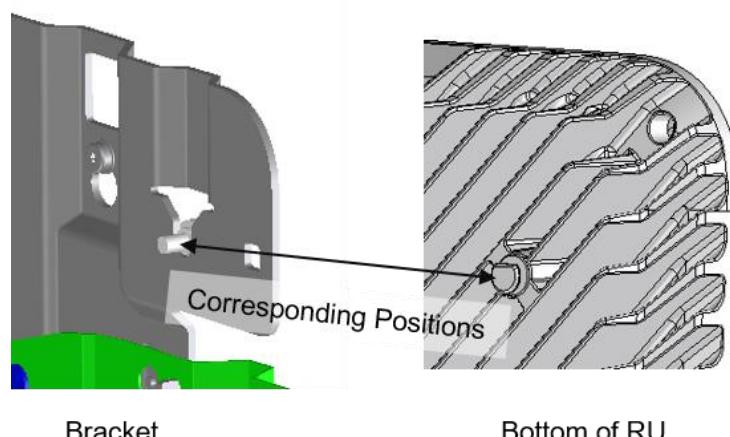
2. Apply the four wall mounting screws into the wall anchors and fix the bracket.



3. At the bottom of the RU, place the four feet into the corresponding positions on the bracket and push down to slide it into the bracket.



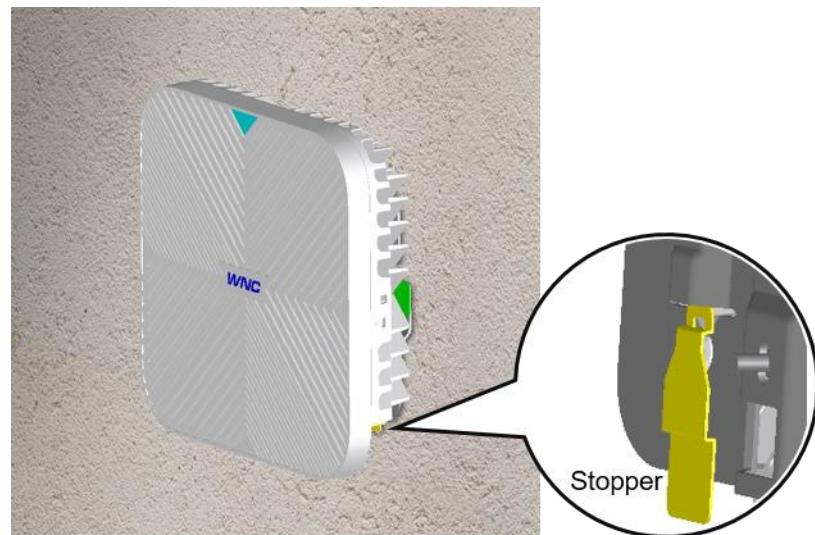
Corresponding positions on the bracket \*4



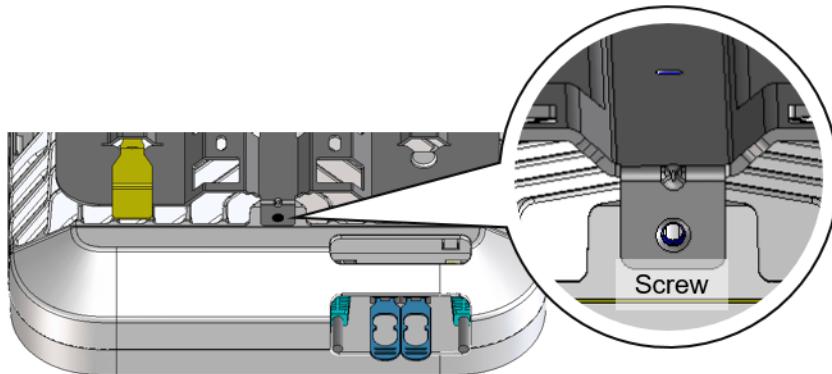
Bracket

Bottom of RU

4. Slide down the RU so the stopper on the bracket can fix it.



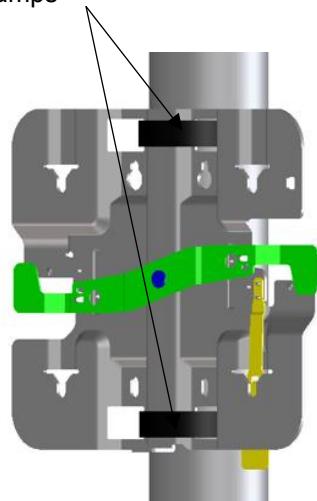
5. Apply security screw and finish assembly.



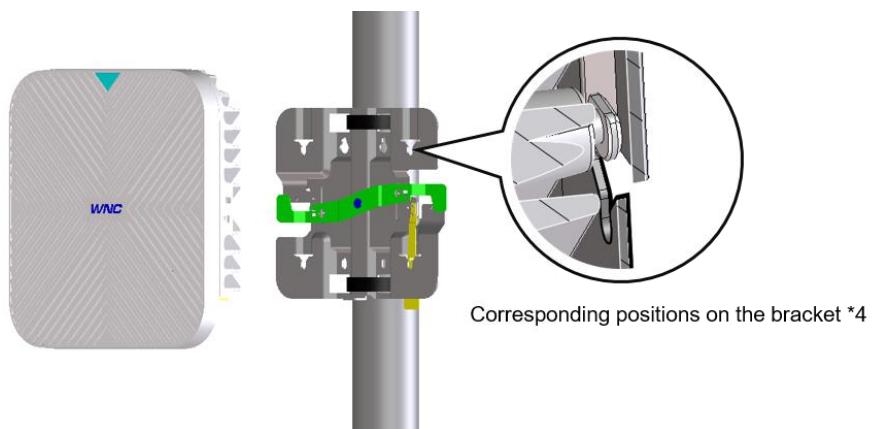
### 2.1.2 Pole Mount (60 mm–400 mm)

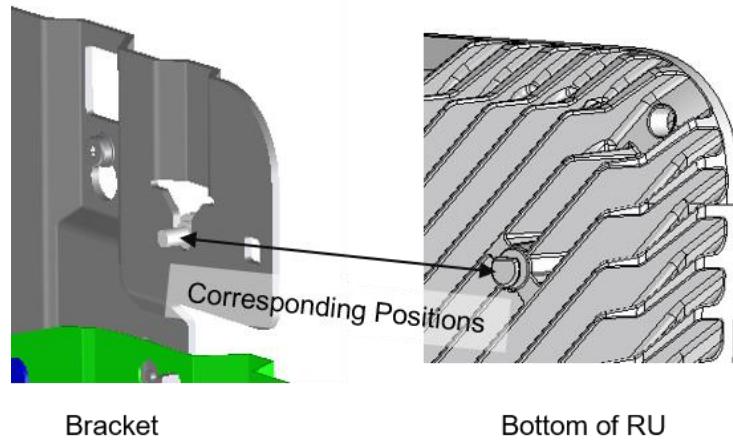
1. Install two hose clamps and secure the bracket to the pole.

Hose clamps



2. At the bottom of the RU, place the four feet into the corresponding positions on the bracket and push down to slide it into the bracket.

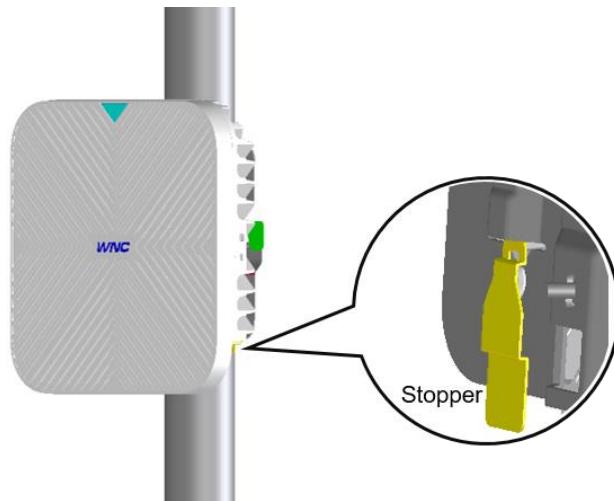




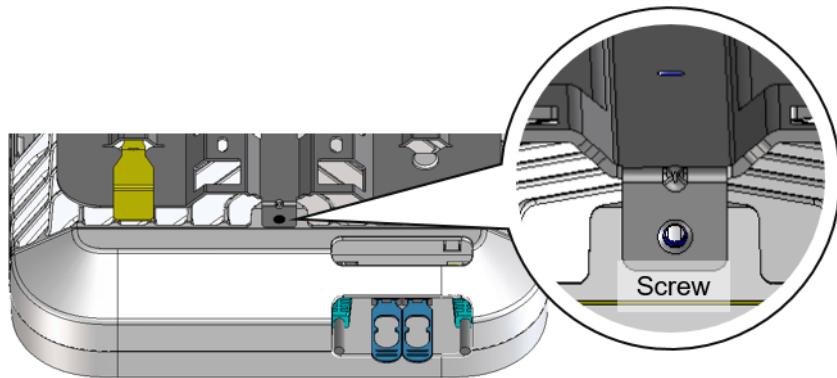
Bracket

Bottom of RU

3. Slide down the RU so the stopper on the bracket can secure it.

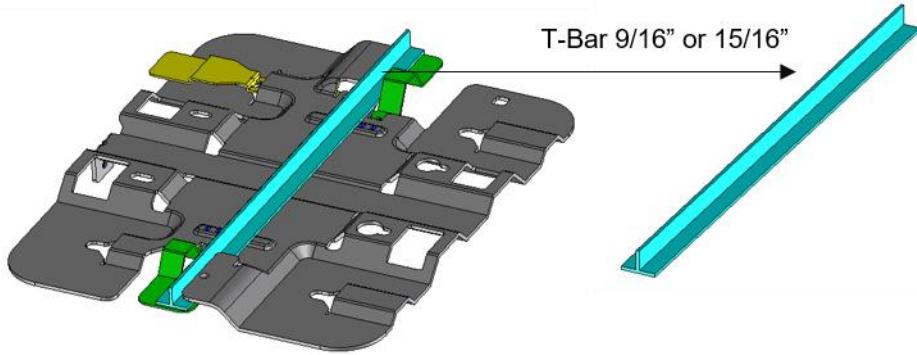


4. Apply the security screw to finish assembling the RU on a pole.

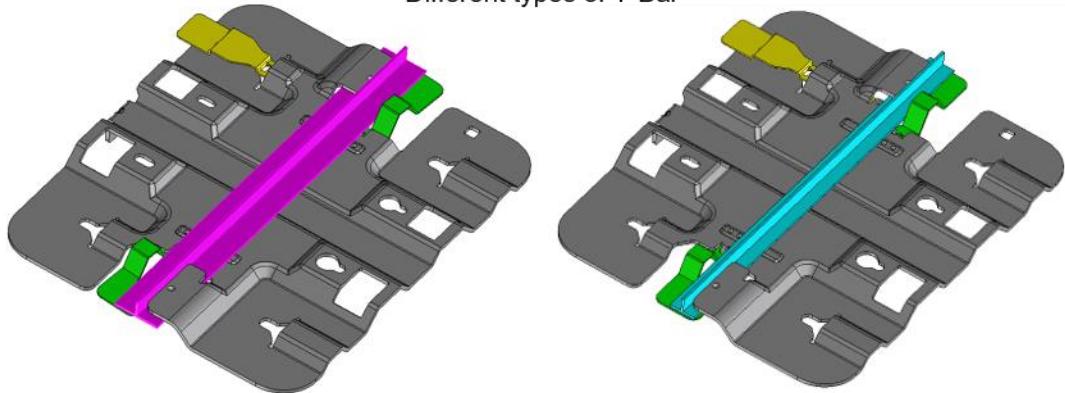


### 2.1.3 Ceiling Mount (T-Bar 9/16", 15/16")

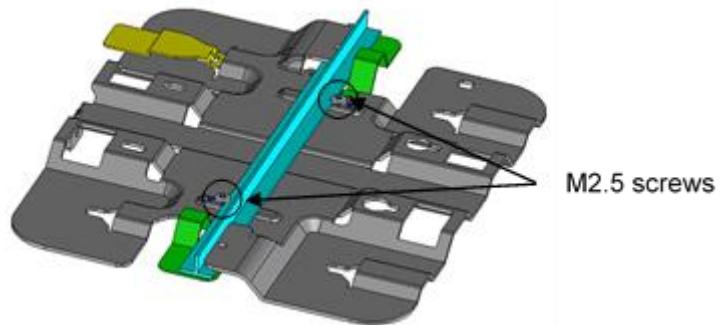
1. Adjust the position of the ceiling spring according to the size of the T-Bar and affix the bracket onto the T-Bar.



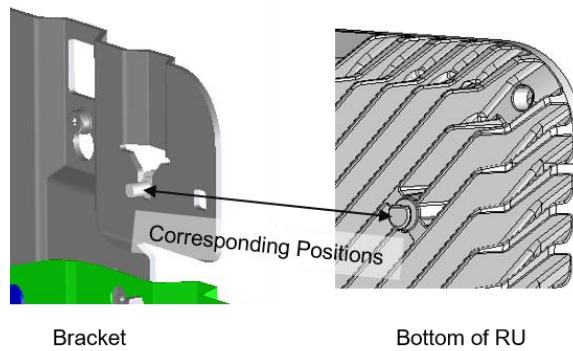
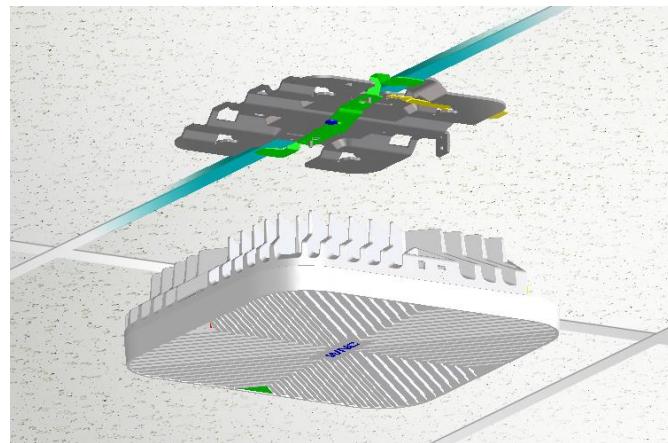
Different types of T-Bar



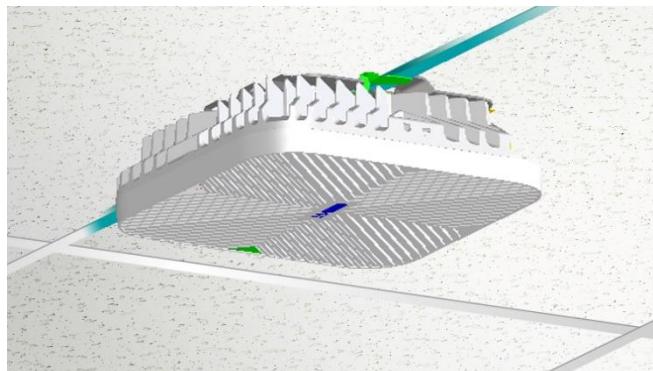
2. Secure the bracket to the T-bar with two M2.5 screws.



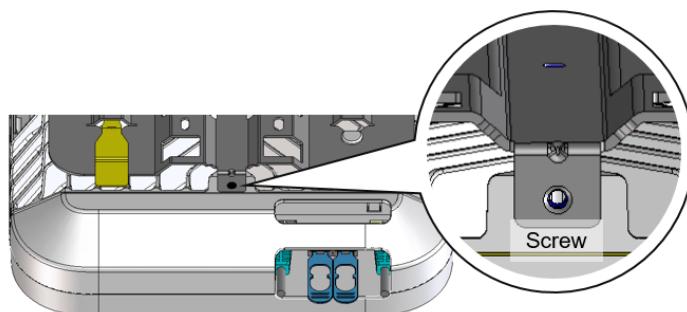
3. At the bottom of the RU, place the four feet into the corresponding positions on the bracket and push downwards to slide it into the bracket.



4. Push the RU towards the direction of the cables until the stopper secures it.



5. Apply the security screw and finish the ceiling mount.



## 2.2 Installing the cables

Follow the steps below to install the cables.

1. Insert the SFP+ transceiver module in either port as shown in the figure below.



2. Insert the SFP+ fiber cable as shown in the figure below.



3. Insert the RJ45 cable into the RJ45 port as shown in the figure below.



4. Insert the power cable into the DC connector port as shown in the figure below.



## 2.3 Powering on the RU

The RU can be powered via a PSE or a DC adaptor. If both are available, choose the DC adaptor over the PSE. Please make sure your PSE device can support 802.3bt, as the RU's full loading power consumption will exceed 802.3at specifications.

The steps below describe ways of powering on the RU.

1. RU power source:

Scenario	RU power source
RJ45 Ethernet cable is connected to a PSE device.	RU can be powered by the PSE.
RJ45 Ethernet cable is connected to a non-PSE device.	Insert the DC power connector. The RU needs to be powered up by a DC power adaptor.
Both PSE and DC adaptor are connected.	RU will use the DC adaptor as the first priority.

2. When the RU is powering on, the LED light turns from dark to solid or blinking green.

LED	Mode	Description
Green	Solid	System is powered on but not ready for service.
	Slow blinking	1. System is powered on but not ready for service. 2. Correct synchronization messages are received but are not locked yet.
	Fast blink	1. System is powered on but not ready for service. 2. C/U plane eCPRI messages are received.

3. After the RU is powered on and is ready for service, the LED light turns from green to blue.

Blue	Solid	System is in service.
	Slow blinking	1. System is in service. 2. Correct synchronization messages are received, but are not locked yet.
	Fast blink	1. System is in service. 2. C/U plane eCPRI messages are received.



If LED illuminates yellow or red, RU may have performance or fatal issues. Please refer to the LED definition section.

### 3. Recommended Transceiver List

The table below is a list of transceivers that are recommended to be used with the RU.

Vendor	Description	Vendor P/N
INTEL	Ethernet SFP+ SR Optics	FTLX8571D3BCL
DELL	Ethernet SFP+ SR Optics	LT8502-BC+-DEN
Eoptolink	Ethernet SFP+ SR Optics	EOLP-8596-02-I
FINISAR	Ethernet SFP+ SR Optics	FTLX8571D3BCL
LUXSHARE	Ethernet SFP+ SR Optics	LUXSHARE-ICT
Cisco	Ethernet SFP+ SR Optics	SFP+10G-SR©
JPC	Ethernet SFP+ SR Optics	TNP199007A00038-7
JPC	Ethernet SFP+ SR Optics	TNP199007A00038-A
CZT	Ethernet SFP+ SR Optics	YV02-C01-HS01
CZT	Ethernet SFP+ SR Optics	YV02-C01-HS02
FINISAR	Ethernet SFP+ LR Optics	FTLX1471D3BCL
LUXSHARE	Ethernet SFP+ LR Optics	PGN1SSD01-NC-T
Eoptolink	Ethernet SFP+ LR Optics	EOLP-1396-10
Cisco	Ethernet SFP+ LR Optics	SFP+10G-LR(C)
JPC	Ethernet SFP+ LR Optics	TNP14200103A009-A
JPC	Ethernet SFP+ LR Optics	TNP14200103A009-7
CZT	Ethernet SFP+ LR Optics	YV02-C02-HS01
CZT	Ethernet SFP+ LR Optics	YV02-C02-HS02

## 4. Technical Specifications

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<b>Model Name</b>	R1220-048L
<b>FPGA</b>	Intel Arria 10
<b>RF IC</b>	ADI ADRV 9025
<b>5G NR</b>	<ul style="list-style-type: none"><li>■ 5G NR TDD 4T4R</li><li>■ Supported bands: n48</li><li>■ 100 MHz bandwidth, 30KHz SCS</li></ul>
<b>Fronthaul</b>	O-RAN Split option 7.2X
<b>TX power</b>	24dBm per RF antenna port
<b>Max Bandwidth OBW</b>	40MHz
<b>Antenna</b>	Embedded
<b>Data interface</b>	10Gbps SFP+
<b>Synchronization</b>	PTPv2 w/ G.8275.1
<b>Holdover</b>	1.5 $\mu$ s over 4 hours
<b>M-plane</b>	O-RAN compliant Netconf protocol and Yang model
<b>Power Supply</b>	IEEE802.3bt PoE or DC 12V/5A
<b>Dimensions</b>	250 mm x 250 mm x 65.5 mm
<b>Weight</b>	3.5Kgs
<b>Indoor IP Rating</b>	IP30
<b>Operating temperature</b>	0 °C to 40 °C
<b>Installation</b>	Ceiling/Wall/Pole mount