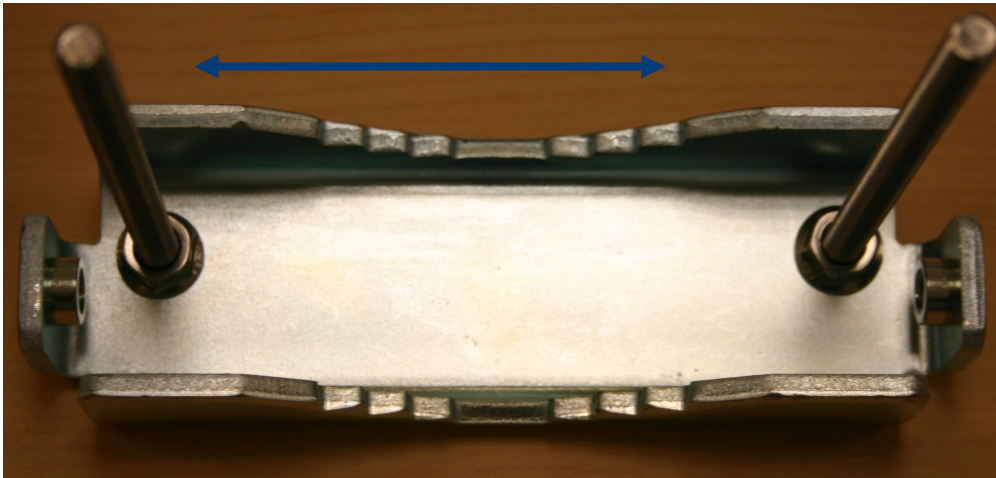


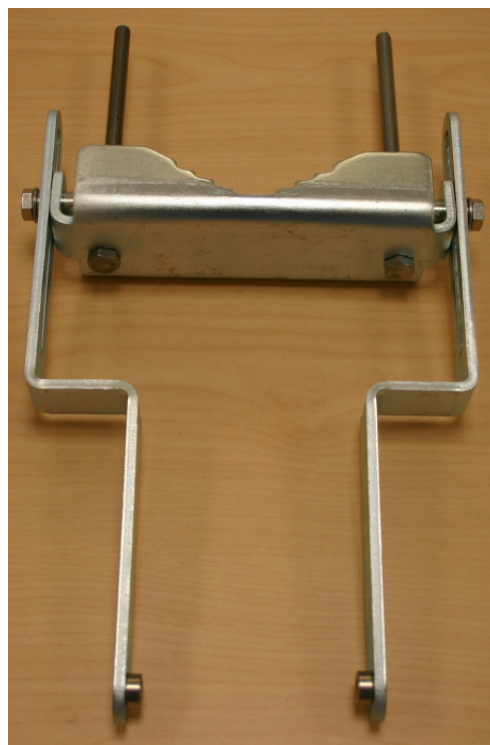
- 6 Assemble the upper bracket by attaching the (2) 7" hex bolts to the bracket using (2) serrated flange nuts

Figure 87 AP antenna upper bracket assembly



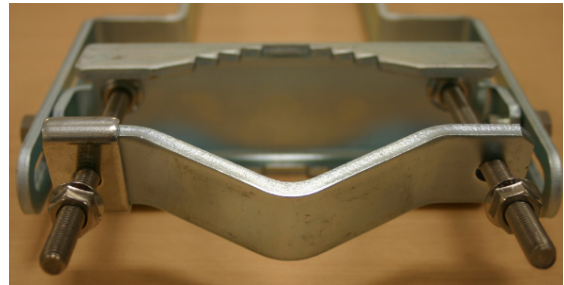
- 7 Attach the upper bracket to the adjustment arms using (2) hex bolts, (2) flat washers and (2) lock washers. Feed the bolt through the lock washer then flat washer, then thread the bolt into the upper bracket's threaded receptacle.

Figure 88 AP antenna upper bracket attached to upper adjustment arms



- 8** Attach the rear strap to the upper bracket using (2) serrated flange nuts and (1) retaining bracket. Do not tighten the nuts now.

Figure 89 Rear strap connected to upper AP antenna bracket



- 9** Attach the entire upper bracket to the antenna using (2) hex bolts, (2) flat washers and (2) lock washers. Feed the bolt through the lock washer then flat washer, then thread the bolt into the upper bracket's threaded receptacle.

Figure 90 Assembled upper bracket connected to AP antenna



- 10** Begin assembling the lower bracket by attaching the (2) 7" hex bolts to the bracket using (2) serrated flange nuts

Figure 91 AP Antenna Lower Bracket Assembly



- 11** Attach the rear strap to the bracket using (2) serrated flange nuts and (1) retaining bracket. Do not tighten the nuts now.

Attach the entire lower bracket to the antenna using (2) hex bolts, (2) flat washers and (2) lock washers.

Figure 92 Lower bracket attached to AP antenna



Figure 93 Completed AP and antenna assembly



PMP 450 Series

Assembling the PMP 450 AP antenna

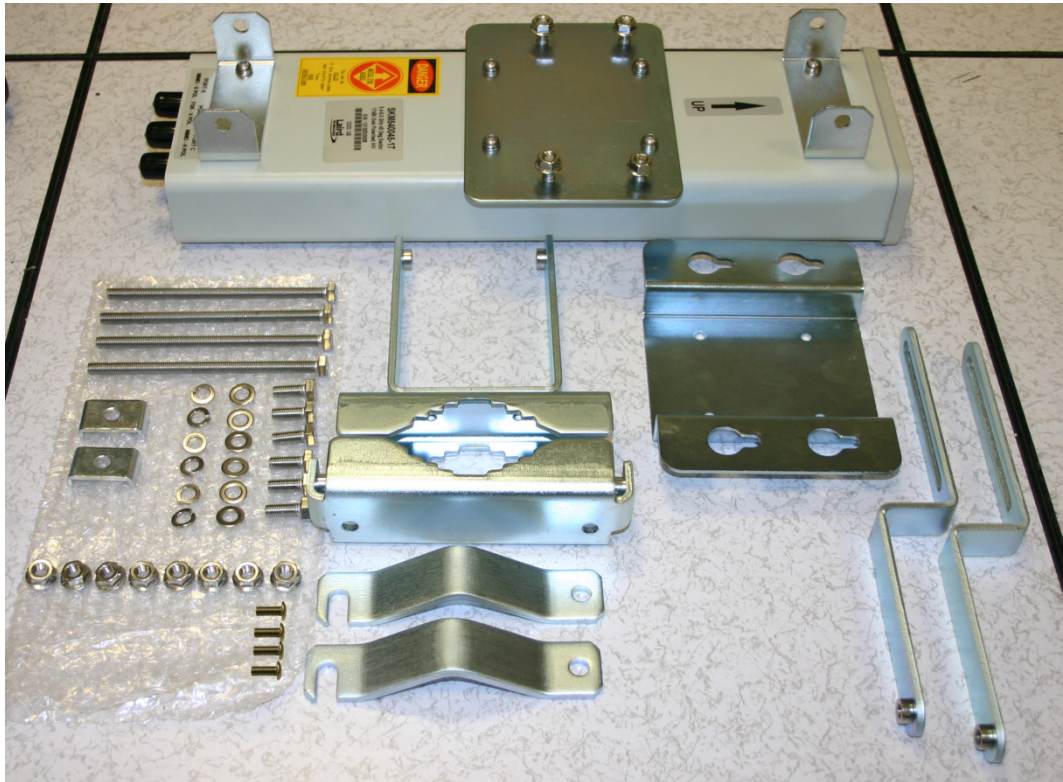
To assemble a PMP 450 Series AP antenna, perform the following steps.

**Note**

Cambium recommends to assemble the antenna, attach the AP and cabling, and to seal the RF connections before installing the unit at the deployment site.

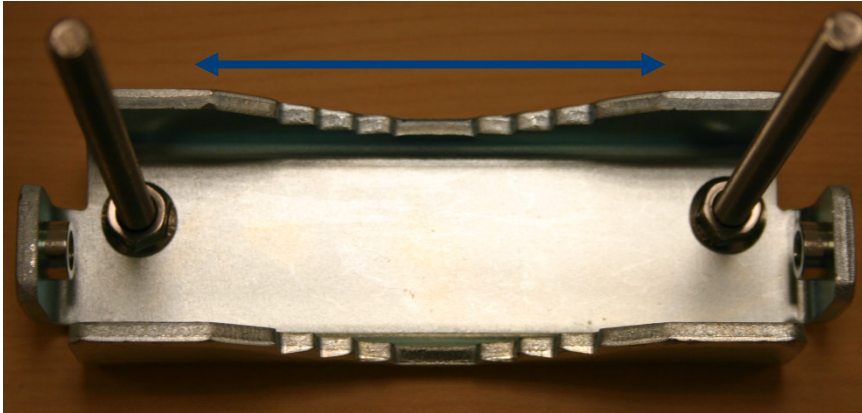
- 1 Inventory the parts to ensure that you have them all before you begin. The full set of parts is shown below.

Figure 94 PMP 450 AP antenna parts



- 2 Begin assembling the upper bracket by attaching the (2) 7" hex bolts to the bracket using (2) serrated flange nuts

Figure 95 AP antenna upper bracket assembly



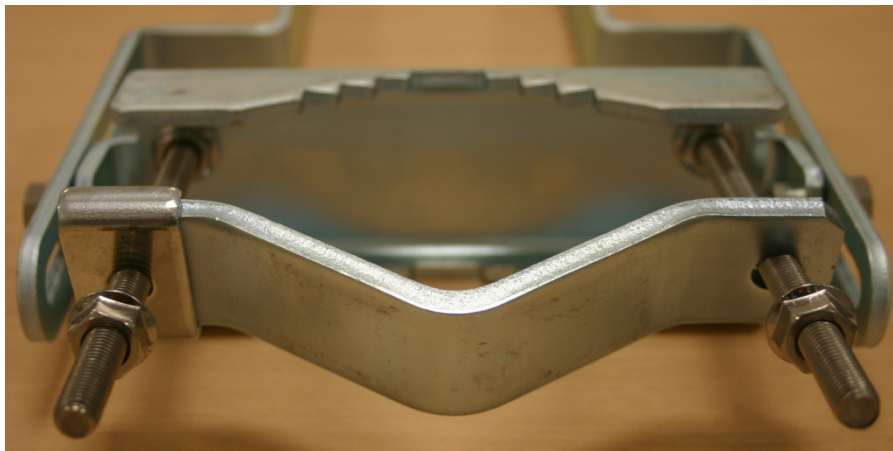
- 3 Attach the upper bracket to the adjustment arms using (2) hex bolts, (2) flat washers and (2) lock washers. Feed the bolt through the lock washer then flat washer, then thread the bolt into the upper bracket's threaded receptacle.

Figure 96 AP antenna upper bracket attached to upper adjustment arms



- 4 Attach the rear strap to the upper bracket using (2) serrated flange nuts and (1) retaining bracket. Do not tighten the nuts now.

Figure 97 Rear strap connected to upper AP antenna bracket



- 5 Attach the entire upper bracket to the antenna using (2) hex bolts, (2) flat washers and (2) lock washers. Feed the bolt through the lock washer then flat washer, then thread the bolt into the upper bracket's threaded receptacle.

Figure 98 Assembled upper bracket connected to AP antenna



- 6 Begin assembling the lower bracket by attaching the (2) 7" hex bolts to the bracket using (2) serrated flange nuts

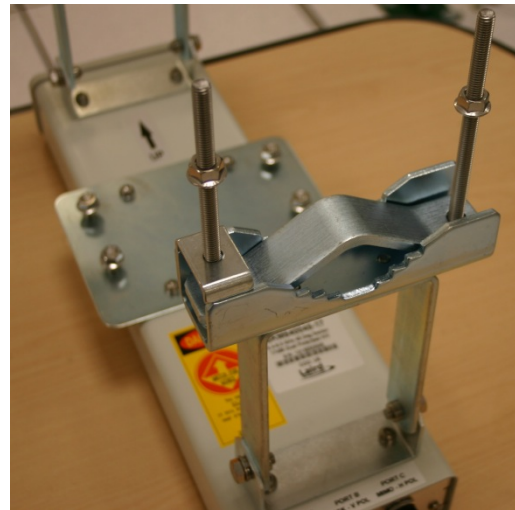
Figure 99 AP Antenna Lower Bracket Assembly



- 7 Attach the rear strap to the bracket using (2) serrated flange nuts and (1) retaining bracket. Do not tighten the nuts now.

Attach the entire lower bracket to the antenna using (2) hex bolts, (2) flat washers and (2) lock washers.

Figure 100 Lower bracket attached to AP antenna



Attaching the PMP 450 AP to the antenna

To attach a PMP 450 Series AP to the antenna, perform the following steps.

**Note**

Use shielded cable for all infrastructure connections associated with APs, SMs, and CMMs. The environment that these modules operate in often has significant unknown or varying RF energy. Operator experience consistently indicates that the additional cost of shielded cables is more than compensated by predictable operation and reduced costs for troubleshooting and support.

- 1 Attach the included bracket to the rear of the AP using the (4) M5 x 7mm bolts

Figure 101 Attaching bracket to the rear of the AP



- 2 Attach the AP to the antenna by sliding the bracket onto the bolts and tighten the (4) serrated flange nuts using a 13 mm spanner wrench.

Figure 102 Lower bracket attached to AP antenna



**Note**

If using a non-standard antenna, do not cover the equilibrium membrane vent located on the back of the unit.



Equilibrium Membrane Vent

Figure 103 Mounted PMP 450 AP and antenna assembly, viewed from back and back



Attaching the PMP 450 Series AP and antenna to the mount point

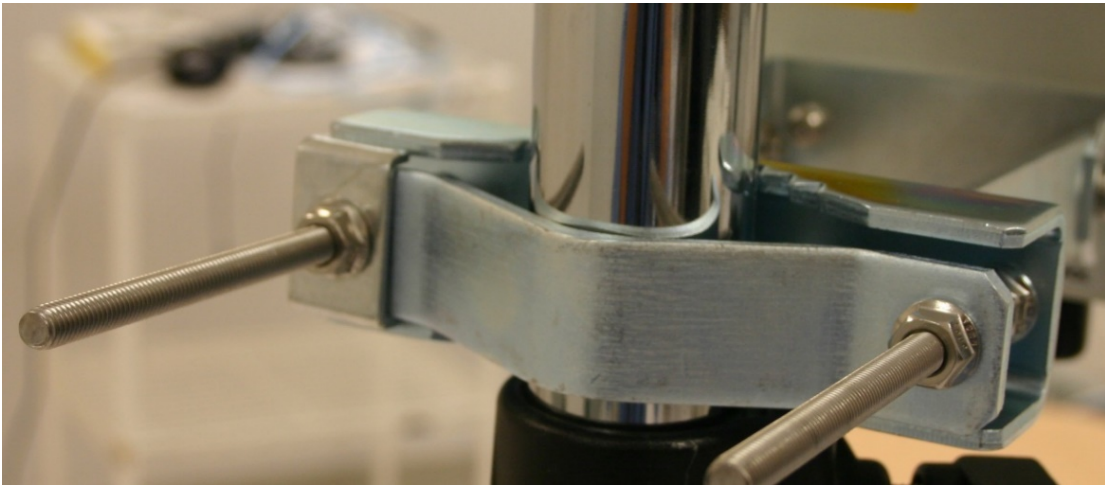
- 1 Attach the upper bracket of the antenna to the mount point by closing the rear strap around the pole and tightening the (2) serrated flange nuts using a 13mm spanner wrench. These must be tightened evenly on the pole to avoid jumping/stripping threads.

Figure 104 Attaching the AP antenna upper bracket to the pole



- 2 Attach the lower bracket of the antenna to the mount point by closing the rear strap around the pole and tightening the (2) serrated flange nuts using a 13mm spanner wrench. These must be tightened evenly on the pole to avoid jumping/stripping threads.

Figure 105 Attaching the AP antenna lower bracket to the pole



- 3 Use a local map, compass, and/or GPS device as needed to determine the direction that one or more APs require to each cover the 90° sector.

4 Choose the best mounting location for your particular application.



Note

Use the embedded spectrum analyzer or a commercial analyzer to evaluate the frequencies present in various locations. OFDM APs need not be mounted next to each other. They can be distributed throughout a given site. However, the 90° offset must be maintained. If you want to collocate these APs with PMP 100 Series APs of the 5.4-GHz frequency band range, plan to allow at least 25 MHz of separation between their center channels.

5 Secure a ground strap to the ground lug on the back of the AP.

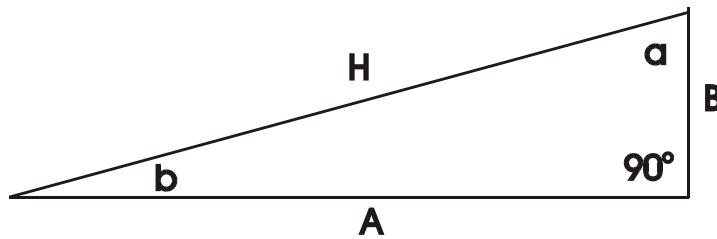
6 Secure the ground strap to the pole, tower, or other trusted ground.

7 The bracket of the standard antenna has provision for measured down tilt. The recommended practice is to use one of the many radio analysis and mapping tools or on-line tools to calculate down tilt based on antenna height above the service area.

The proper angle of tilt can be calculated as a factor of both the difference in elevation and the distance that the link spans. Even in this case, a plumb line and a protractor can be helpful to ensure the proper tilt. This tilt is typically minimal.

The number of degrees to offset (from vertical) the mounting hardware leg of the support tube is equal to the angle of elevation from the lower module to the higher module (<B in the example provided in Figure 69).

Figure 106 Variables for calculating angle of elevation (and depression)

**Where:****Is:**

b	angle of elevation
B	vertical difference in elevation
A	horizontal distance between modules

To use metric units to find the angle of elevation, use the following formula:

$$\tan b = \frac{B}{1000A}$$

Where:**Is:**

B	expressed in meters
A	expressed in kilometers

To use English standard units to find the angle of elevation, use the following formula:

$$\tan b = \frac{B}{5280A}$$

Where:**Is:**

B	expressed in feet
A	expressed in miles

The angle of depression from the higher module is identical to the angle of elevation from the lower module.

- 8 Connect the coax cables to the antenna and to the AP
- 9 Weatherproof the connector on the coax cables (see section [Attaching and weatherproofing an N type connector](#) on page 6-72).

PMP 450i Series AP 900 MHz

Mounting of PMP 450i AP 900 MHz

- 1 Inventory the parts to ensure that you have them all before you begin. The full set of parts is shown in [Figure 108](#).

Figure 107 PMP 450i AP 900 MHz antenna unbox view

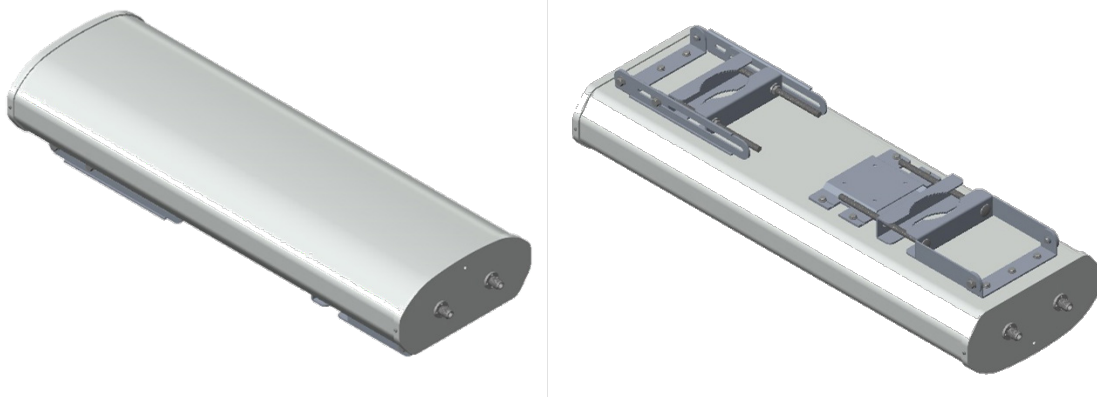
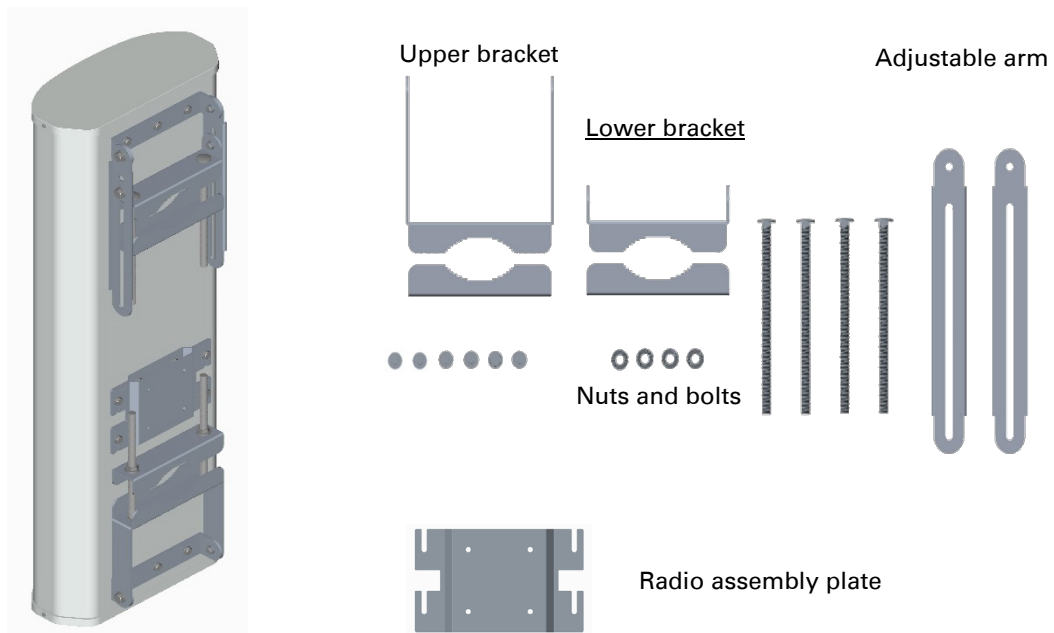
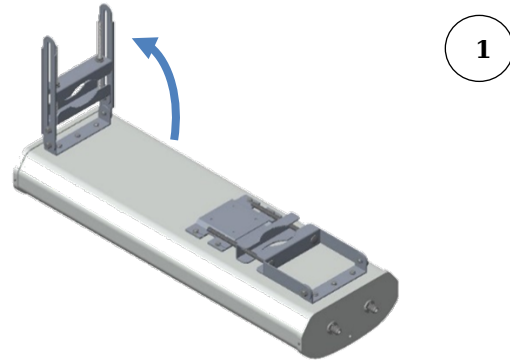


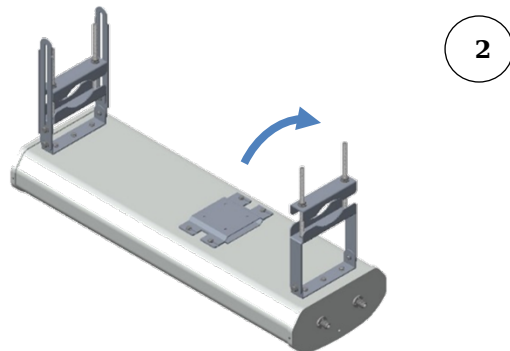
Figure 108 PMP 450i AP 900 MHz antenna inventory



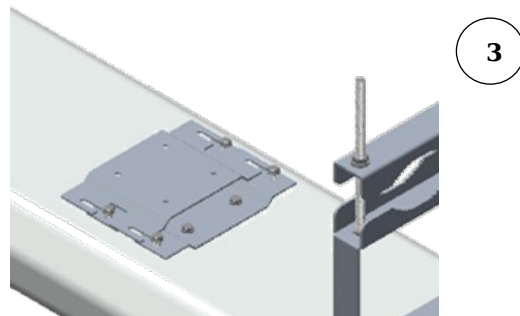
- 2 (1) Unfold the upper bracket assembly of the antenna.



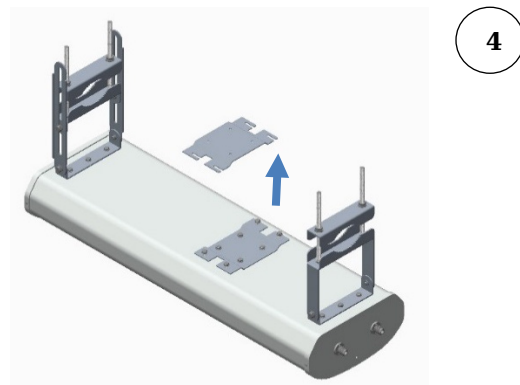
- (2) Unfold the lower bracket assembly.



- (3) Loose the radio assembly plate by untightening M8 four bolts.



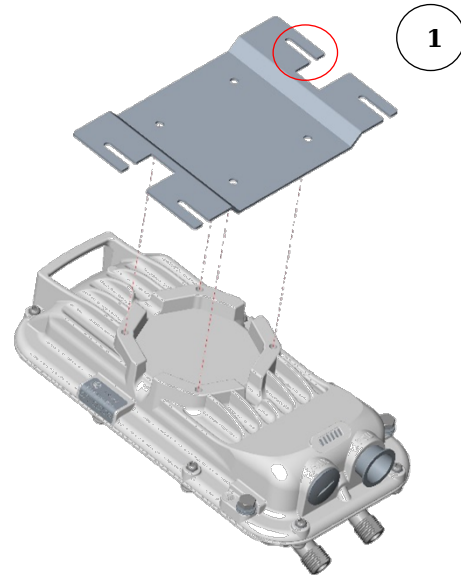
- (4) Remove the radio assembly top plate by sliding towards upper bracket assembly.



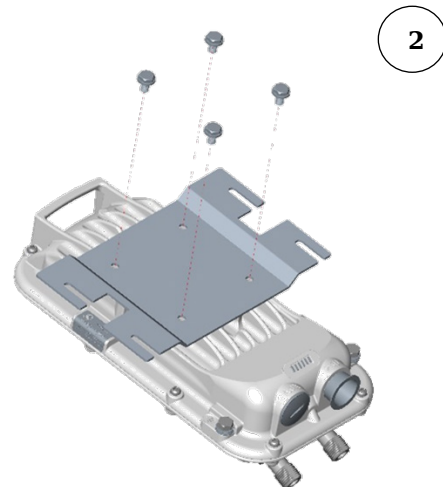
- 3 (1) Place the radio assembly plate on the radio and align holes with radio enclosure.

**Note**

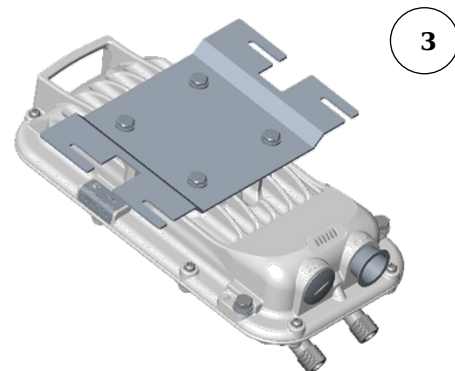
Ensure that the radio plate notch opening and RF port of radio in same direction. It is also important to make sure you attach the radio assembly plate in the proper orientation as shown in figure.



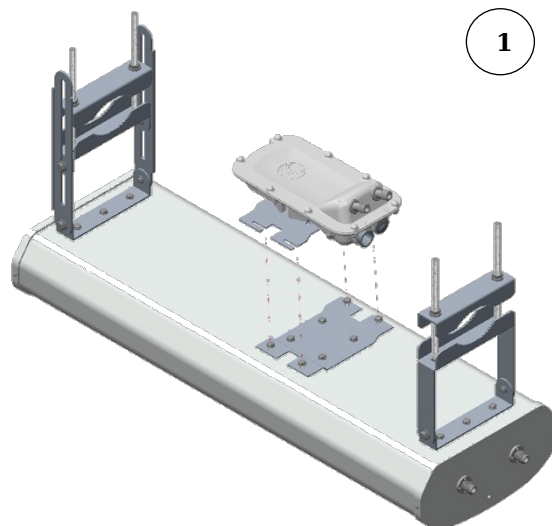
- (2) Insert M6 bolts through plate into radio enclosure



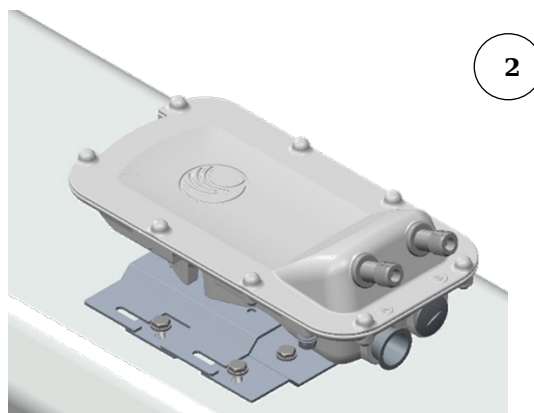
- (3) Fix the plate by tightening four bolts with a torque setting on 2 ± 0.5 Nm



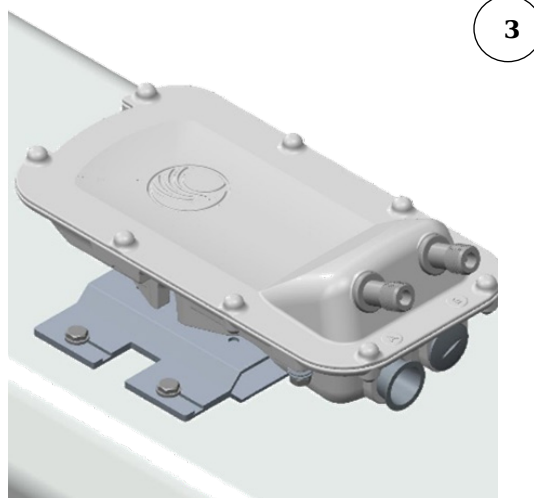
- 4** (1) Place the radio mounted plate on sector antenna as shown in the figure. Ensure that the orientation of RF port of antenna and radio are in same direction



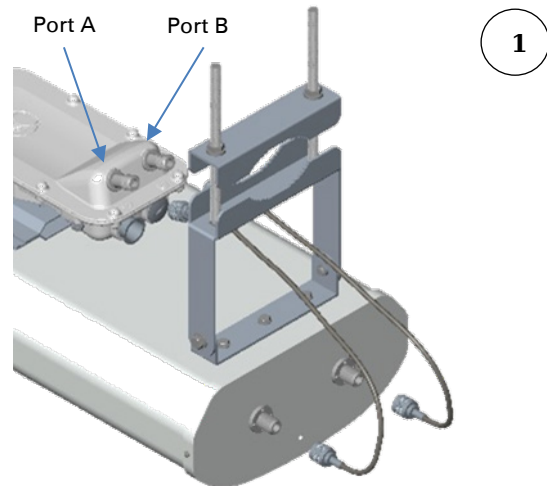
- (2) Line up the radio assembly to four bolts and slide towards lower bracket assembly to lock.



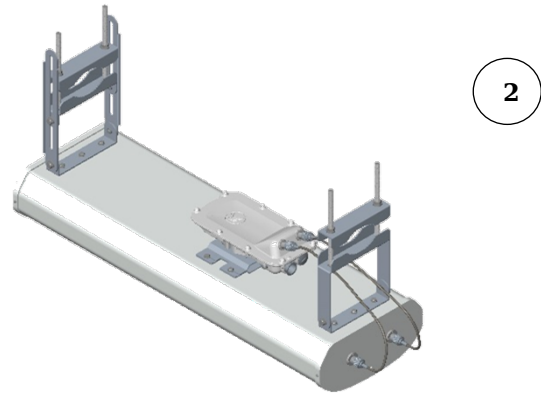
- (3) Tighten the radio assembly plate using four M8 bolts to a torque setting of 2 ± 0.5 Nm



- 5** (1) Connect the port A of AP to vertical and port B of AP to horizontal polarization interfaces of the antenna with RF cable. Ensure that the RF cables are pass-through inside the lower bracket assembly



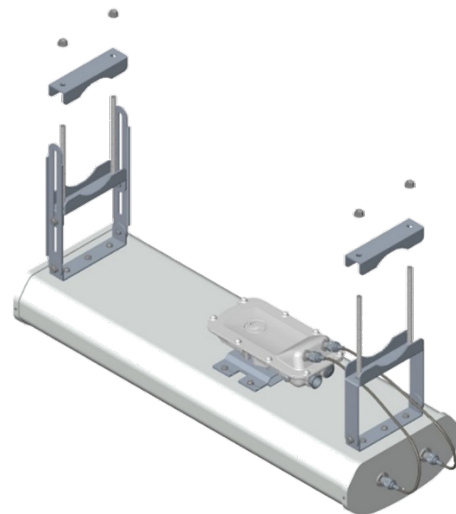
- (2) Hand tighten the N type connectors and the torque should not exceed more than 1 Nm



Mounting of PMP 450i AP 900 MHz antenna to the pole

The mounting procedure of PMP 450i AP 900 MHz and antenna to the pole is given below:

- 1** Remove the upper and lower rear bracket strap from the sector antenna.

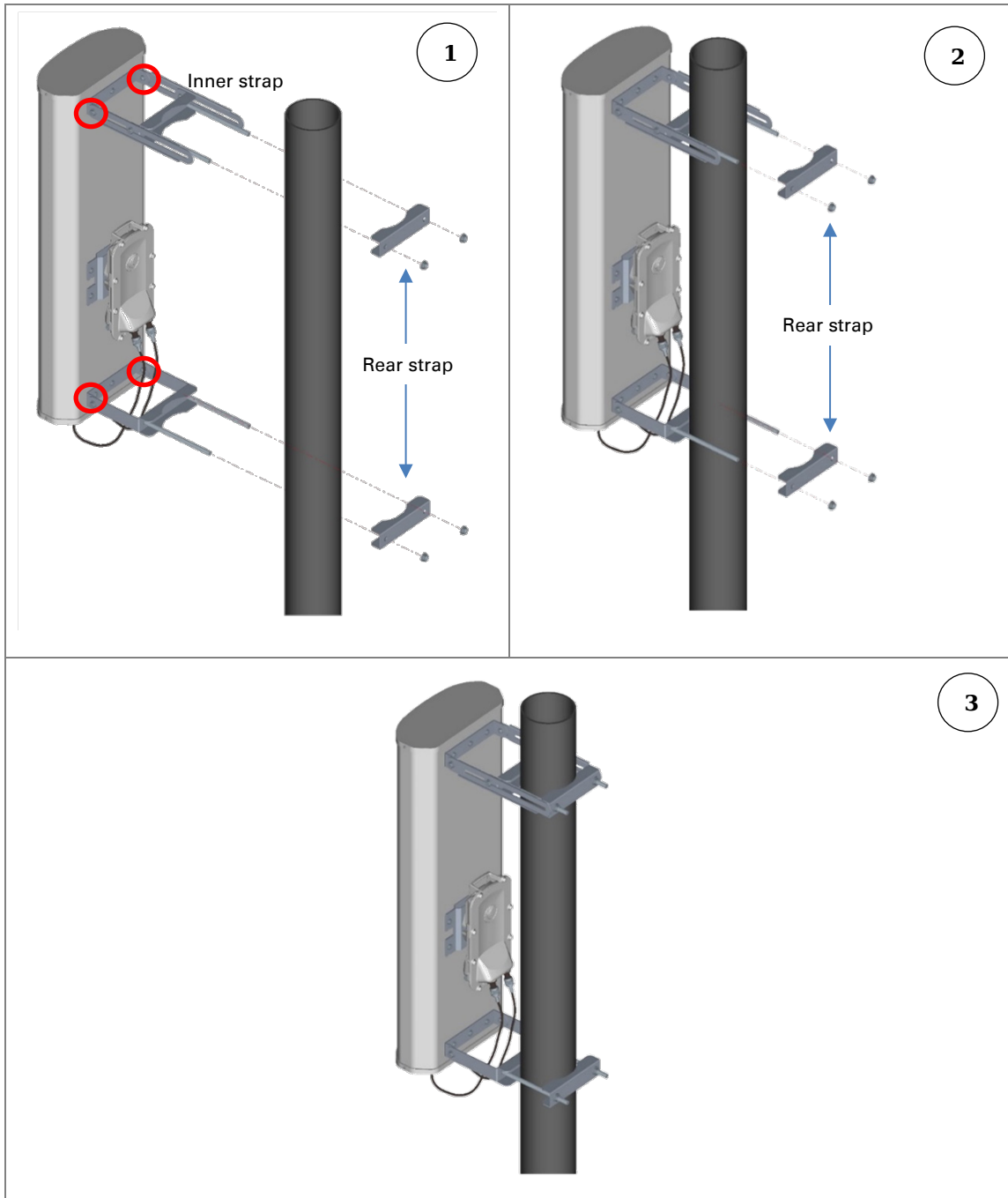


- 2 Attach the upper and lower bracket of the antenna to the mount point by closing the rear strap around the pole.

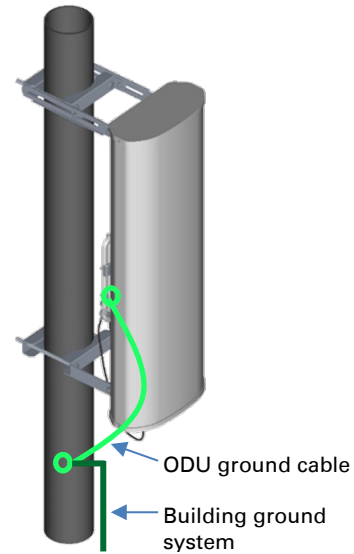
**Note**

Before mounting the radio on the pole, secure the upper and lower bracket assemblies with a torque setting of 3 to 4 Nm as shown in Figure 109. Also, ensure that inner strap of upper bracket is set to zero degree marking.

Figure 109 Attaching radio mounting PMP 450i AP 900 MHz antenna to the pole



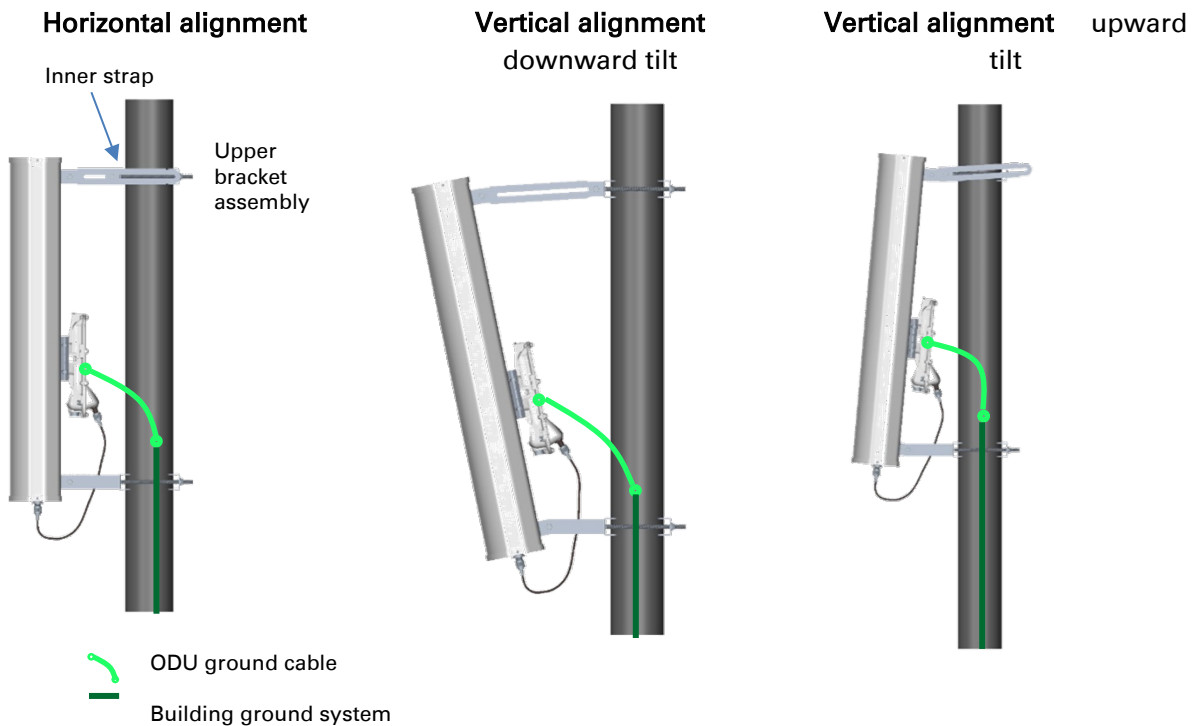
- 3 Tighten the four serrated flange M10 nuts on the upper and lower rear straps using a 17 mm spanner wrench. These must be tightened evenly on the pole to avoid jumping/stripping threads



Sector antenna alignment

The 900 MHz sector antenna horizontal and vertical alignment procedure is shown in [Figure 110](#). The antenna can be aligned from +5 to -10 degree by adjusting the inner strap of the upper bracket assembly.

Figure 110 900 MHz sector antenna alignment

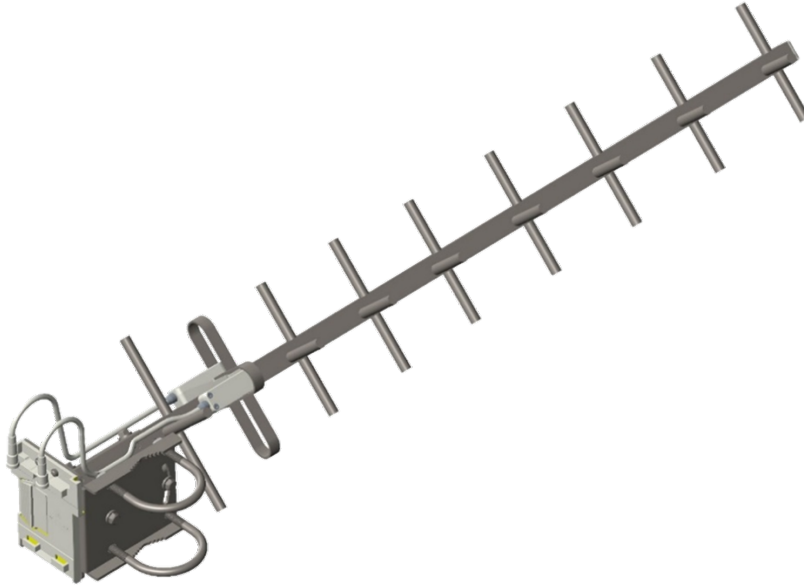


PMP 450 Series SM 900 MHz

Attaching the SM 900 MHz directional antenna to the pole

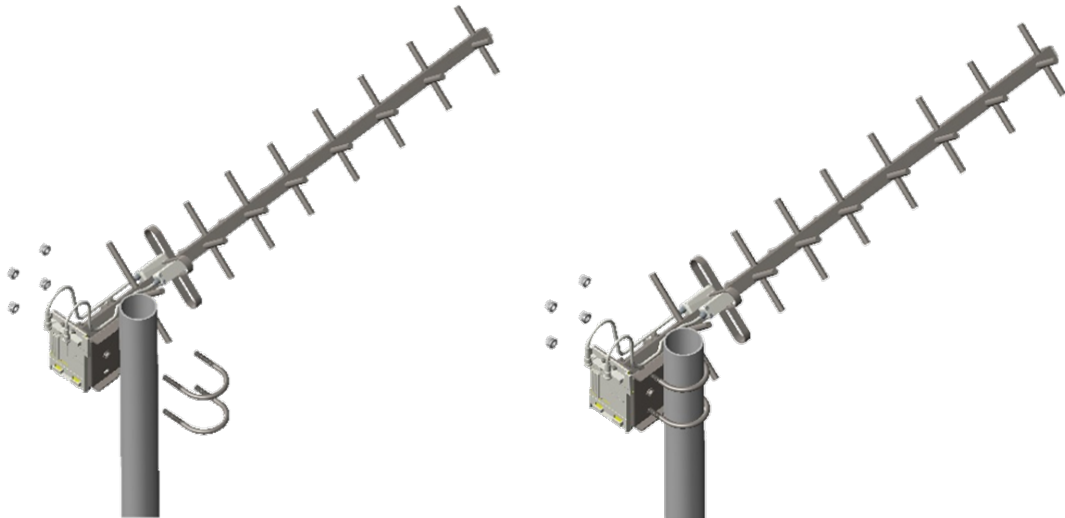
- 1 Unbox the directional Yagi antenna.

Figure 111 PMP 450i SM 900 MHz external directional antenna



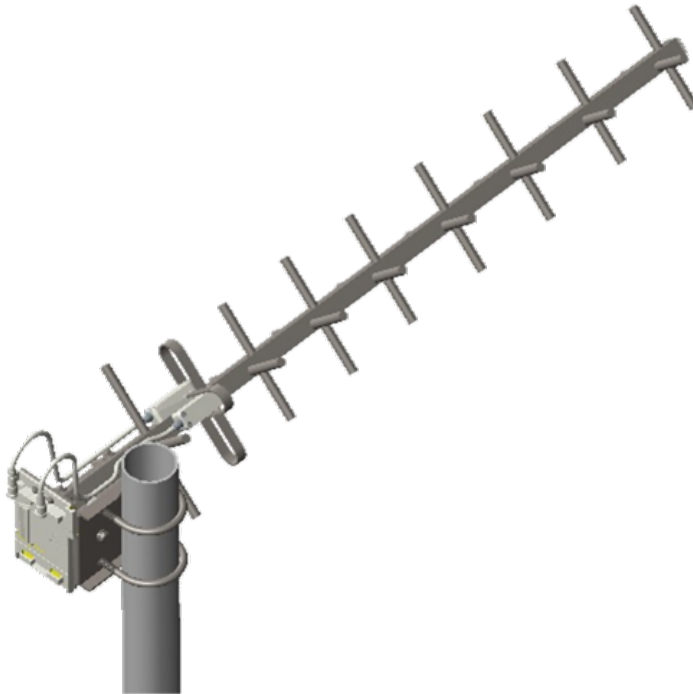
- 2 Attach the directional antenna to the pole and insert the two U clamps into the mounting bracket of the antenna

Figure 112 Attach the antenna to the pole



- 3 Tighten all nuts to approximately 6 to 7 Nm or less to avoid deforming the pole.

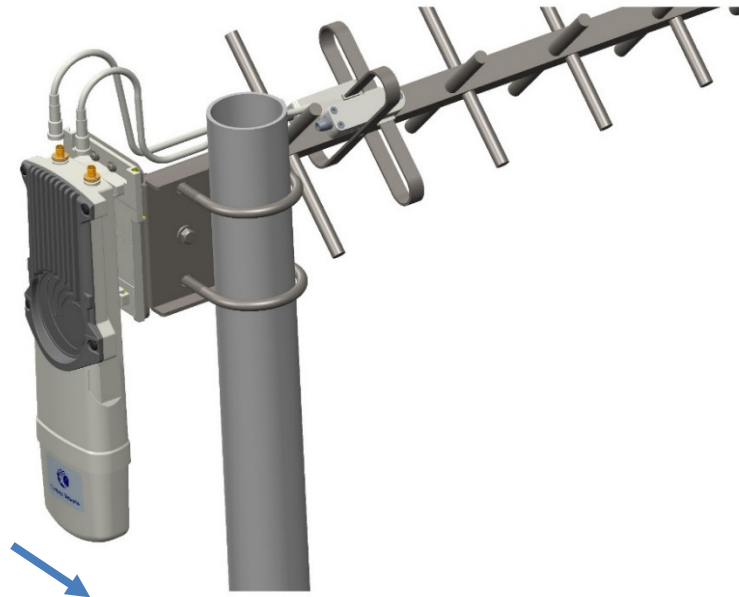
Figure 113 Fixing the nuts



Radio mounting to the antenna

- 1 Align the radio to E bracket and slide towards right to lock on the antenna as shown in figure.

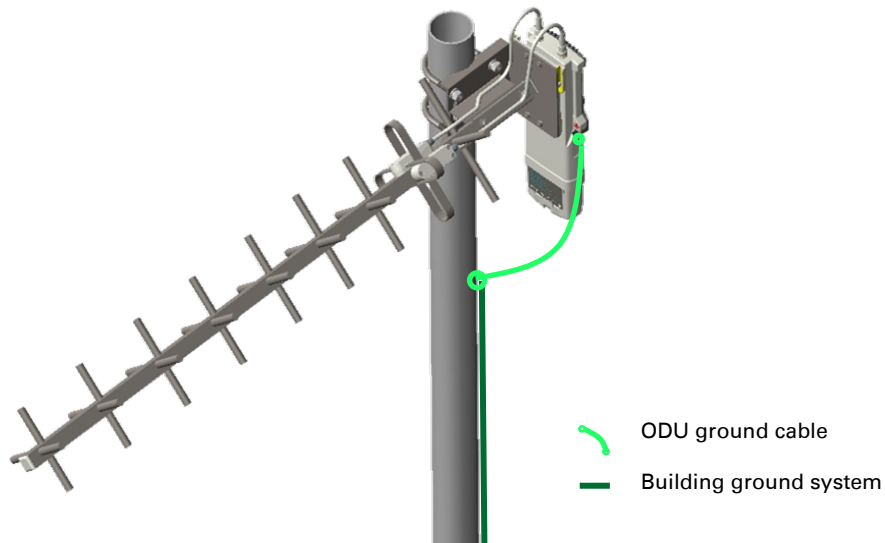
Figure 114 Fixing the radio to the antenna



Slide towards right to lock

- 2 Connect the port A of SM to vertical and port B of SM to horizontal polarization interfaces of the antenna with RF cable.

Figure 115 Connecting RF cable to the radio



ODU ground cable

Building ground system

Directional Yagi antenna alignment

The directional Yagi antenna horizontal and vertical alignment procedure is shown below. The Yagi antenna can be aligned for +15 to -15 degree.

Figure 116 Yagi antenna alignment - horizontally

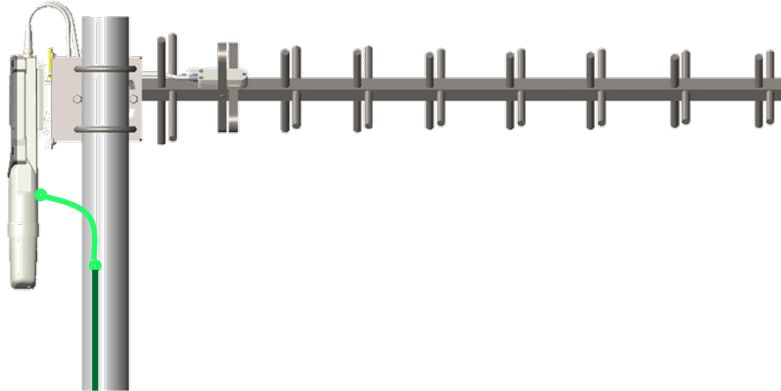


Figure 117 Yagi antenna alignment - upward tilt

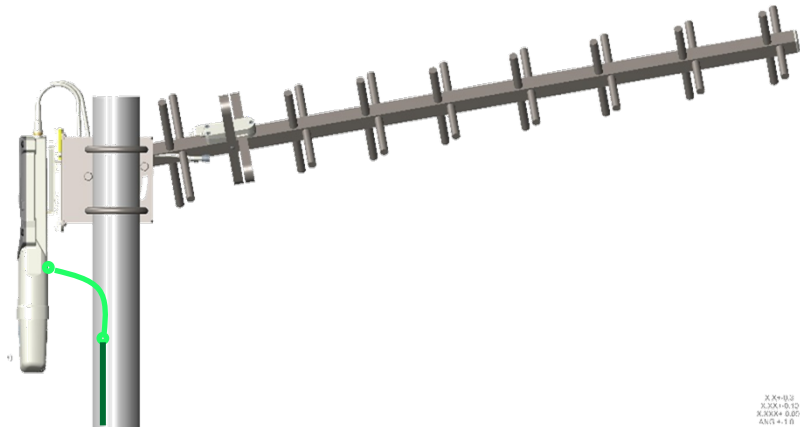
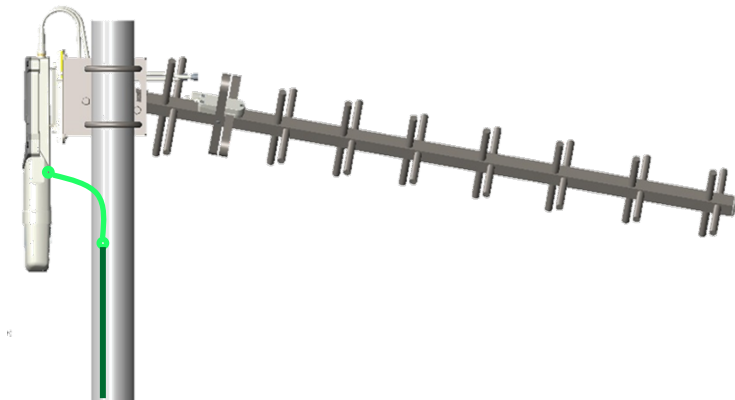


Figure 118 Yagi antenna alignment - downward tilt



Installing an integrated ODU

**Caution**

Do not reverse the bracket clamp, as this arrangement may lead to failure of the assembly. Do not over-tighten the bolts as this may lead to failure of the assembly.

PMP 450m Series – AP

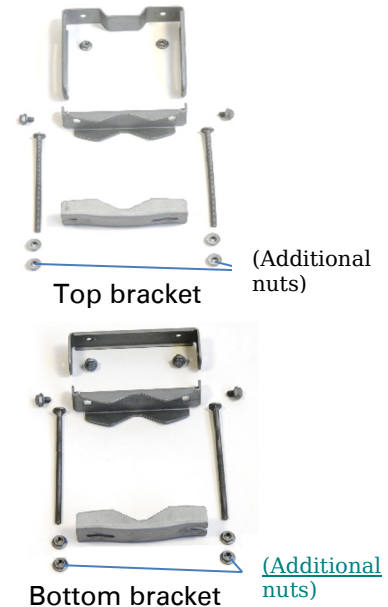
To mount and connect an integrated ODU, proceed as follows:

- 1 Inventory the parts to ensure that you have them all before you begin. The full set of parts is shown in [Figure 119](#).

Figure 119 PMP 450m Series - AP unbox view

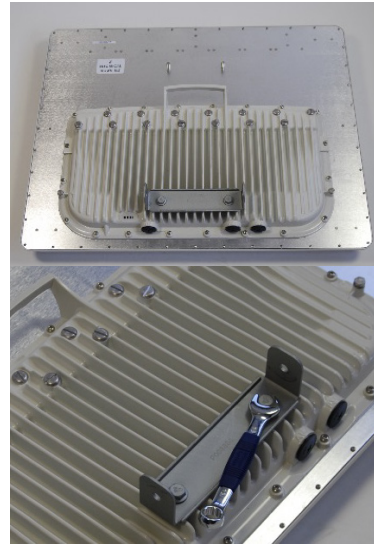


PMP 450m AP

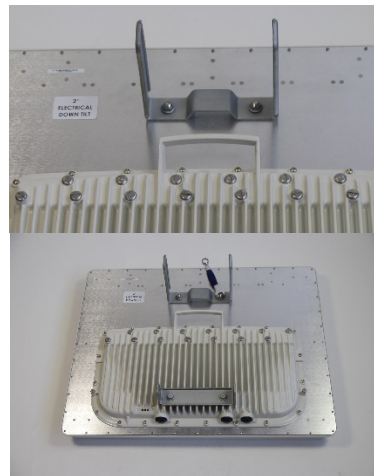
**Note**

The additional nuts provided for top and bottom brackets are used to hold the long bolts in position during installation.

- 2 Attach the bottom bracket to the ODU using (2) hex bolts and secure the M8 bolts by applying 5 Nm torque.

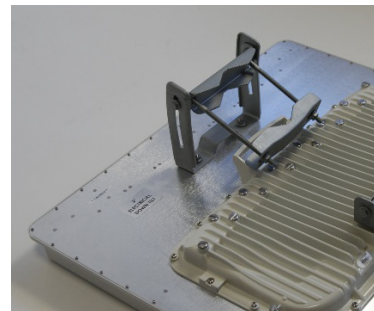


- 3 Attach the top bracket to the projecting studs on the ODU and secure the top bracket using two M8 nuts by applying 5 Nm torque.



- 4 Fix the front and rear strap assembly to the upper bracket using two bolts. Do not tighten the nuts now.

Note: The PMP 450m antenna operates with 2 degrees of electrical down-tilt.



- 5 Fix the front and rear strap assembly to the bottom bracket using two bolts. Do not tighten the nuts now.



- 6** See [PMP 450m Series – AP](#) on page [6-3](#) for the grounding procedure.

See [PMP 450m Series – AP](#) on page [6-6](#) for the mounting procedure.

