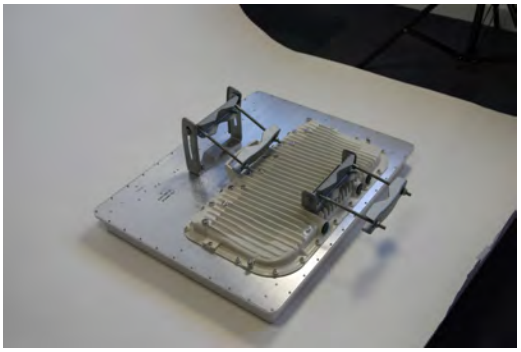
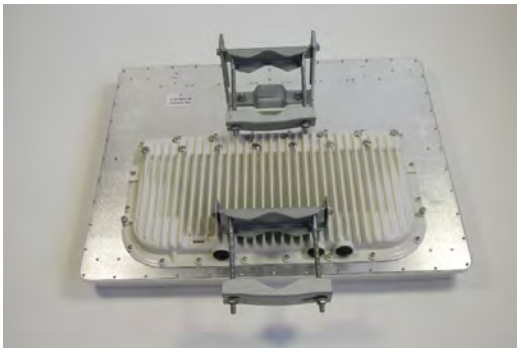
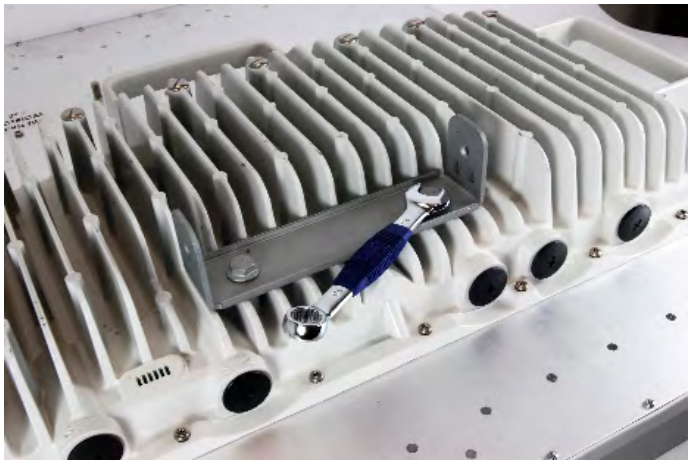
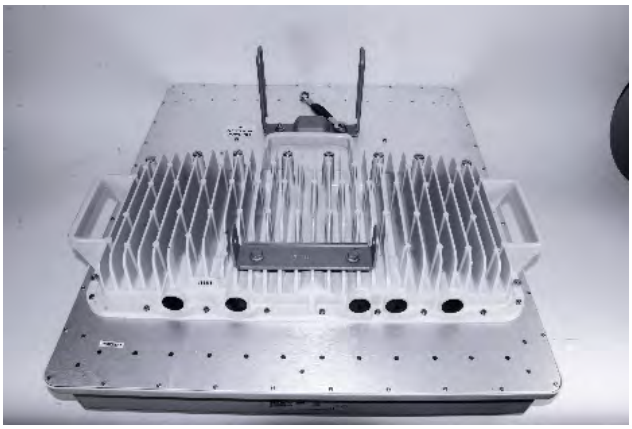
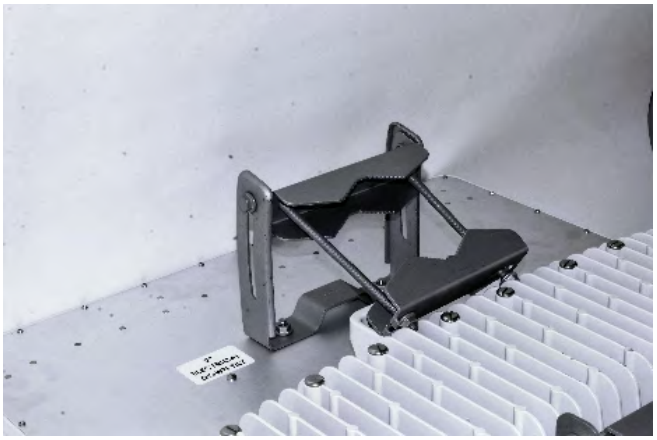
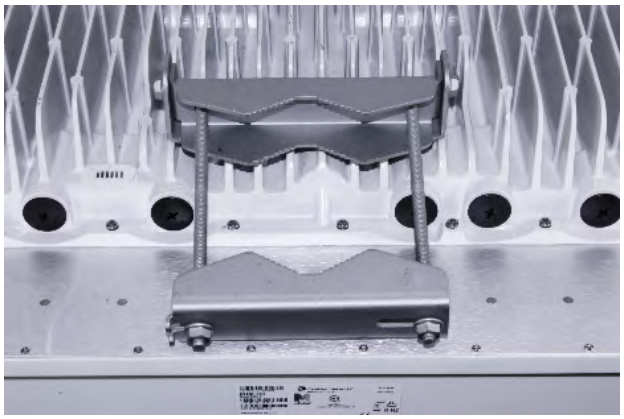
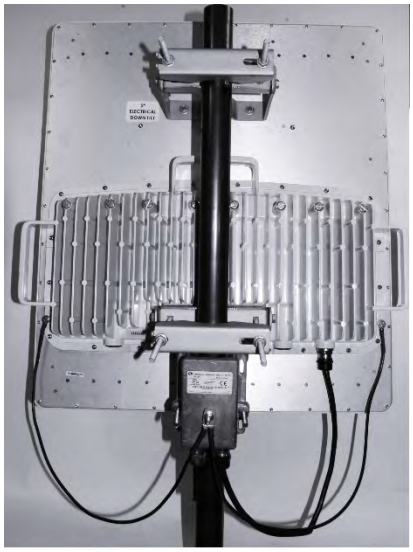
4	Fix the front and rear strap assembly to the upper bracket using two bolts. Do not tighten the nuts now. **Note** The PMP 450m antenna operates with 2 degrees of electrical down-tilt.	
5	Fix the front and rear strap assembly to the bottom bracket using two bolts. Do not tighten the nuts now.	
6	See PMP 450m Series – AP for the grounding procedure. See PMP 450m Series – AP for the mounting procedure.	

PMP 450m Series – 3 GHz 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 PMP 450m Series - 5 GHz AP unbox view. **Note** The additional nuts provided for top and bottom brackets are used to hold the long bolts in position during installation.	PMP 450m Series - 3 GHz AP unbox view  PMP 450m AP - 3 GHz   Top bracket Bottom bracket
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.	 

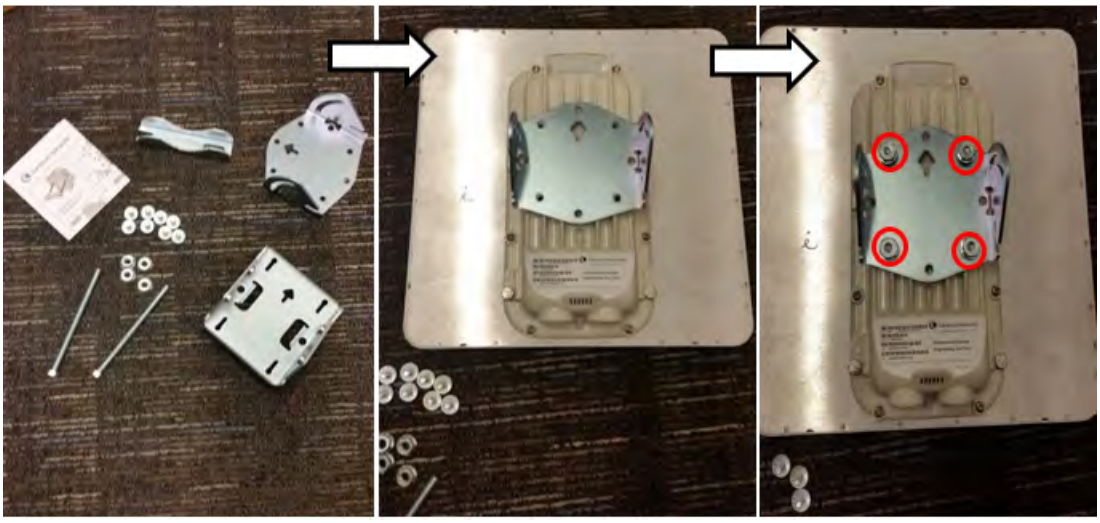
4	Fix the front and rear strap assembly to the upper bracket using two bolts. Do not tighten the nuts now. **Note** The PMP 450m antenna operates with 2 degrees of electrical down-tilt.	
5	Fix the front and rear strap assembly to the bottom bracket using two bolts. Do not tighten the nuts now.	
6	See PMP 450m Series – AP for the grounding procedure. See PMP 450m Series – AP for the mounting procedure.	

PMP/PTP 450i Series – AP/SM/BH

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

1. Fix the mounting plate to the back of the ODU using the four M6 bolts, and spring and plain washers provided. Tighten the bolts to a torque setting of 5.0 Nm (3.7 lb ft).

Figure 154: *Fixing the mounting plate to the back of the ODU*



2. Attach the bracket body to the mounting plate using the M8 bolt, spring and plain washers.
3. Hoist the ODU to the mounting position.
4. Attach the bracket body to the pole using the bracket clamp, M8 bolts, and spring and plain washers.
5. If the ODU is mounted outdoors, weatherproof the N type connectors (when antenna alignment is complete) using PVC tape and self-amalgamating rubber tape.

Figure 155: *Attaching the bracket body*

Connecting Cat5e Ethernet cable

Connecting an RJ45 and gland to a unit

Perform this task to connect the Ethernet cable to an AP.

To connect the Ethernet cable with a gland to an AP unit, proceed as follows:

1	Insert the RJ45 cable through the gland components

2	Insert the RJ45 plug into the socket in the unit, making sure that the locking tab snaps home.
3	Support the drop cable and gently hand screw the gland body into the unit until the bushing seal is flush to the unit body. **Note** Do not fit the back shell prior to securing the gland body.
4	Once the gland is fully hand screwed into the unit, tighten it one full rotation only with a 1 1/8 inch spanner wrench.
5	When the gland body has been fitted, tighten the gland back shell

Caution

Do not over-tighten the gland back shell, as the internal seal and structure or RJ45 port may be damaged.

Figure 156: *Ethernet cable gland for PMP/PTP 450 Series*

Figure 157: *Ethernet cable gland for PMP/PTP 450i Series*

Disconnecting an RJ45 and gland from a unit

To disconnect the Ethernet cable and gland from a unit, proceed as follows:

1	Hold the Ethernet cable and remove the gland back shell.
2	Use a small flathead screwdriver (0.2”/5mm wide or greater) to gently release the black plastic watertight bushing from the compression fins, being careful not to damage the bushing.
3	Unscrew the gland body from the AP, making sure that the Ethernet cable is not rotating while disengaging the gland body from the AP housing.
4	Use a small screwdriver to depress the RJ45 locking clip.
5	Unplug the RJ45 cable.
6	Remove the gland from the cable, if necessary.

Installing ODU

Installing a 450 Platform Family AP

To install a 450 Platform Family AP, perform the following steps.

Procedure 5: Installing an AP

1	Begin with the AP in the powered-down state.
2	Choose the best mounting location for your particular application. Modules need not be mounted next to each other. They can be distributed throughout a given site. However, the 60° offset must be maintained. Mounting can be done with supplied clamps. See Installing external antennas to a connectorised ODUfor connecting an external antenna to PMP 450i Series, PMP 450 Series, PMP 450m Series – 5 GHz AP, PMP 450m Series – 3 GHz AP, andPMP 450 Series SM 900 MHz See Installing an integrated ODU
3	Align the AP as follows: 1. Move the module to where the link will be unobstructed by the radio horizon and no objects penetrate the Fresnel zone. 2. 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 intended 60° sector. 3. Apply the appropriate degree of downward tilt. 4. Ensure that the nearest and furthest SMs that must register to this AP are within the beam coverage area.
4	Adjust the azimuth to achieve visual alignment, lock the AP in the proper direction and downward tilt.
5	Attach the cables to the AP (See Powering the AP/SM/BH for test configuration)
6	Waterproof the cables (See section Attaching and weatherproofing an N type connector).

Installing a 450 Platform Family SM

Installing a 450 Platform Family SM consists of two procedures:

- Physically installing the SM on a residence or other location and performing a coarse alignment using the alignment tool or alignment tone.
- Verifying the AP to SM link and finalizing alignment using review of power level, link tests, and review of registration and session counts.

Procedure 6: Installing an SM

1	Choose the best mounting location for the SM based on section ODU and external antenna location.
2	Use stainless steel hose clamps or equivalent fasteners to lock the SM into position. See Installing external antennas to a connectorised ODUfor connecting external antenna See Installing an integrated ODU
3	Remove the base cover of the SM.
4	Terminate the UV outside grade Category 5 Ethernet cable with an RJ-45 connector, and connect the cable to the SM.

<table>
<tr><td>5</td><td>Wrap a drip loop in the cable.</td></tr>
<tr><td>6</td><td>For Connectorised Models, Install the external antenna according to the manufacturer’s instructions.</td></tr>
<tr><td>7</td><td>For Connectorised Models, connect the SM’s N-type antenna connectors to the external antenna, ensuring that the polarity matches between the SM cable labeling and the antenna port labels.<table><tr><th>Connectorised SM Antenna Cable Label</th><th>Antenna Connection</th></tr><tr><td>A</td><td>Vertical</td></tr><tr><td>B</td><td>Horizontal</td></tr></table></td></tr>
<tr><td>8</td><td>For Connectorised Models, weatherproof the N-type antenna connectors following section Attaching and weatherproofing an N type connector.</td></tr>
<tr><td>9</td><td>Wrap an AWG 10 (or 6mm^2) copper wire around the Ground post of the SM</td></tr>
<tr><td>10</td><td>Securely connect the copper wire to the grounding system (Protective Earth) according to applicable regulations.</td></tr>
<tr><td>11</td><td>Install a surge suppressor as described in the section Mount the Surge Suppressor.</td></tr>
<tr><td>12</td><td>Connect the power supply to a power source.</td></tr>
<tr><td>13</td><td>Connect the Ethernet output from the Data port of the power supply to the Ethernet port of your laptop.</td></tr>
<tr><td>14</td><td>Connect the drop cable from ODU to the Data+power port of the power suppy.</td></tr>
<tr><td>15</td><td>Launch your web browser. In the URL address bar, enter 169.254.1.1. then press Enter.</td></tr>
<tr><td>16</td><td>If the browser in laptop fails to access the interface of the SM, follow the procedure Radio recovery mode.</td></tr>
<tr><td>17</td><td>Log in as admin on the ODU. Configure a password for the admin account and log off.</td></tr>
<tr><td>18</td><td>Log back into the SM as admin or root, using the password that you configured.</td></tr>
<tr><td>19</td><td>For coarse alignment of the SM, use the Alignment Tool located at Tools, Alignment Tool.

Optionally, connect a headset to the AUX/SYNC port on the SM and listen to the alignment tone, which indicates greater SM receive signal power by pitch. By adjusting the SM’s position until the highest frequency pitch is obtained operators and installers can be confident that the SM is properly positioned. For information on device GUI tools available for alignment, see sections Using the Alignment Tool, Using the Link Capacity Test tool, and Using AP Evaluation tool in Configuration Guide.</td></tr>
<tr><td>20</td><td>When the highest power is achieved, lock the SM mounting bracket in place.</td></tr>
<tr><td>21</td><td>Log off of the SM web interface.</td></tr>
<tr><td>22</td><td>Disconnect the Ethernet cable from your laptop.</td></tr>
<tr><td>23</td><td>Replace the base cover of the SM.</td></tr>
<tr><td>24</td><td>Connect the Ethernet cable to the computer that the subscriber will be using.</td></tr>
</table>

Installing a 450 Platform Family BHM

To install a 450 Platform Family BHM, perform the following steps.

Procedure 7: Installing a BHM

1	Choose the best mounting location for your particular application.
2	Align the BHM as follows: • Move the module to where the link will be unobstructed by the radio horizon and no objects penetrate the Fresnel zone. • Use a local map, compass, and/or GPS device as needed to determine the direction to the BHS. • Apply the appropriate degree of downward or upward tilt. • Ensure that the BHS is within the beam coverage area.
3	Using stainless steel hose clamps or equivalent fasteners, lock the BHM into position. See Installing external antennas to a connectorised ODUfor connecting external antenna
4	If this BHM will not be connected to a CMM, optionally connect a cable to a GPS timing source and then to the SYNC port of the BHM.
5	Either connect the BHM's Aux to the CMM or connect the DC power converter to the BHM and then to an AC power source. RESULT: When power is applied to a module or the unit is reset on the web-based interface, the module requires approximately 25 seconds to boot. During this interval, self-tests and other diagnostics are being performed.
6	Access Configuration > General page of the BHM for Synchronization configuration.
7	If a CMM4 is connected, set the Sync Input parameter to the AutoSync or Autosync + Free Run selection.

Installing a 450 Platform Family BHS

To install a PTP 450 platform Series BHS, perform the following steps.

Procedure 8: Installing a BHS

1	Choose the best mounting location for the BHS.
2	Terminate the UV outside grade Category 5 Ethernet cable with an RJ-45 connector and connect the cable to the BHS. (See Powering the AP/SM/BH for test configuration)
3	Use stainless steel hose clamps or equivalent fasteners to lock the BHS into position.
4	Install a surge suppressor as described in the section Mount the Surge Suppressor
5	For coarse alignment of the BHS, use the Audible Alignment Tone feature as follows: • At the BHS, connect the RJ-45 connector of the Alignment Tool Headset to the Aux port via an alignment tone adapter as shown in section Alignment Tone in Configuration Guide.

	• Listen to the alignment tone for pitch, which indicates greater signal power (RSSI/dBm) by higher pitch. Adjust the module slightly until you hear the highest pitch and highest volume
6	When you have achieved the best signal (highest pitch, loudest volume), lock the BHS in place with the mounting hardware

Configuring the Link

See Configuring remote access in Configuration Guide.

Monitoring the Link

See Monitoring the Link in Configuration Guide.

Installing the AC Power Injector

Caution

As the PSU is not waterproof, locate it away from sources of moisture, either in the equipment building or in a ventilated moisture-proof enclosure. Do not locate the PSU in a position where it may exceed its temperature rating.

Caution

Do not plug any device other than a PMP/PTP 450i Series ODU into the ODU port of the PSU. Other devices may be damaged due to the non-standard techniques employed to inject DC power into the Ethernet connection between the PSU and the ODU.

Do not plug any device other than a Cambium 450 Platform PSU into the PSU port of the ODU. Plugging any other device into the PSU port of the ODU may damage the ODU and device.

Follow this procedure to install the AC Power Injector:

1	Form a drip loop on the PSU end of the LPU to PSU drop cable. The drip loop ensures that any moisture that runs down the cable cannot enter the PSU.
2	(a) Place the AC Power Injector on a horizontal surface. Plug the LPU to PSU drop cable into the PSU port labeled ODU. (b) When the system is ready for network connection, connect the network Cat5e cable to the LAN port of the PSU:

	(a)  	(b) 

Note

For instructions on CMM3 (CMMmicro) or CMM4 installation, including the outdoor temperature range in which it is acceptable to install the unit, tools required, mounting and cabling instructions, and connectivity verification, please see the PMP Synchronization Solutions User Guide located on the Cambium website.

Installing CMM4

The Cluster Management Module 4 (CMM4) provides power, sync, and network connectivity for up to eight APs, backhauls, and Ethernet terrestrial feeds in a variety of configurations.

The CMM4 provides:

- Sync over Power over Ethernet and integrated surge suppression on the controller board for up to 8 APs or BHs. Both a custom 30 VDC power scheme and a custom 56 VDC power scheme are available. Neither is the same as the later IEEE Standard 802.3af, and neither is compatible with it.
- Managed switching using a hardened EtherWAN switch (1090CKHH models). The CMM4 ships with a 14-port EtherWAN switch and is also available without a switch. The CMM4 originally shipped with a 9-port EtherWAN switch.
- Surge suppression on the controller board for the incoming 30V DC and 56V DC power lines and GPS coax cable.
- Auto-negotiation on the Ethernet ports. Ports will auto-negotiate to match inputs that are either 100Base-T or 10Base-T, and either full duplex or half duplex, when the connected device is set to auto-negotiate. Alternatively, these parameters are settable.
- An always-on NTP (Network Time Protocol) server that can provide date and time to any radio that can reach the CMM's management IP address.
- CNUT can be used to upgrade the CMM-4 software.

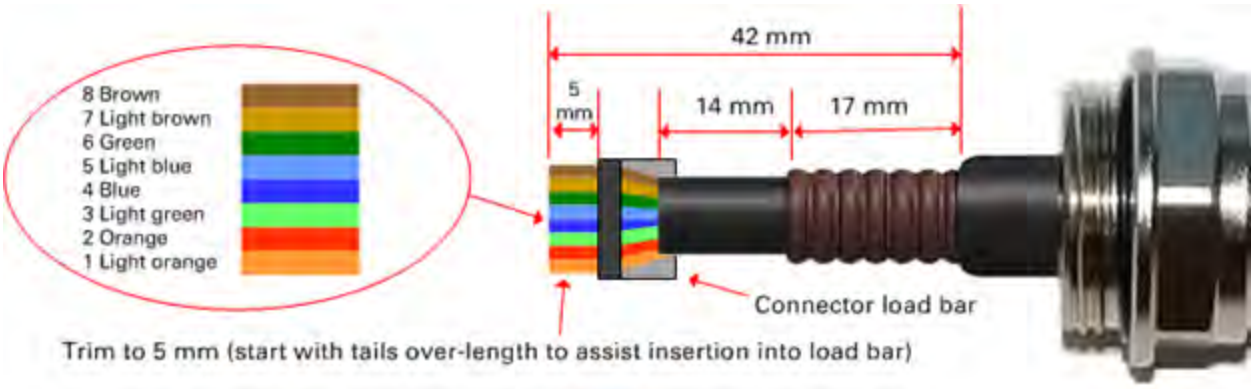
450 Series and 450i Series can use the CMM4's EtherWan switch for their network connectivity.

Supplemental installation information

This section contains detailed installation procedures that are not included in the above topics, such as how to strip cables, create grounding points and weatherproof connectors.

Stripping drop cable

When preparing the drop cable for connection to the 450 Platform Family ODU or LPU, use the following measurements:



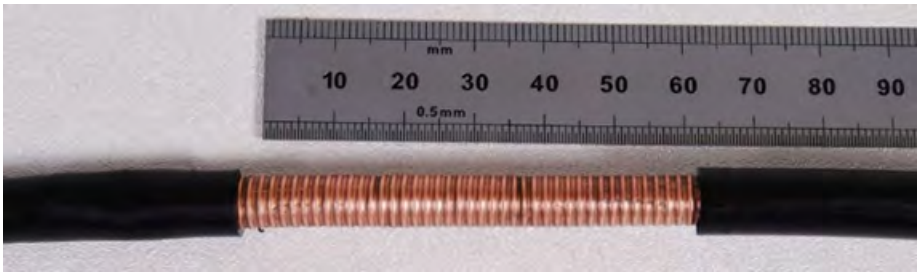
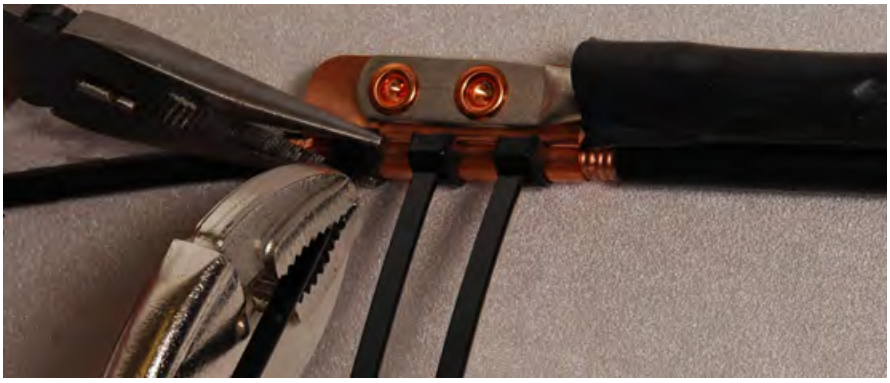
When preparing the drop cable for connection to the 450 Platform PSU (without a cable gland), use the following measurements:

Creating a drop cable grounding point

Use this procedure to connect the screen of the main drop cable to the metal of the supporting structure using the cable grounding kit (Cambium part number 01010419001).

To identify suitable grounding points, refer to Hazardous locations.

1	Remove 60 mm (2.5 inches) of the drop cable outer sheath.

	
2	Cut 38mm (1.5 inches) of rubber tape (self-amalgamating) and fit to the ground cable lug. Wrap the tape completely around the lug and cable. 
3	Fold the ground wire strap around the drop cable screen and fit cable ties. 
4	Tighten the cable ties with pliers. Cut the surplus from the cable ties. 
5	Cut a 38mm (1.5 inches) section of self-amalgamating tape and wrap it completely around the joint between the drop and ground cables.

	
6	Use the remainder of the self-amalgamating tape to wrap the complete assembly. Press the tape edges together so that there are no gaps. 
7	Wrap a layer of PVC tape from bottom to top, starting from 25 mm (1 inch) below and finishing 25 mm (1 inch) above the edge of the self-amalgamating tape, overlapping at half width. 
8	Repeat with a further four layers of PVC tape, always overlapping at half width. Wrap the layers in alternate directions (top to bottom, then bottom to top). The edges of each layer should be 25mm (1 inch) above (A) and 25 mm (1 inch) below (B) the previous layer.

	
9	Prepare the metal grounding point of the supporting structure to provide a good electrical contact with the grounding cable clamp. Remove paint, grease or dirt, if present. Apply anti-oxidant compound liberally between the two metals.
10	Clamp the bottom lug of the grounding cable to the supporting structure using site approved methods. Use a two-hole lug secured with fasteners in both holes. This provides better protection than a single-hole lug.

Attaching and weatherproofing an N type connector

The following procedure should be used to weatherproof the N type connectors fitted to the connectorised ODU (AP/sM/BH) and antenna. This procedure must be followed to ensure that there is no moisture ingress at the radio ports. Failure to properly seal N-type antenna connectors can result in poor link performance or complete loss of radio communication.

Note

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

Note

N type connectors should be tightened using a torque wrench, set to 15 lb in or 1.7 Nm. If a torque wrench is not available, N type connectors may be finger tightened.

Use this procedure to weatherproof the N type connectors fitted to the connectorised ODU and external antenna (if recommended by the antenna manufacturer).

1	Ensure the connection is tight. A torque wrench should be used if available:

	
2	Wrap the connection with a layer of 19 mm (0.75 inch) PVC tape, starting 25 mm (1 inch) below the connector body. Overlap the tape to half-width and extend the wrapping to the body of the LPU. Avoid making creases or wrinkles: 
3	Smooth the tape edges: 
4	Cut a 125mm (5 inches) length of rubber tape (self-amalgamating): 

5	Expand the width of the tape by stretching it so that it will wrap completely around the connector and cable: 
6	Press the tape edges together so that there are no gaps. The tape should extend 25 mm (1 inch) beyond the PVC tape: 
7	Wrap a layer of 50 mm (2 inch) PVC tape from bottom to top, starting from 25 mm (1 inch) below the edge of the self-amalgamating tape, overlapping at half width. 
8	Repeat with a further four layers of 19 mm (0.75 inch) PVC tape, always overlapping at half width. Wrap the layers in alternate directions: • Second layer: top to bottom. • Third layer: bottom to top. • Fourth layer: top to bottom. • Fifth layer: bottom to top. The bottom edge of each layer should be 25 mm (1 inch) below the previous layer. 
9	Check the completed weatherproof connection:

Note

A video of this procedure can be found at:
https://www.youtube.com/watch?v=a-twPfCVq4A

Chapter 6: Compliance with safety standards

This section lists the safety specifications against which the 450 Platform Family has been tested and certified. It also describes how to keep RF exposure within safe limits.

Electrical safety compliance

The 450 Platform Family hardware has been tested for compliance to the electrical safety specifications listed in Safety compliance specifications.

Table 141: Safety compliance specifications

Region	Specification
USA	UL 60950-1 or UL 62368-1, UL 60950-22
Canada	CSA C22.2 No. 60950-1 or 62368-1, CSA C22.2 No 60950-22
International	CB certified & certificate to IEC 60950-1 or IEC 62368-1, IEC 60950-22

Electromagnetic compatibility (EMC) compliance

The EMC specification type approvals that have been granted for 450 Platform Family are listed under EMC emissions compliance.

Table 142: EMC emissions compliance

Region	Specification
USA	FCC Part 15 Class B
Canada	RSS Gen
International	EN 301 489-1 V2.1.1 EN 301 489-17 V3.1.1 EN 301 489-4 V3.1.1

Human exposure to radio frequency energy

Relevant standards (USA and EC) applicable when working with RF equipment are:

- ANSI IEEE C95.1-2005, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- US FCC limits for the general population. See the FCC web site at http://www.fcc.gov, and the policies, guidelines, and requirements in Part 1 of Title 47 of the Code of Federal Regulations, as well as the guidelines and suggestions for evaluating compliance in KDB 447498.

- Health Canada Safety Code 6 limits for the general population. See the Health Canada web site at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/consultations/limits-human-exposure-radiofrequency-electromagnetic-energy-frequency-range-3-300.html and RSS-102.
    - BS EN 50385:2017 Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 MHz – 40 GHz) – general public.
- ICNIRP (International Commission on Non-Ionizing Radiation Protection) guidelines for the general public. See the ICNIRP web site at https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf and Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields.

Power density exposure limit

Install the radios for the 450 Platform Family of wireless solutions so as to provide and maintain the minimum separation distances from all persons.

The applicable FCC power density exposure limit for RF energy in the 3, 4.9, 5.4 and 5.8 GHz frequency bands is 10 W/m^2 and in 900 MHz frequency band is 6 W/m^2. For more information, see Human exposure to radio frequency energy on page Human exposure to radio frequency energy.

The applicable ISEDC power density exposure limit for RF energy in unlicensed bands is 0.02619 * (f^ (0.6834)), where f is the lowest frequency of the supported band. For licensed bands, the power density exposure limit is 0.6455 * (f^(0.5)), where f is the lowest frequency of the supported band.

Calculation of power density

The following calculation is based on the ANSI IEEE C95.1-1991 method, as that provides a worst-case analysis. Details of the assessment to EN50383:2002 can be provided, if required.

Peak power density in the far field of a radio frequency point source is calculated as follows:

$$S = \frac{P.G}{4\pi d^2}$$

Where:		Is:	
	S		power density in W/m^2
	P		maximum average transmit power capability of the radio, in W
	G		total Tx gain as a factor, converted from dB
	d		distance from point source, in m

Rearranging terms to solve for distance yields:

$$d = \sqrt{\frac{P.G}{4\pi .S}}$$

Calculated distances and power compliance margins

The following tables show calculated minimum separation distances, recommended distances and resulting margins for each frequency band and antenna combination for the USA and Canada. These are conservative distances that include compliance margins. At these and greater separation distances, the power density from the RF field is below generally accepted limits for the general population.

450 Platform Family ODU adheres to all applicable EIRP limits for transmit power when operating in MIMO mode. Separation distances and compliance margins include compensation for both transmitters.

Explanation of terms used in the following tables:

- P burst – maximum average transmit power during transmit burst (Watt)
- P – maximum average transmit power of the radio (Watt)
- G – total transmit gain as a factor, converted from dB
- S – power density (Watt/m2)
- d – minimum safe separation distance from point source (meters)

Table 143: FCC minimum safe distances – PMP 450m 3 GHz and 5 GHz (5.1 GHz, 5.2 GHz, 5.4 GHz and 5.8 GHz)

Band (GHz)	Antenna	PG (W)	S (W/ m2)	d (m)
3.65	90° sector	33.9	10	0.52
4.9	90° sector	174	10	1.08
5.1	90° sector	3.38	10	0.16
5.2	90° sector	0.85	10	0.08
5.4	90° sector	0.85	10	0.08
5.8	90° sector	3.38	10	0.16

Table 144: FCC minimum safe distances – PMP/PTP 450b 3.65 GHz, 4.9 GHz, 5.1 GHz, 5.2 GHz, 5.4 GHz, 5.8 GHz and 6 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
3.65	Dish	0.199	20.0	10.0	0.40

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
4.9	Dish	0.501	24.0	10.0	1.00
	Patch Array	0.501	17.0	10.0	0.45
	On-board	0.501	0	10.0	0.06
5.1	Dish	0.501	24.0	10.0	1.00
	Patch Array	0.501	17.0	10.0.	0.45
	On-board	0.501	0	10.0	0.06
5.2	Dish	0.004	24.0	10.0	0.09
	Patch Array	0.020	17.0	10.0	0.09
	On-board	0.251	0	10.0	0.04
5.4	Dish	0.004	24.0	10.0	0.09
	Patch Array	0.020	17.0	10.0	0.09
	On-board	0.501	0	10.0	0.06
5.8	Dish	0.501	24.0	10.0.	1.00
	Patch Array	0.501	17.0	10.0	0.45
	On-board	0.501	0	10.0	0.06
6	Dish	0.016	24.0	10.0.	0.18

Table 145: FCC minimum safe distances – PMP 450 MicroPoP APs 4.9 GHz, 5.1 GHz, 5.2 GHz, 5.4 GHz and 5.8 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
4.9	Omni	0.501	9	10.0	0.18
	Sector	0.501	13	10.0	0.28
	Connectorised	0.501	(*)	10.0	(*)
5.1	Omni	0.501	9	10.0	0.18
	Sector	0.199	13	10.0.	0.18
	Connectorised	(*)	(*)	10.0	0.18
5.2	Omni	0.125	9	10.0	0.09
	Sector	0.050	13	10.0	0.09
	Connectorised	(*)	(*)	10.0	0.09

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
5.4	Omni	0.125	9	10.0	0.09
	Sector	0.050	13	10.0	0.09
	Connectorised	(*)	(*)	10.0	0.09
5.8	Omni	0.501	9	10.0.	0.18
	Sector	0.199	13	10.0	0.18
	Connectorised	(*)	(*)	10.0	0.18

(*) It depends on the external antenna gain

Table 146: FCC minimum safe distances – PMP/PTP 450b Retro APs 4.9 GHz, 5.1 GHz, 5.2 GHz, 5.4 GHz and 5.8 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
4.9	Integrated	0.501	8	10.0	0.16
5.1	Integrated	0.501	8	10.0	0.16
5.2	Integrated	0.501	8	10.0	0.16
5.4	Integrated	0.501	8	10.0	0.16
5.8	Integrated	0.501	8	10.0	0.16

Table 147: FCC minimum safe distances – PMP/PTP 450i 900 MHz, 3.65 GHz, 4.9 GHz, 5.1 GHz, 5.2 GHz, 5.4 GHz and 5.8 GHz

Band	Antenna	P burst (W)	P (W)	G (dBi)	S (W/m^2)	d (m)
900 MHz	Sector antenna	-	0.19	22.75 (13 dBi)	6.0	0.27
3.65 GHz	90° sector antenna, integrated	-	0.316	50.0 (17 dBi)	10.0	0.36
	90° sector antenna, connectorised	-	0.316	40.0 (16 dBi)	10.0	0.32
	Panel, integrated	-	0.251	79.0 (19 dBi)	10.0	0.40

Band	Antenna	P burst (W)	P (W)	G (dBi)	S (W/m^2)	d (m)
4.9 GHz	Omni-directional	0.2138	0.2512	20.0 (13 dBi)	10.0	0.17
	90° sector antenna	0.2138	0.2512	50.0 (17 dBi)	10.0	0.26
	2ft directional flat plate	0.2138	0.2512	631.0 (28 dBi)	10.0	0.93
	4ft directional parabolic	0.851	0.1000	2344.0 (34.9 dBi)	10.0	1.14
	6ft directional parabolic	0.1413	0.1659	5248.0 (37.2 dBi)	10.0	2.19
5.1 GHz	Omni-directional	0.170	0.200	20.0 (13.0 dBi)	10.0	0.15
	90° sector	0.034	0.040	50.1 (17.0 dBi)	10.0	0.10
	2ft directional flat plate	0.002	0.002	707.9 (28.5 dBi)	10.0	0.09
	4ft directional parabolic	0.011	0.013	2818.4 (34.5 dBi)	10.0	0.44
5.2 GHz	Omni-directional	0.036	0.042	20.0 (13.0 dBi)	10.0	0.07
	90° sector	0.014	0.017	50.1 (17.0 dBi)	10.0	0.07
	2ft directional flat plate	0.001	0.001	707.9 (28.5 dBi)	10.0	0.07
	4ft directional parabolic	0.000	0.000	2818.4 (34.5 dBi)	10.0	0.06
5.4 GHz	Omni-directional	0.036	0.042	20.0 (13.0 dBi)	10.0	0.07
	90° sector	0.014	0.017	50.1 (17.0 dBi)	10.0	0.07
	2ft directional flat plate	0.001	0.001	707.9 (28.5 dBi)	10.0	0.07
	2ft directional parabolic	0.001	0.001	707.9 (28.5 dBi)	10.0	0.08

Band	Antenna	P burst (W)	P (W)	G (dBi)	S (W/m^2)	d (m)
5.8 GHz	Omni-directional	0.24	0.28	20.0 (13 dBi)	10.0	0.18
	90° sector	0.10	0.12	50.0 (17 dBi)	10.0	0.18
	2ft directional flat plate	0.54	0.63	708.0 (28.5 dBi)	10.0	1.57
	4ft directional parabolic	0.54	0.63	3388.0 (35.3 dBi)	10.0	3.43
	6ft directional parabolic	0.54	0.63	6457.0 (38.1 dBi)	10.0	4.74

Table 148: FCC minimum safe distances – PMP/PTP 450 900 MHz, 2.4 GHz, 3.65 GHz and 5 GHz

Band	Antenna	P burst (W)	G (dBi)	S (W/m^2)	d (m)
900 MHz	Yagi	0.032	13 (11 dBi)	6.0	0.07
2.4 GHz	Sector Antenna	0.079	50 (17 dBi)	10.0	0.18
	Integrated	0.158	6 (8 dBi)	10.0	0.09
	Reflector	0.040	100 (20 dBi)	10.0	0.18
3.65 GHz	Sector Antenna	0.316	32 (15 dBi)	10.0	0.28
	Integrated	0.316	6 (8 dBi)	10.0	0.12
	Reflector	0.25	100 (20 dBi)	10.0	0.45
	High Gain Ruggedized	0.25	79 (19 dBi)	10.0	0.40
5.4 GHz	Sector	0.025	40 (16 dBi)	10.0	0.09
	Integrated	0.126	8 (9 dBi)	10.0	0.09
	Reflector	0.003	316 (25 dBi)	10.0	0.09
	CLIP	0.020	50 (17 dBi)	10.0	0.09
	LENS	0.032	28 (14.5 dBi)	10.0	0.08
	Integrated Dish (450d)	0.0032	316 (25 dBi)	10.0	0.09
5.8 GHz	Sector	0.079	40 (16 dBi)	10.0	0.16
	Integrated	0.158	8 (9 dBi)	10.0	0.10
	Reflector	0.158	316 (25 dBi)	10.0	0.63
	CLIP	0.158	50 (17 dBi)	10.0	0.25
	LENS	0.158	28 (14.5 dBi)	10.0	0.19
	Integrated Dish (450d)	0.158	316 (25 dBi)	10.0	0.63

Table 149: FCC minimum safe distances – 450v AP 5.1 GHz, 5.8 GHz, and 6 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
5.1	Integrated	0.1	16	10	0.18
5.8	Integrated	0.1	16	10	0.18
6	Integrated	0.1	16	10	0.18

Table 150: FCC minimum safe distances – 450v SM 5.1 GHz, 5.8 GHz, and 6 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
5.1	Integrated	0.501	22	10	0.8
5.8	Integrated	0.501	22	10	0.8
6	Integrated	0.1	22	10	0.18

Table 151: FCC minimum safe distances – 450v 2x2 SM 5.8 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)
5.8	Dish	0.5	26	10	0.281

Table 152: ISEDC minimum safe distances – 450v 2x2 SM 5.8 GHz

Band (GHz)	Antenna	PG (W)	S (W/ m2)	d (m)
5.8	Dish	-	9.66	0.135

Table 153: ISEDC minimum safe distances – PMP 450m 3GHz and 5 GHz (4.9 GHz, 5.4 GHz and 5.8 GHz)

Band (GHz)	Antenna	PG (W)	S (W/ m2)	d (m)
3.45	90° sector	851	6.85	3.14
3.65	90° sector	33.84	7.12	0.61
4.9	90° sector	174	8.75	1.16
5.4	90° sector	0.85	9.39	0.08
5.8	90° sector	3.38	9.83	0.17

Table 154: ISED minimum safe distances – PMP 450 MicroPoP APs 4.9 GHz, 5.1 GHz, 5.2 GHz, 5.4 GHz and 5.8 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)	S @ 20 cm (W/ m2)
4.9	Omni	0.501	9	8.71	0.18	7.92
	Sector	0.501	13	8.71	0.28	19.89
	Connectorised	0.501	(*)	8.71	(*)	(*)
5.1	Omni	0.501	9	9.01	0.17	7.92
	Sector	0.199	13	9.01	0.17	7.92
	Connectorised	(*)	(*)	9.01	0.17	7.92
5.2	Omni	0.125	9	9.13	0.09	1.99
	Sector	0.050	13	9.13	0.09	1.99
	Connectorised	(*)	(*)	9.13	0.09	1.99
5.4	Omni	0.125	9	9.39	0.08	1.99
	Sector	0.050	13	9.39	0.08	1.99
	Connectorised	(*)	(*)	9.39	0.08	1.99
5.8	Omni	0.501	9	9.69	0.17	7.92
	Sector	0.199	13	9.69	0.17	7.92
	Connectorised	(*)	(*)	9.69	0.17	7.92

(*) It depends on the external antenna gain

Table 155: ISED minimum safe distances – PMP/PTP 450b Retro APs 4.9 GHz, 5.1 GHz, 5.2 GHz, 5.4 GHz and 5.8 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)	S @ 20 cm (W/ m2)
4.9	Integrated	0.501	8	8.71	0.16	6.29
5.1	Integrated	0.501	8	9.01	0.15	6.29
5.2	Integrated	0.501	8	9.13	0.15	6.29
5.4	Integrated	0.501	8	9.39	0.15	6.29
5.8	Integrated	0.501	8	9.69	0.15	6.29

Table 156: ISEDC minimum safe distances – PMP/PTP 450b 3.65 GHz, 4.9 GHz, 5.1 GHz, 5.2 GHz, 5.4 GHz, 5.8 GHz and 6 GHz

Band (GHz)	Antenna	P (W)	G (dBi)	S (W/ m2)	d (m)	S @ 20 cm (W/ m2)
3.5	Dish	0.794	20	6.99	0.88	158.0
3.65 GHz (Lower Canada)	Dish	0.199	20	7.13	0.44	39.7
3.65 GHz (Upper Canada)	Dish	0.199	20	7.13	0.44	39.7
3.95 GHz	Dish					
4.9	Dish	0.501	24	8.76	1.07	250.5
	Patch Array	0.501	17	8.76	0.48	50.0
	On-board	0.501	0	8.76	0.07	1.0
5.1	Dish	0.501	24	9.01	1.05	250.5
	Patch Array	0.501	17	9.01	0.47	50.0
	On-board	0.501	0	9.01	0.07	1.0
5.2	Dish	0.004	24	9.13	0.09	2.0
	Patch Array	0.020	17	9.13	0.09	2.0
	On-board	0.251	0	9.13	0.05	0.5
5.4	Dish	0.004	24	9.39	0.09	2.0
	Patch Array	0.020	17	9.39	0.09	2.0
	On-board	0.501	0	9.39	0.07	1.0
5.8	Dish	0.501	24	9.69	1.02	250.5
	Patch Array	0.501	17	9.69	0.45	50.0
	On-board	0.501	0	9.69	0.06	1.0
6	Dish	0.016	24	9.92	0.18	7.9

Table 157: ISEDC minimum safe distances – PMP/PTP 450i, 900 MHz, 3.5 GHz, 3.65 GHz, 4.9 GHz, 5.2 GHz, 5.4 GHz, and 5.8 GHz

Band	Antenna	P burst (W)	P (W)	G (dBi)	S (W/ m2)	d (m)
900 MHz	Sector	-	.02	20.0 (13 dBi)	2.74	0.11

Band	Antenna	P burst (W)	P (W)	G (dBi)	S (W/ m2)	d (m)
3.5 GHz	90° sector antenna, integrated	-	0.316	50.0 (17 dBi)	6.99	0.39
	90° sector antenna, connectorised	-	0.316	40.0 (16 dBi)	6.99	0.35
	Panel, integrated	-	0.316	79.0 (19 dBi)	6.99	0.49
3.65 GHz (Lower Canada)	90° sector antenna, integrated	-	0.316	50.0 (17 dBi)	7.13	0.42
	90° sector antenna, connectorised	-	0.316	40.0 (16 dBi)	7.13	0.37
	Panel, integrated	-	0.251	79.0 (19 dBi)	7.13	0.47
3.65 GHz (Upper Canada)	90° sector antenna, integrated	-	0.316	50.0 (17 dBi)	7.13	0.42
	90° sector antenna, connectorised	-	0.316	40.0 (16 dBi)	7.13	0.37
	Panel, integrated	-	0.251	79.0 (19 dBi)	7.13	0.47
4.9 GHz	Omni-directional	0.214	0.251	20.0 (13 dBi)	8.71	0.20
	90° sector	0.214	0.251	50.1 (17 dBi)	8.71	0.31
	2ft directional flat plate	0.214	0.251	631.0 (28 dBi)	8.71	1.11
	6ft directional parabolic	0.141	0.166	5248.0 (37.2 dBi)	8.71	2.60
5.2 GHz	Omni-directional	0.009	0.011	20.0 (13.0 dBi)	9.13	0.04
	90° sector	0.012	0.014	50.1 (17.0 dBi)	9.13	0.06
	2ft directional flat plate	0.001	0.001	707.9 (28.5 dBi)	9.13	0.07
	2ft directional parabolic	0.001	0.001	707.9 (28.5 dBi)	9.13	0.06

Band	Antenna	P burst (W)	P (W)	G (dBi)	S (W/ m2)	d (m)
5.4 GHz	Omni-directional	0.036	0.042	20.0 (13.0 dBi)	9.39	0.07
	90° sector	0.014	0.017	50.1 (17.0 dBi)	9.39	0.07
	2ft directional flat plate	0.001	0.001	707.9 (28.5 dBi)	9.39	0.07
	2ft directional parabolic	0.001	0.001	707.9 (28.5 dBi)	9.39	0.06
5.8 GHz	Omni-directional	0.24	0.28	20.0 (13 dBi)	9.69	0.20
	90° sector	0.10	0.12	50.1 (17 dBi)	9.69	0.20
	2ft directional flat plate	0.54	0.63	707.9 (28.5 dBi)	9.69	1.67
	4ft directional parabolic	0.54	0.63	3388.4 (35.3 dBi)	9.69	4.82

Table 158: ISEDC minimum safe distance – PMP/PTP 450 900 MHz, 2.4 GHz, 3.5/3.65 GHz and 5 GHz

Band	Antenna	P burst (W)	G (dBi)	S (W/ m2)	d (m)
900 MHz	Yagi	0.316	13 (11 dBi)	2.74	0.35
2.4 GHz	Sector Antenna	0.079	50 (17 dBi)	5.35	0.24
	Integrated	0.158	6 (8 dBi)	5.35	0.12
	Reflector	0.040	100 (20 dBi)	5.35	0.24
3.5 GHz	Sector	0.316	32 (15 dBi)	37.10	0.15
	Integrated	0.316	6 (8 dBi)	37.10	0.06
	Reflector	0.316	100 (20 dBi)	37.10	0.26
	High Gain Ruggedized	0.316	79 (19 dBi)	37.10	0.23
3.65 GHz (lower Canada)	Sector	0.316	32 (15 dBi)	38.20	0.15
	Integrated	0.316	6 (8 dBi)	38.20	0.06
	Reflector	0.316	100 (20 dBi)	38.20	0.26
	High Gain Ruggedized	0.316	79 (19 dBi)	38.20	0.23

Band	Antenna	P burst (W)	G (dBi)	S (W/ m2)	d (m)
3.65 GHz (upper Canada)	Sector	0.316	32 (15 dBi)	38.20	0.14
	Integrated	0.316	6 (8 dBi)	38.20	0.06
	Reflector	0.20	100 (20 dBi)	38.20	0.20
	High Gain Ruggedized	0.003	79 (19 dBi)	38.20	0.23
5.4 GHz	Sector	0.025	40 (16 dBi)	9.39	0.09
	Integrated	0.126	8 (9 dBi)	9.39	0.09
	Reflector	0.003	316 (25 dBi)	9.39	0.09
	CLIP	0.020	50 (17 dBi)	9.39	0.09
	LENS	0.032	28 (14.5 dBi)	9.39	0.09
	Integrated Dish (450d)	0.0032	316 (25 dBi)	9.39	0.09
5.8 GHz	Sector	.079	40 (16 dBi)	9.69	0.16
	Integrated	0.158	8 (9 dBi)	9.69	0.10
	Reflector	0.158	316 (25 dBi)	9.69	0.064
	CLIP	0.158	50 (17 dBi)	9.69	0.25
	LENS	0.158	28 (14.5 dBi)	9.69	0.19
	Integrated Dish (450d)	0.158	316 (25 dBi)	9.69	0.64

(*1) P: maximum average transmit power capability of the radio including cable loss (Watt)

Note

Gain of antenna in dBi = 10 * log(G).

The regulations require that the power used for the calculations is the maximum power in the transmit burst subject to allowance for source-based time-averaging.

At 5.4 GHz and EU 5.8 GHz, the products are generally limited to a fixed EIRP which can be achieved with the Integrated Antenna. The calculations above assume that the maximum EIRP allowed by the regulations is being transmitted.

Remarque

Gain de l'antenne en dBi = 10 * log(G).

Les règlements exigent que la puissance utilisée pour les calculs soit la puissance maximale de la rafale de transmission soumis à une réduction pour prendre en compte le rapport cyclique pour les signaux modulés dans le temps.

Pour une opération dans la CEE dans les bandes 5,4 GHz et 5,8 GHz, les produits sont généralement limités à une PIRE qui peut être atteinte avec l'antenne intégrée. Les calculs ci-dessus supposent que la PIRE maximale autorisée par la réglementation est atteinte.

Note

If there are no EIRP limits in the country of deployment, use the distance calculations for FCC 5.8 GHz for all frequency bands.

At FCC 5.8 GHz, for antennas between 0.6m (2ft) and 1.8m (6ft), alter the distance proportionally to the antenna gain.

Remarque

Si aucune limite de PIRE existe pour le pays de déploiement, utilisez les calculs de distance pour FCC 5,8 GHz pour toutes les bandes de fréquence.

Pour la band FCC 5,8 GHz et les antennes entre 0,6 m (2 pieds) et 1,8 m (6 pieds), modifier la distance proportionnellement au gain de l'antenne.

Capacité de puissance d'émission moyenne maximale de la radio comprenant la perte dans les câble de connexion (W)

(*2) G: total transmit gain as a factor, converted from dB

Gain total d'émission, converti à partir de la valeur en dB

(*3) S: power density (W/m^2)

Densité de puissance (W/m^2)

(*4) d: minimum distance from point source (meters)

Distance minimale de source ponctuelle (en mètres)

Tx power limits for PMP 450 MicroPoP

The PMP 450 MicroPoP uses the same FCC grant as the PMP 450b mid-gain. The Tx power limits are captured as shown below. Omni antenna gain = 8 dBi; Sector antenna gain = 13 dBi

	5/10 MHz				20/40 MHz			
	Rounded EIRP	MicroPoP Omni Tx power	MicroPoP Sector Tx power	MicroPoP Connectorised	Rounded EIRP	MicroPoP Omni Tx power	MicroPoP Sector Tx powe	MicroPoP Connectorised
4.9 GHz		26 dBm	26 dBm	26 dBm		24 dBm	24 dBm	24 dBm
5.1 GHz	26 dBm	17 dBm	13 dBm	EIRP – Antenna Gain	32 dBm	23 dBm	19 dBm	EIRP – Antenna Gain
5.2 GHz	25 dBm	16 dBm	12 dBm	EIRP – Antenna Gain	25 dBm	16 dBm	12 dBm	EIRP – Antenna Gain
5.4 GHz	25 dBm	16 dBm	12 dBm	EIRP – Antenna Gain	25 dBm	16 dBm	12 dBm	EIRP – Antenna Gain
5.8 GHz	32 dBm	23 dBm	19 dBm	EIRP – Antenna Gain	31 dBm	22 dBm	18 dBm	EIRP – Antenna Gain

Hazardous location compliance

The PMP/PTP 450i series IECEx/ATEX/HAZLOC ODUs have been certified for operation in the following hazardous locations:

ATEX

The products have been approved under an “Intrinsic Safety” assessment as defined in EN60079-11:2012.

The approval is given by certificate number EMT126ATEX0003X, issued by Element Materials Technology, with the specific level of coverage shown below:

- II 3 G Ex ic IIC T4
- II - Equipment group (surface applications)
- 3 - Equipment category (infrequent exposure)
- G - Atmosphere (Gas)
- ic - Protection concept (intrinsic safety)
- IIC - Gas group (up to and including Hydrogen and Acetylene)
- T4 - Temperature class (135°C)

IECEx approvals - Certificate No, IECEx EMT 16.0001X

Marking - Ex ic IIC T4 Gc Tamb -40C to + 60C

Chapter 7: Compliance with radio regulations

This section describes how the 450 Platform Family complies with the radio regulations that are in force in various countries.

Caution

Where necessary, the end user is responsible for obtaining any National licenses required to operate this product and these must be obtained before using the product in any country. Contact the appropriate national administrations for details of the conditions of use for the bands in question and any exceptions that might apply.

Caution

Changes or modifications not expressly approved by Cambium Networks could void the user's authority to operate the system.

Caution

For the connectorised version of the product and in order to reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the Effective Isotropically Radiated Power (EIRP) is not more than that permitted for successful communication.

Attention

Le cas échéant, l'utilisateur final est responsable de l'obtention des licences nationales nécessaires pour faire fonctionner ce produit. Celles-ci doivent être obtenus avant d'utiliser le produit dans un pays particulier. Contactez les administrations nationales concernées pour les détails des conditions d'utilisation des bandes en question, et toutes les exceptions qui pourraient s'appliquer

Attention

Les changements ou modifications non expressément approuvés par les réseaux de Cambium pourraient annuler l'autorité de l'utilisateur à faire fonctionner le système.

Attention

Pour la version du produit avec une antenne externe, et afin de réduire le risque d'interférence avec d'autres utilisateurs, le type d'antenne et son gain doivent être choisis afin que la puissance isotrope rayonnée équivalente (PIRE) ne soit pas supérieure au minimum nécessaire pour établir une liaison de la qualité requise.

Type approvals

This system has achieved Type Approval in various countries around the world. This means that the system has been tested against various local technical regulations and found to comply. The frequency bands in which the system operates may be 'unlicensed' and, in these bands, the system can be used

provided it does not cause interference. The system is not guaranteed protection against interference from other products and installations.

The radio specification type approvals that have been granted for 450 Platform Family frequency variants are listed under Radio certifications.

Table 159: Radio certifications

Region/Country	Band	Specification
Brazil	4.9 GHz	ANATEL, RESOLUÇÃO Nº 633, DE 14 DE MARÇO DE 2014
	5.4 GHz	ANATEL, RESOLUTION No. 506, FROM JULY 1, 2008
	5.8 GHz	ANATEL, RESOLUTION No. 506, FROM JULY 1, 2008
Mexico	900 MHz	NOM-121-SCT1-2009
	4.9 GHz	Protocol Between the UNITED STATES OF AMERICA and MEXICO – Use of 4940 to 4990 MHz band.
	5.4 GHz	Acuerdo del 27 de noviembre de 2012
	5.8 GHz	NOM-121-SCT1-2009
USA	900 MHz	FCC Part 15.247, FCC Part 15 Class B
	2.4 GHz	FCC Part 15.247, FCC Part 15 Class B
	3.6 GHz	FCC Part 96, FCC Part 15 Class B
	4.9 GHz	FCC 47 CFR Part 90, FCC Part 15 Class B
	5.1 GHz	FCC 47 CFR Part 15 E, FCC Part 15 Class B
	5.2 GHz	FCC 47 CFR Part 15 E, FCC Part 15 Class B
	5.4 GHz	FCC 47 CFR Part 15 E, FCC Part 15 Class B
	5.8 GHz	FCC 47 CFR Part 15 E
Canada	900 MHz	RSS Gen and RSS 210
	2.4 GHz	RSS Gen and RSS 210
	3.5 /3.6/3.95 GHz	RSS Gen, RSS-197, RSS 192 and RSS 198
	4.9 GHz	IC RSS-111, Issue 5
	5.8 GHz	IC RSS-247, Issue 2
Europe	3.5 GHz	ETSI EN 302 326-2 V1.2.2
	5.4 GHz	ETSI EN 301 893 V2.1.1
	5.8 GHz	ETSI EN 302 502 V2.1.1

Brazil specific information

Brazil notification

For compliant operation in the 5.4 GHz band, the Equivalent Isotropic Radiated Power from the integrated antenna or connectorised antenna shall not exceed 30 dBm (0.5 W).

The operator is responsible for enabling the DFS feature on any Canopy 5.4 GHz radio by setting the Country Code to “Brazil”, including after the module is reset to factory defaults.

Important Note: This equipment operates as a secondary application, so it has no rights against harmful interference, even if generated by similar equipment, and cannot cause harmful interference on systems operating as primary applications.

Brazil certification numbers

The Anatel certification number for Brazil for the PMP/PTP 450i Series is 2426-15-7745.

Australia Notification

900 MHz modules must be set to transmit and receive only on center channels of 920, 922, or 923 MHz to stay within the ACMA approved band of 915 MHz to 928 MHz for the class license and not interfere with other approved users.

After considering antenna gain (in dBi), 900 MHz modules’ transmitter output power (in dBm) must be set to stay within the legal regulatory limit of 30 dBm (1 W) EIRP for this 900 MHz frequency band.

Regulatory Requirements for CEPT Member States (www.cept.org)

When operated in accordance with the instructions for use, Cambium Wireless equipment operating in the 5.1 GHz and 5.4 GHz bands is compliant with CEPT Resolution 229 (REV. WRC-12).

Operating the 450 Platform Family in the bands 5150 to 5350 MHz and 5470 to 5725 MHz is granted providing it is not causing interference to the existing primary services allocated to those bands.

For compliant operation in the 5250 to 5350 MHz band, the transmit power from the integrated antenna or a connectorised antenna shall be limited to a maximum mean EIRP of 200 mW and a maximum mean EIRP density of 10 mW/MHz in any 1 MHz band.

For compliant operation in the 5470 to 5725 MHz band, the transmit power shall be restricted to a maximum of 250 mW with a maximum mean EIRP of 1 W and a maximum mean EIRP density of 50 mW/MHz in any 1 MHz band.

For compliant operation in the bands 5 250-5 350 MHz and 5 470-5 725 MHz, the 450 Platform Family employs transmitter power control (TCP) and Dynamic Frequency Selection (DFS).

For EU member states, RLAN equipment in the 5.4GHz bands is exempt from individual licensing under Commission Recommendation 2003/203/EC. Contact the appropriate national administrations for details on the conditions of use for the bands in question and any exceptions that might apply. Also see www.ero.dk for further information.

Cambium Radio equipment operating in the 5470 to 5725 MHz band are categorized as “Class 1” devices within the EU in accordance with ECC DEC(04)08 and are “CE” marked to show compliance with the European Radio Equipment Directive (RED) 2014/53/EU. The relevant Declaration of Conformity can be found at http://www.cambiumnetworks.com/ec_dofc/ .

Canadian Installation Procedures (900 MHz 450i)

1. << En effet, il est conçu pour être approvisionné par un bloc d'alimentation PoE listé UL et portant la mention <<LPS>> ou <<PS2 complied>>.
2. Encapsulé dans un boîtier de type 450i, il comporte 450 circuits qui sont obligatoirement alimentés par 30V dc.
3. La prise de type RJ-11 est utilisée par une personne qualifiée uniquement pour la connexion GPS et aucun raccordement au système de télécommunication n'est nécessaire.