

PMP 450 ORDERING GUIDE

FROM PMP 450 Release 01-00



PMP 450
Access Point



PMP 450
Subscriber Module



Cambium Networks™

CONTENTS

PG	SECTION
3	1. INTRODUCTION
5	2. ORDERING ACCESS POINTS (APs)
5	2.1 AP MODULES
5	2.2 AP SECTOR COVERAGE AND ANTENNA OPTIONS
6	2.3 AP INTERFACES
6	2.4 AP POWER SUPPLY
7	2.5 SURGE SUPPRESSION
7	2.6 GPS SYNCHRONIZATION
8	2.7 PMP INTEROPERABILITY LICENSE KEY
8	2.8 AP EXTENDED WARRANTIES
9	3. ORDERING SUBSCRIBER MODULES (SMs)
9	3.1 SM MODULES
10	3.2 SM INTERFACES
10	3.3 SM POWER SUPPLY
11	3.4 SM ANTENNA ENHANCEMENT OPTIONS
11	3.5 SURGE SUPPRESSION
11	3.6 CABLING AND ACCESSORIES
11	3.7 UPGRADE LICENSE KEYS
12	3.8 SM EXTENDED WARRANTIES
13	4. AP AND SM INSTALLATION EXAMPLES
13	4.1 AP ON A TOWER
14	4.2 AP OR SM ON A RESIDENTIAL OR COMMERCIAL BUILDING
15	4.3 AP ON A ROOFTOP
16	4.4 SM GROUNDING AND PROTECTION

1. INTRODUCTION

This Ordering Guide covers the Cambium PMP 450 Platform. It is intended to provide a structured guide to ordering a link with any accessories and ancillary items for a successful installation. The key steps involved in planning and ordering your system are:

STEPS	ACTIVITIES
1	Regulatory Planning: To begin, you need to contact the applicable radio regulator in your area to identify any restrictions or limitation imposed on radio equipment operating in your planned RF band and to determine whether or not you need to register your PMP network. As the user of the radio equipment, it is your responsibility to ensure that your system complies with any regulatory guidelines imposed by the local regulator.
2	Site Planning: We recommend that you complete a site survey to identify the many considerations critical for successful site selection such as the availability of tower or rooftop space, the location of the grounding system, best positioning of the APs and SMs, aesthetics and other permission-based issues, and maximum cable lengths required for your deployment.
3	Link and Sector Planning: You need to determine link-planning factors such as path obstructions, risk of interference, path and link loss, maximum power levels permitted, and coverage requirements.
4	Spectrum Analysis: One of the most important elements in your planning process is the analysis of spectrum usage and signal strength needed to occupy the spectrum you are planning to use. In this process, you need to plan your sector coverage to determine how many APs will be needed and what sector size will be required to provide adequate coverage for the deployment.
5	Preparing a PMP 450 Order: Once you have identified all the regulatory requirements and planned the site, link, sector coverage and spectrum requirements, you are ready to compile your order. This Ordering Guide provides the part numbers, product descriptions, instructions, and resources to help you complete a PMP 450 order.

When you are ready to prepare your order, the following equipment components can be selected for a PMP 450 Greenfield network or a PMP 450 network migration order.

PMP 450 SYSTEM COMPONENTS	
PMP 450 Access Point (AP)	PMP 450 Subscriber Module (SM)
Access Point: <ul style="list-style-type: none"> Number of APs required 60-degree sector or 90-degree sector 	Subscriber Module: <ul style="list-style-type: none"> Number of SMs required Throughput capacity for each SM (4, 10, 20 Mbps or uncapped capacity)
30V Power Supply: <ul style="list-style-type: none"> Standalone configuration: ACPSSW-20A or ACPSSW-21A AP Cluster: ACPSS120WA (when using with CMM3 or CMM4) 	30V Power Supply: <ul style="list-style-type: none"> ACPSSW-09B ACPSSW-13B
Antenna: <ul style="list-style-type: none"> 6-sector dual mode antenna (FSK and OFDM) 4-sector OFDM antenna Alternative configuration (verify regulations prior to purchase) 	Antenna or Reflector: <ul style="list-style-type: none"> SMs include an integrated antenna May also configure with: <ul style="list-style-type: none"> Passive LENS Reflector dish
Surge Suppressor: <ul style="list-style-type: none"> APs include built-in surge suppression – no external suppression is required at the AP Can add external units at: <ul style="list-style-type: none"> Cable entrance point leading to the network On the bottom of the tower/pole near the grounding bar 	Surge Suppressor: <ul style="list-style-type: none"> SMs do not include built-in surge suppression External Unit: 600 SS
Cabling and Accessories: <ul style="list-style-type: none"> Cat 5e cables Grounding cables Connectors 	Cabling and Accessories: <ul style="list-style-type: none"> Cat 5e cables Grounding cables Connectors
AP Extended Warranty: <ul style="list-style-type: none"> One additional year of coverage Two additional years of coverage Four additional years of coverage 	SM Extended Warranty: <ul style="list-style-type: none"> One additional year of coverage Two additional years of coverage Four additional years of coverage

2. ORDERING ACCESS POINTS (APs)

2.1 AP MODULES

Each AP contains both radio and networking electronics supplied in a connectorized configuration for use with an external antenna. Connectorized modules with external antennas are designed to cope with more difficult radio conditions. Each AP has an established throughput capacity of up to 90 Mbps and can support up to 200 SMs.



Part Number	Description
C054045A001A	PMP 450 Connectorized Access Point
C054045A002A	PMP 450 Connectorized Access Point, US only

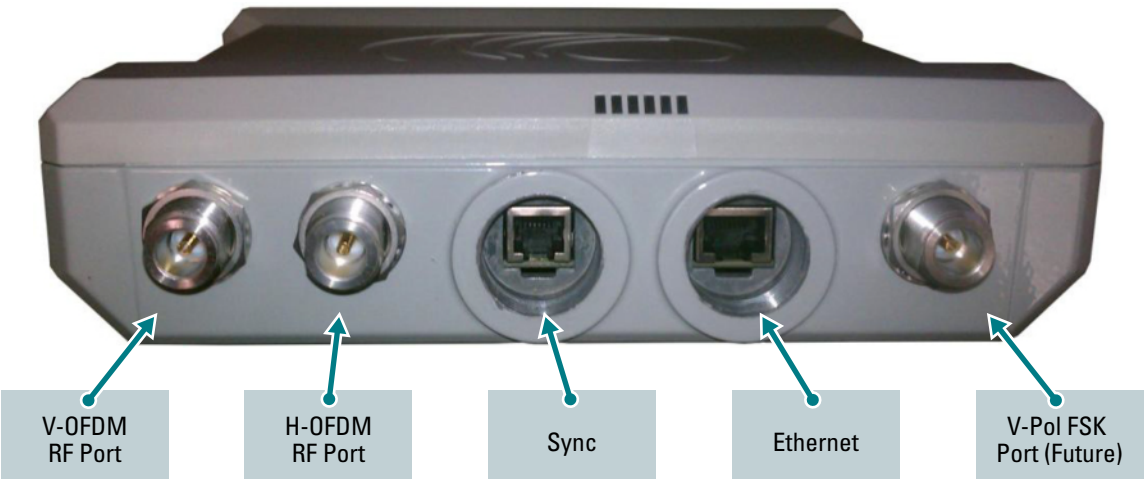
2.2 AP SECTOR COVERAGE AND ANTENNA OPTIONS

Each AP can provide a specific sector size or area of coverage. PMP 450 APs are connectorized radios and can support any coverage you need. However, we recommend using the AP with the high-performance antennas that have been developed specifically for the PMP 450 product – either a 6-sector dual mode (both FSK and OFDM) or a 4-sector OFDM antenna. Your individual network and configuration may require a different sector width. If alternative configurations are needed, be sure that local regulations are followed prior to purchase.

Note that the N-type to N-type cable required to connect the AP to the antenna is not included and must be purchased separately. For an OFDM-only deployment, you will need two cables, one for the horizontal and one for the vertical OFDM polarities. If you are deploying in the Combo mode (i.e., serving both FSK and OFDM subscribers), you will need three of these cables. Each antenna is supplied with a bracket for mounting to a pole that is 2 inches (50 mm) to 3 inches (75 mm) in diameter.

Part Number	Description
85009324001	90 Degree Sector Antenna (H+V OFDM inputs)
85009325001	60 Degree Sector Antenna (H+V OFDM, FSK input)
30009406002	N-type to N-type Cable (16 inch length)

2.3 AP INTERFACES



AP INTERFACES		
Interface	Function	Cabling
V-OFDM RF Port (N1)	Vertical RF connection to AP antenna	50 ohm RF cable, N-type
H-OFDM RF Port (N2)	Horizontal RF connection to AP antenna	50 ohm RF cable, N-type
Synchronization / Default Plug Port	GPS synchronization signalling, provides power to uGPS module	RJ11 Cable
Power-over-Ethernet, Ethernet Communications	Power-over-Ethernet, Ethernet communications (management and data)	RJ45 Cable
RF Port – FSK	For future use in “Combo” mode	50 ohm RF cable, N-type
Ground Lug (bottom of unit)	For grounding the unit	10 AWG copper wire

2.4 AP POWER SUPPLY

Each AP requires a power supply to generate the supply voltage (29.5 VDC) from the external DC source and inject the voltage into the AP. The power supply connects to the AP and network equipment via Cat 5e cable with RJ45 connectors.



You can select the power supply that best meets your specific requirements. Power supplies ACPSSW-20A and ACPSSW-21A should be used with a PMP 450 AP in a standalone configuration. ACPSSW-20A plugs into the AC source using a detachable clip with the US, UK, and EU clips included. ACPSSW-21A has a clip that allows a 2-wire IEC AC line cord to connect the power supply to an AC source for countries outside the US, UK, or EU regions.

For APs in a cluster configuration, ACPS120WA should be used for connecting to a CMM3 or CMM4. A 3-wire IEC AC line cord will be needed to connect the power supply to the AC source.

Part Number	Description
ACPSSW-20A	Power Supply, 20W, 29.5V, 100-240VAC / 50-60 Hz
ACPSSW-21A	Power Supply, 20W, 29.5V, 100-240VAC / 50-60 Hz+C8 AC
ACPS120WA	Power Supply, 120W, 30VDC at 60C 100-240 VAC EL5

When selecting the location for the power supply, the following factors should be considered:

- Indoor location with no possibility of condensation
- Availability of mains electricity supply
- Accessibility for viewing the status indicator LED and connecting Ethernet cables
- Cable lengths – the maximum permitted length of the copper Ethernet interface cable is 330 feet (100 m) from the AP to the power supply or CMM.

2.5 SURGE SUPPRESSION

Because each AP includes a built-in surge suppressor, no external surge suppression unit is required on the AP module. However, you should include a surge suppressor at the building's cable entrance point leading to the indoor power supply. You may also want to include a surge suppressor at the bottom of the tower near the tower ground bar.

Part Number	Description
600SSD	Surge Suppressor

2.6 GPS SYNCHRONIZATION

GPS synchronization is essential in most networks to avoid self-interference and maintain efficient use of available spectrum. There are many options to provide the network with the timing pulse that maintains network synchronization.

For one cluster or throughout an entire wireless system, the Cluster Management Module (CMM) can provide a GPS timing pulse to each module, enabling the synchronization of the transmission cycles within a network. There are four variants of the CMM. A CMM is available in the Micro version (also known as CMM3) with an embedded Ethernet switch in an outdoor cabinet. In addition, there are three variants of the CMM4. If you have your own switches, you can choose either an outdoor cabinet or an indoor rack-mounted (1 Rack Unit high) version. If a rugged managed switch is required, there is an outdoor cabinet version with the switch included. Each CMM includes a GPS antenna and receiver.

You also have the option of using a Universal GPS (UGPS) to provide synchronization to one or two APs. The UGPS is powered by the PMP 450 AP Sync (Timing) Port, eliminating the need for any external power supply for the UGPS device.

Part Number	Description
1070CKDB	CMM Micro (Outdoor Enclosure)
1090CKBA	CMM4 with Ruggedized Switch and GPS (Outdoor Enclosure)
1091AA	CMM4 No Switch (Outdoor Enclosure)
1092AA	CMM4 Rack Mount Assembly
1096A	Universal GPS Module

2.7 PMP INTEROPERABILITY LICENSE KEY

Because the PMP 450 Series radios are software-defined radios, you have the ability to upgrade system features as they become available. While minor enhancements may be available at no additional charge, major feature enhancements often require the purchase of a license key. One example of this is the PMP Interoperability License Key which allows your PMP 450 system to interoperate with PMP 100 or PMP 430 subscriber modules (when available).

Part Number	Description
C000045K001A	PMP Interoperability License Key

2.8 AP EXTENDED WARRANTIES

With the purchase of each AP, you have a 12-month (one-year) limited warranty on hardware components. Typical turn-around time for the RMA (Return Materials Authorization) process is less than 30 days. This Standard Warranty also includes minor software enhancements as available and 24x7 telephone technical support.

At the time of purchase or any time prior to the end of the 12-month Standard Warranty, we recommend that you purchase an Extended Warranty to extend your equipment coverage and protect your investment. You have the option of purchasing an Extended Warranty for one, two, or four additional years of coverage with a typical turn-around time of less than 30 days. Your Extended Warranty also includes minor software enhancements as they become available and 24x7 telephone technical support.

Part Number	Description
SG00TS4009A	PMP 450 AP Extended Warranty, 1 Additional Year
SG00TS4017A	PMP 450 AP Extended Warranty, 2 Additional Years
SG00TS4025A	PMP 450 AP Extended Warranty, 4 Additional Years

3. ORDERING SUBSCRIBER MODULES (SMs)

3.1 SM MODULES

Each SM is a self-contained unit that houses the radio and networking electronics and is supplied in an integrated antenna configuration. Up to 200 SMs can be connected to one AP.



PMP 450 Subscriber
Module (SM)



PMP 450 Subscriber Module (SM)
With a Reflector Dish

Part Number	Description
C054045C001A	PMP 450 Subscriber Module, 4 Mbps
C054045C002A	PMP 450 Subscriber Module, 10 Mbps
C054045C003A	PMP 450 Subscriber Module, 20 Mbps
C054045C004A	PMP 450 Subscriber Module, Uncapped

The capacity that you order establishes the maximum throughput capacity that can be achieved for the SM. “Uncapped” capacity indicates an SM module that will provide up to its maximum capacity – nearly 55 Mbps.

3.2 SM INTERFACES



The network connection to a PMP 450 Series SM is made via a 1000BaseT or 100BaseT Ethernet connection. Power is provided over the Ethernet connection using a patented, non-standard power technique.

SM INTERFACES		
Interface	Function	Cabling
Power-over-Ethernet, Ethernet Communications	Power-over-Ethernet, Ethernet communications (management and data)	RJ45 Cable
Synchronization, Default Plug Port	GPS synchronization signaling, provides power to uGPS module	RJ11 cable
Ground Lug (bottom of unit)	For grounding the unit	10 AWG copper wire

3.3 SM POWER SUPPLY

The SM power supply unit generates the supply voltage (29.5 VDC) from the external DC source and injects the voltage into the SM. The power supply is connected to the SM and network equipment using Cat5e cable with RJ45 connectors.



ACPSSW-09B or
ACPSSW-13B
(shown here)
Power Supply

Part Number	Description	Region
ACPSSW-09B	Power Supply, 13.6W, 29.5V, 100-240VAC / 50-60 Hz	US, UK, and EU
ACPSSW-13B	Power Supply, 13.6W, 29.5V, 100-240VAC / 50-60+Fixed US	US Fixed Blade
ACPSSW-10B	Power Supply, 13.6W, 29.5V, 100-240VAC / 50-60 Hz+ARG	Argentina
ACPSSW-11B	Power Supply, 13.6W, 29.5V, 100-240VAC / 50-60 Hz+AUS	Australia
ACPSSW-12C	Power Supply, Assy, P/S, 13.6W, 29.5V, 90-240VAC / 50-60 Hz PS	China
ACPSSW-14A	Power Supply, 13.6W, 29.5V, 100-240VAC / 50-60 Hz+BRAZ	Brazil

When selecting the location for the power supply, the following factors should be considered:

- Indoor location with no possibility of condensation
- Availability of mains electricity supply
- Accessibility for viewing the status indicator LED and connecting Ethernet cables
- Cable lengths – the maximum permitted length of the copper Ethernet interface cable is 330 feet (100 m) from the SM to the associated power supply.

3.4 SM ANTENNA ENHANCEMENT OPTIONS

Each SM comes with an integrated 9 dBi antenna. You may also add a passive LENS to achieve 14 dBi gain or a passive reflector dish to achieve a 24 dBi of total gain. These antennas extend the range or could enable higher speeds at the same range.

Part Number	Description
AN500A	5 GHz LENS
HK2022A	53 cm Offset, Reflector Dish Kit, 4 pk

3.5 SURGE SUPPRESSION

SMs do not include embedded surge suppression. So, we strongly recommend that you add external surge suppressors to your SMs for protection from the harmful effects of power surges induced into the electronics as a result of nearby lightning strikes. In addition to a surge suppressor near the SM, we recommend that you also include a surge suppressor at the building ingress.

Part Number	Description
600SSD	Surge Suppressor

3.6 CABLING AND ACCESSORIES

In addition to the components above, you will need to order your cables and other accessories as needed to complete your AP order.

Part Number	Description
SMMB1A	Universal Mounting Kit

3.7 UPGRADE LICENSE KEYS

When you purchase an SM, you specify the throughput capacity desired for the initial deployment. Later, you can upgrade the capacity of one or more SMs as desired. Each SM capacity upgrade is available by purchasing an upgrade key. Then with a simple online process, you can reset the SM to the new throughput capacity without changing hardware. Once reset, the new capacity will be available immediately.

The next table gives you the part numbers and descriptions for those upgrade license keys.

Part Number	Description
C000045K002A	PMP 450 4 to 10 Mbps Upgrade Key
C000045K003A	PMP 450 4 to 20 Mbps Upgrade Key
C000045K004A	PMP 450 4 to Uncapped Upgrade Key
C000045K005A	PMP 450 10 to 20 Mbps Upgrade Key
C000045K006A	PMP 450 10 to Uncapped Mbps Upgrade Key
C000045K007A	PMP 450 20 to Uncapped Mbps Upgrade Key

3.8 SM EXTENDED WARRANTIES

With the purchase of each SM, you have a 12-month (one-year) limited warranty on hardware components. Typical turn-around time for the RMA (Return Materials Authorization) process is less than 30 days. This Standard Warranty also includes minor software enhancements as available and 24x7 telephone technical support.

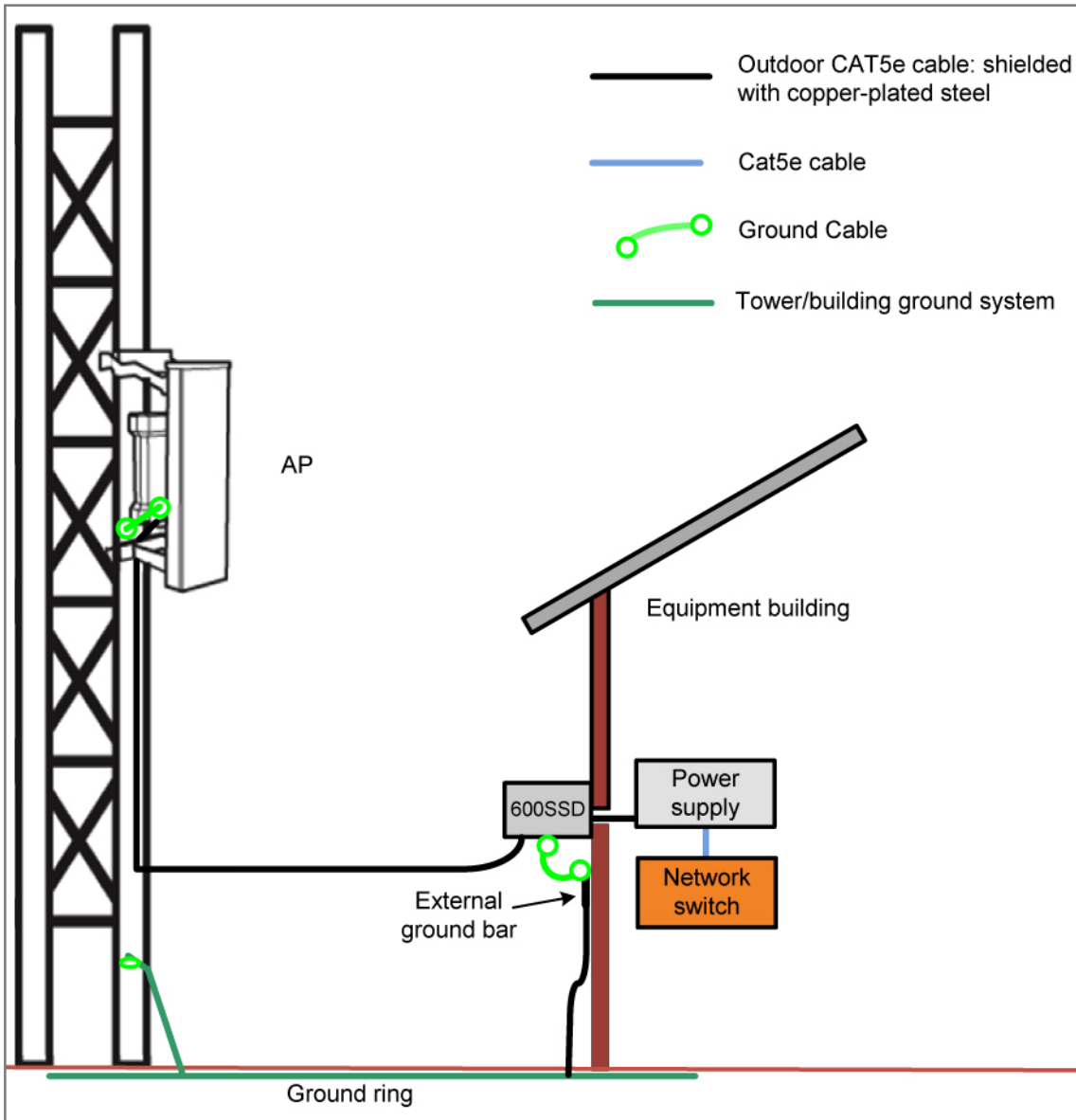
At the time of purchase or any time prior to the end of the 12-month Standard Warranty, we recommend that you purchase an Extended Warranty to extend your equipment coverage and protect your investment. You have the option of purchasing an Extended Warranty for one, two, or four additional years of coverage with a typical turn-around time of less than 30 days. Your Extended Warranty also includes minor software enhancements as they become available and 24x7 telephone technical support.

Part Number	Description
SG00TS4010A	PMP 450 SM Extended Warranty, 1 Additional Year
SG00TS4018A	PMP 450 SM Extended Warranty, 2 Additional Years
SG00TS4026A	PMP 450 SM Extended Warranty, 4 Additional Years

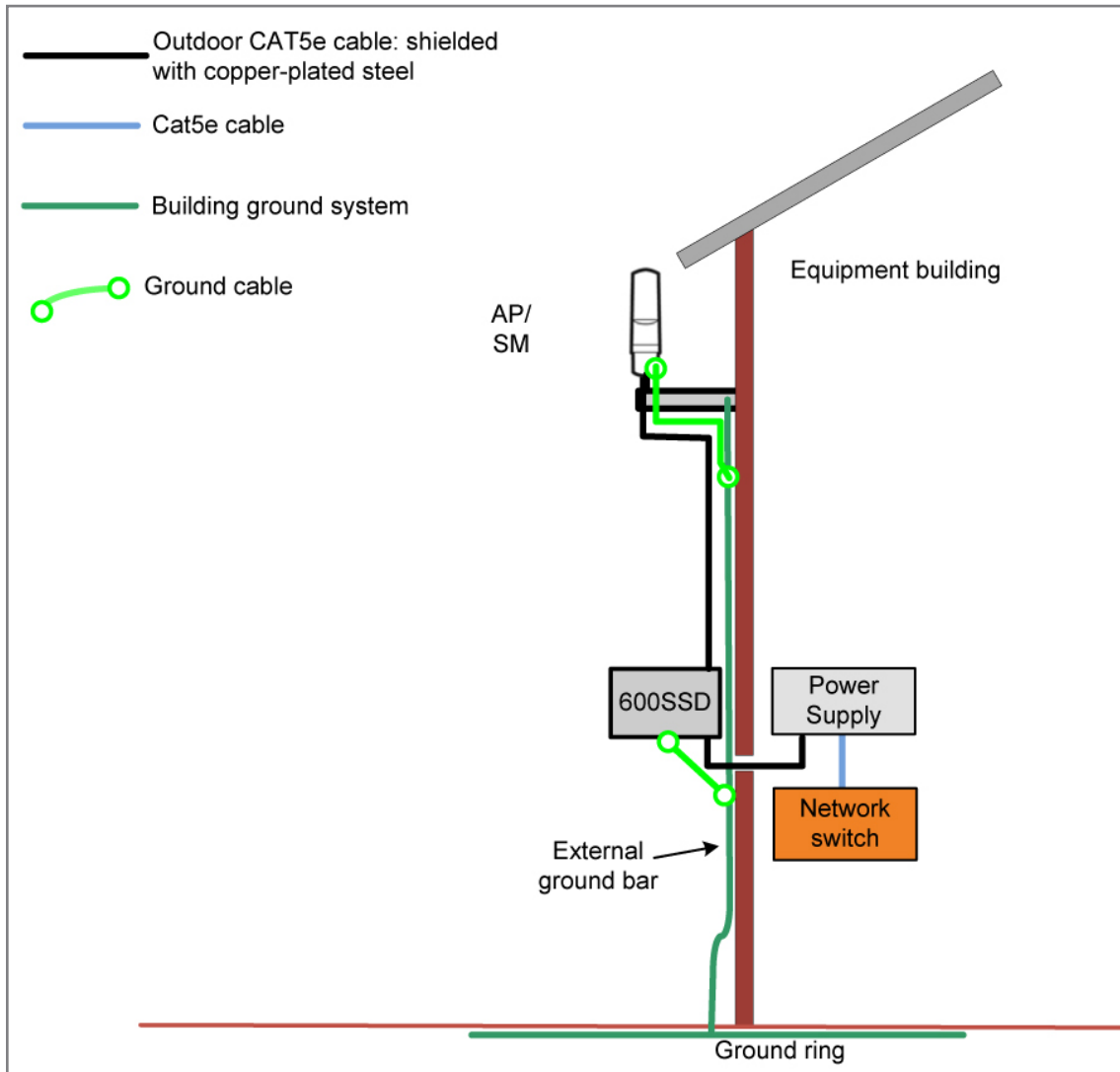
4. AP AND SM INSTALLATION EXAMPLES

This section provides illustrations showing the placement of PMP 450 systems with their ancillary components, cables, and accessories.

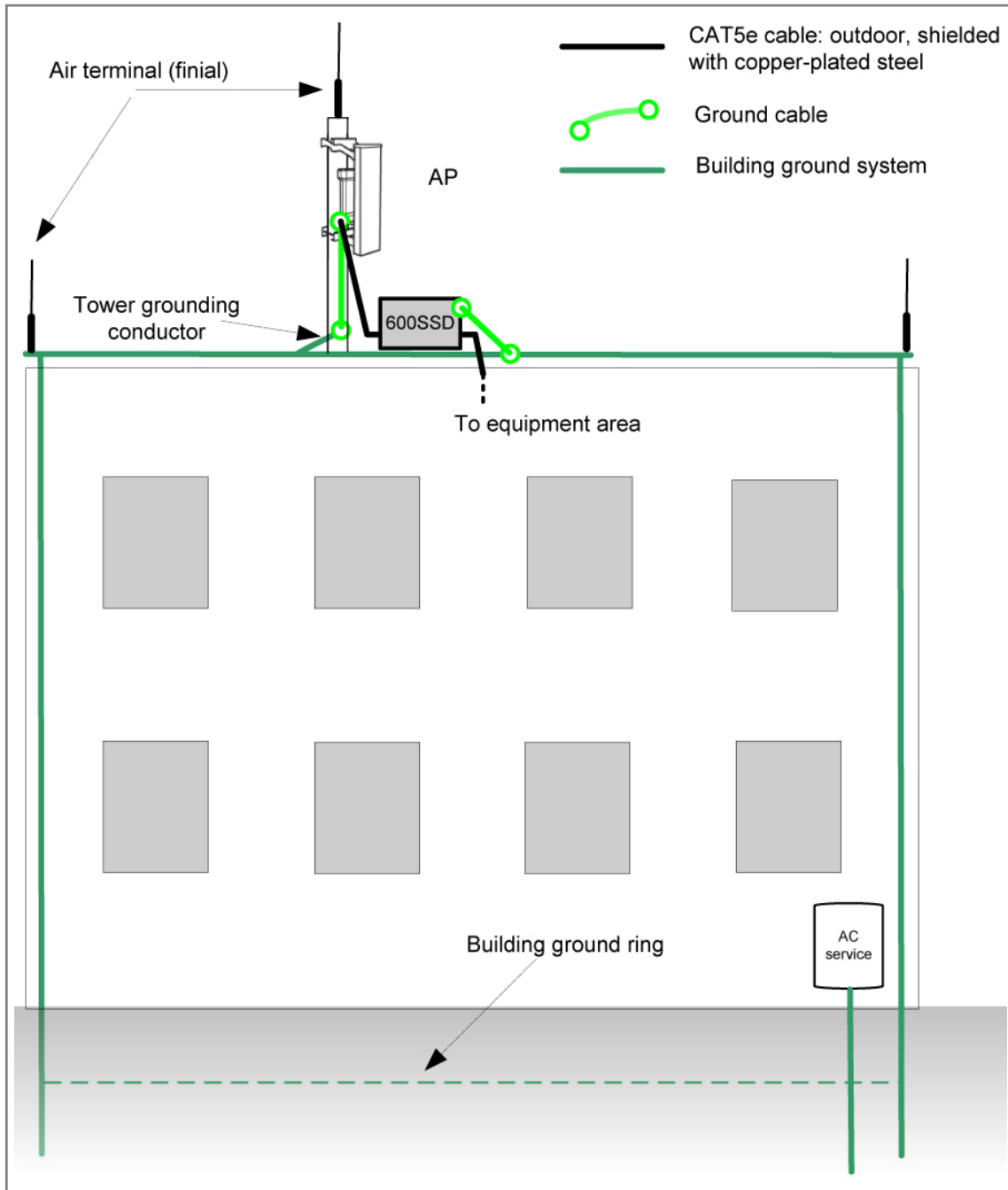
4.1 AP ON A TOWER



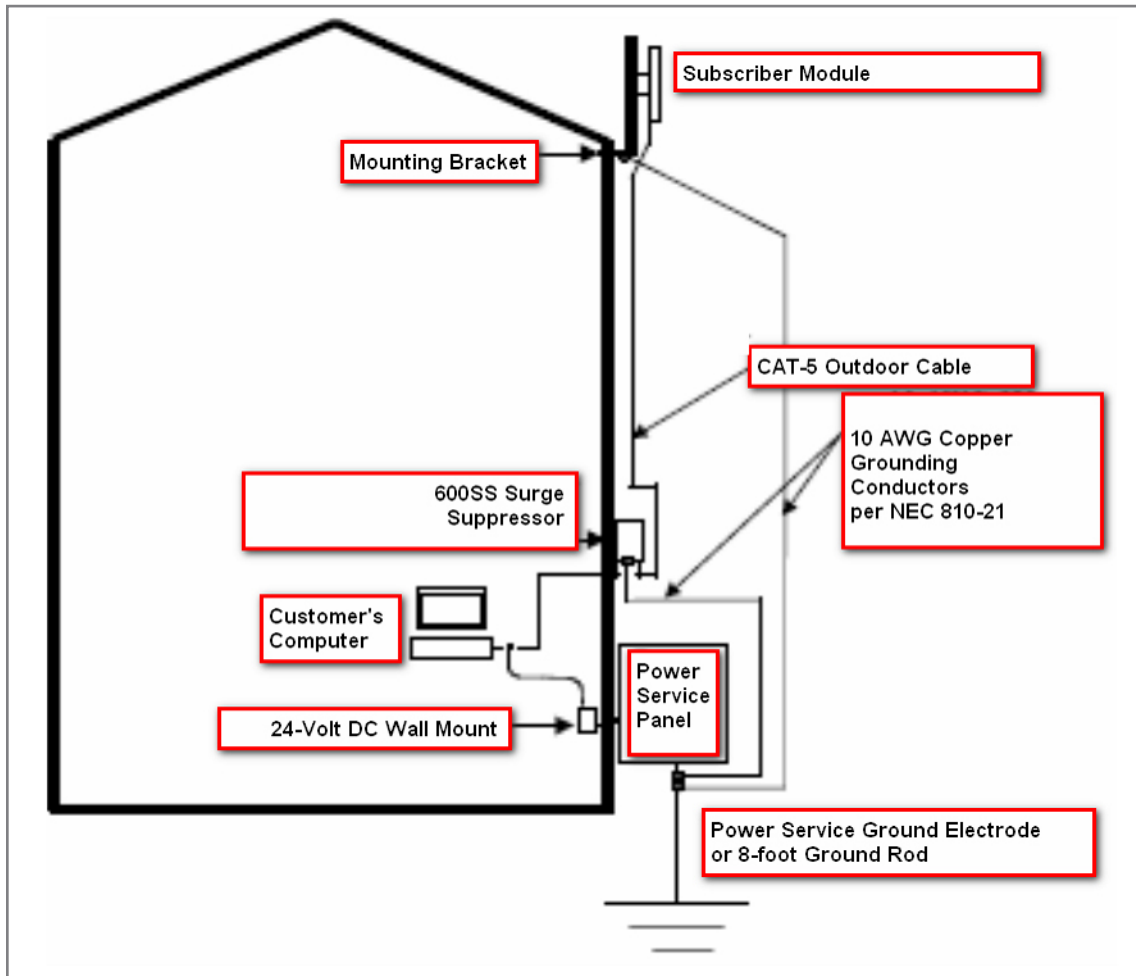
4.2 AP OR SM ON A RESIDENTIAL OR COMMERCIAL BUILDING



4.3 AP ON A ROOFTOP



4.4 SM GROUNDING AND PROTECTION



For more information about configuring, ordering, and installing PMP 450 systems, refer to the [PMP 450 Planning and Installation Guides](#).