

Grounding and lightning protection

Ensure that the link meets the grounding and lightning protection requirements described in this section.

**Warning**

Electro-magnetic discharge (lightning) damage is not covered under warranty. The recommendations in this guide, when followed correctly, give the user the best protection from the harmful effects of EMD. However 100% protection is neither implied nor possible.

The need for power surge protection

Ensure that the planned PTP 800 installation protects structures, equipment and people against power surges (typically caused by lightning) by conducting the surge current to ground via a separate preferential solid path. The actual degree of protection required depends on local conditions and applicable local regulations. Cambium recommends that PTP 800 installation is contracted to a professional installer.

Standards

To gain a full understanding of lightning protection methods and requirements, refer to the international standards IEC 61024-1 and IEC 61312-1, the U.S. National Electric Code ANSI/NFPA No. 70-1984, or section 54 of the Canadian Electric Code.

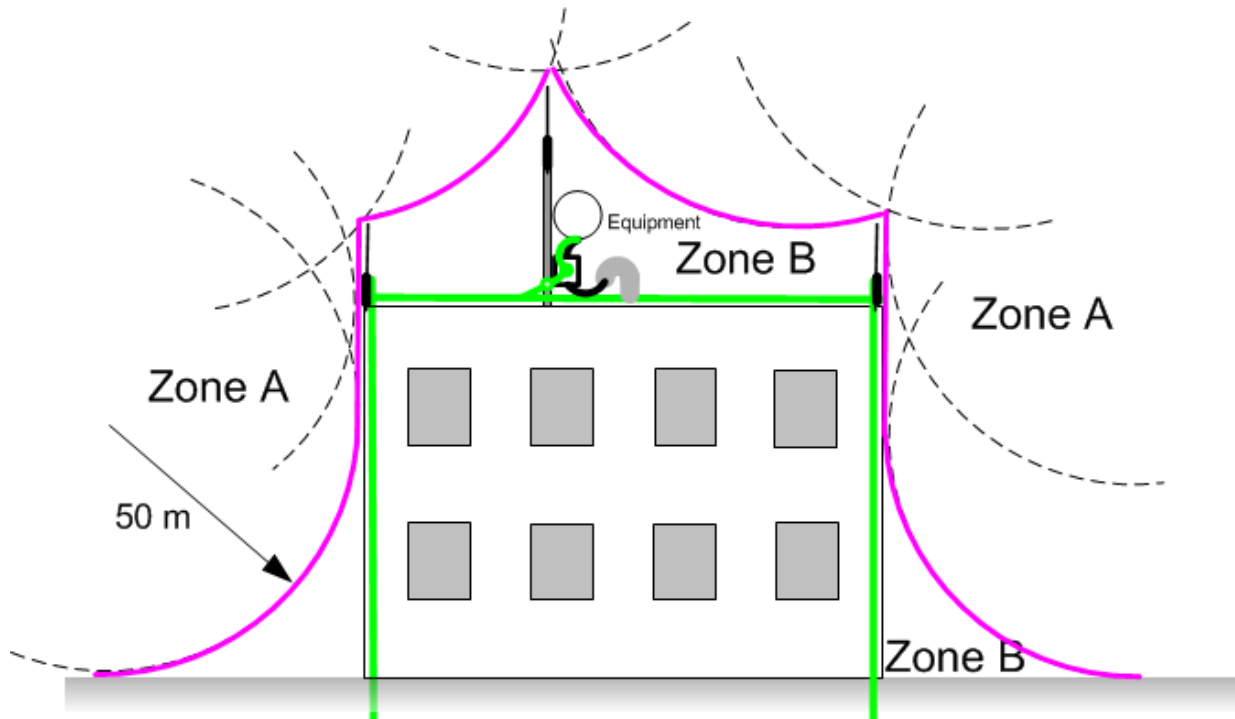
**Note**

International and national standards take precedence over the requirements in this guide.

Lightning protection zones

Use the rolling sphere method (Figure 37) to determine where it is safe to mount equipment. An imaginary sphere, typically 50 meters in radius, is rolled over the structure. Where the sphere rests against the ground and a strike termination device (such as a finial or ground bar), consider the space under the sphere to be in the zone of protection (Zone B). Where the sphere rests on two finials, consider the space under the sphere to be in the zone of protection.

Figure 37 Rolling sphere method to determine the lightning protection zones



Assess locations on masts, towers and buildings to determine if the location is in Zone A or Zone B:

- Zone A: In this zone a direct lightning strike is possible. Do not mount equipment in this zone.
- Zone B: In this zone, direct EMD (lightning) effects are still possible, but mounting in this zone significantly reduces the possibility of a direct strike. Mount equipment in this zone.



Warning

Never mount equipment in Zone A. Mounting in Zone A may put equipment, structures and life at risk.

General protection requirements

Ensure that the PTP 800 installation meets the general protection requirements described in this section.

Basic requirements

Install the outdoor equipment, that is antenna and ODU (if deployed), in Zone B (see [Lightning protection zones](#) on page 2-8).

Ground the indoor devices, that is CMU and IRFU (if deployed), at their chassis bonding points.

Grounding cable requirements

Use grounding cables that meet the following requirements:

- Grounding cables are no less than 16mm² or #6AWG in size, with solid or stranded, tinned and/or jacketed copper conductors.
- Grounding conductor runs are as short, straight, and smooth as possible, with bends and curves kept to a minimum.
- Grounding cables are not installed with drip loops.
- All bends have a minimum radius of 203 mm (8 in) and a minimum angle of 90°. A diagonal run is preferable to a bend, even though it does not follow the contour or run parallel to the supporting structure.
- All bends, curves and connections are routed towards the grounding electrode system, ground rod, or ground bar.
- Grounding conductors are securely fastened.
- Braided grounding conductors are not used.
- Approved bonding techniques are employed when connecting dissimilar metals.

LPU and IF cable requirements

**Note**

Applies to ODU deployments only.

Use LPUs and IF cables that meet the following requirements:

- An LPU (Cambium part number WB3657) is installed within 600 mm (24 in) of the point at which the IF cable enters the building or equipment room.
- The IF cable is bonded to the supporting structure in order to prevent lightning creating a potential between the structure and cable, which could cause arcing, resulting in damage to equipment.
- The IF cable is grounded at the building entry point.

Specific requirements for the ODU

**Note**

Applies to ODU deployments only.

Ensure that all ODU installations meet the following requirements:

- The ODU and top LPU are as close together as possible.
- The IF cable length between the ODU and top LPU is less than 800mm. The cable supplied in the accessory kit meets this requirement.
- The top LPU is mounted lower than the ODU.
- The ODU and top LPU are bonded together with the 800 mm long 16mm², #6AWG cable supplied in the accessory kit.
- The LPU is bonded to the tower (or main grounding system) using the 600mm long 16mm², #6AWG cable supplied in the accessory kit.

Protection requirements for a mast or tower installation

**Note**

Applies to ODU deployments only.

For equipment (ODU or antenna) mounted on a metal tower or mast, ensure that the installation meets the following requirements:

- The equipment is lower than the top of the tower or its lightning terminal and finial.
- The metal tower or mast is correctly grounded.
- A grounding kit is installed at the first point of contact between the IF cable and the tower, near the top.
- A grounding kit is installed at the bottom of the tower, near the vertical to horizontal transition point. This grounding kit is bonded to the tower or tower ground bus bar (TGB) if installed.
- If the tower is greater than 61 m (200 ft) in height, an additional grounding kit is installed at the tower midpoint. Additional ground kits are installed as necessary to reduce the distance between ground kits to 61 m (200 ft) or less.
- In high lightning prone geographical areas, additional ground kits are installed at spacing between 15 to 22 m (50 to 75 ft). This is especially important on towers taller than 45 m (150 ft).

Mast or tower protection diagrams

Figure 38 shows the protection requirements for an ODU mounted on a metal tower or mast.

Figure 39 shows the protection requirements for a 1+1 HSB protected end.

Figure 38 Grounding and lightning protection on mast or tower

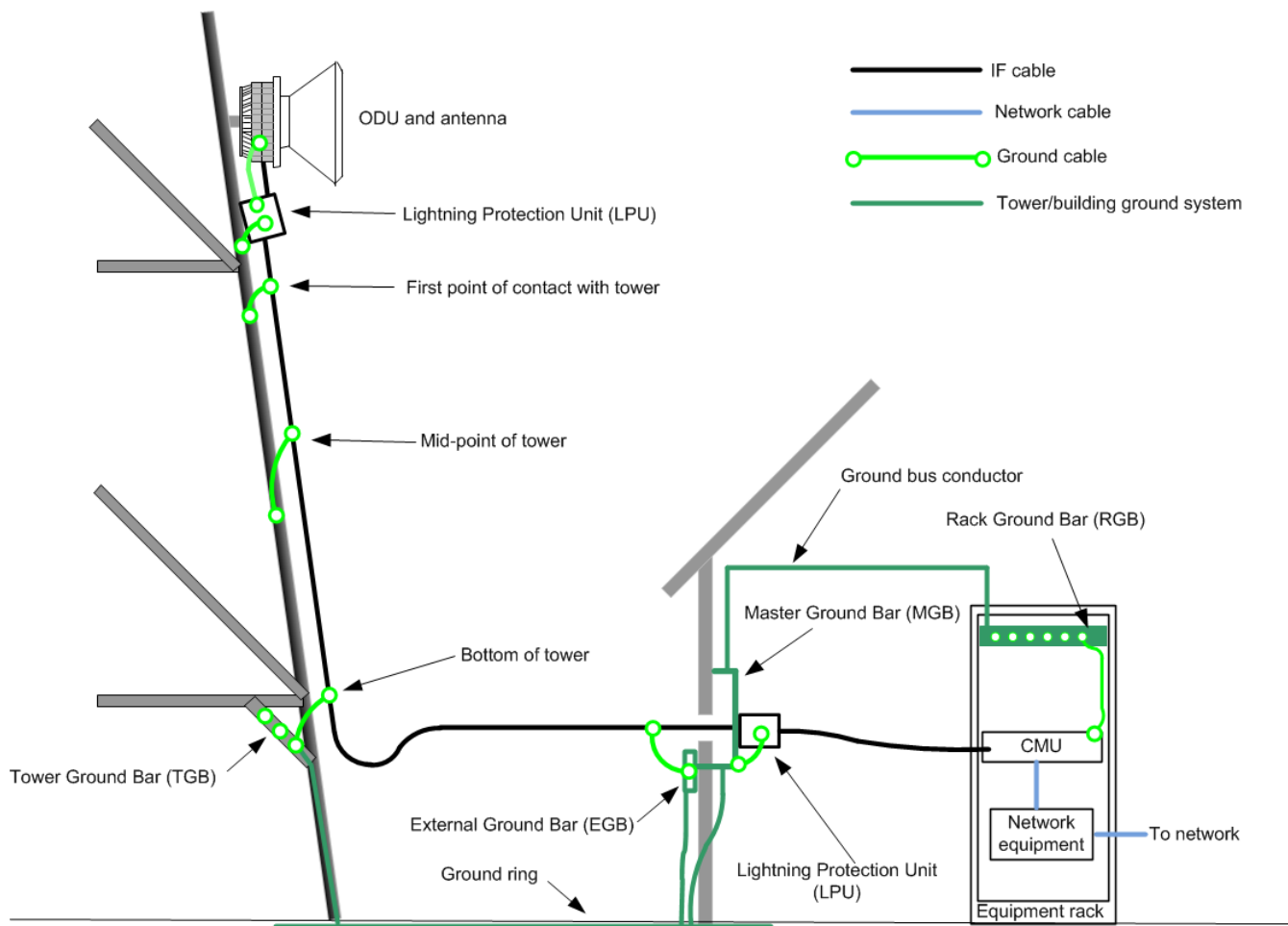
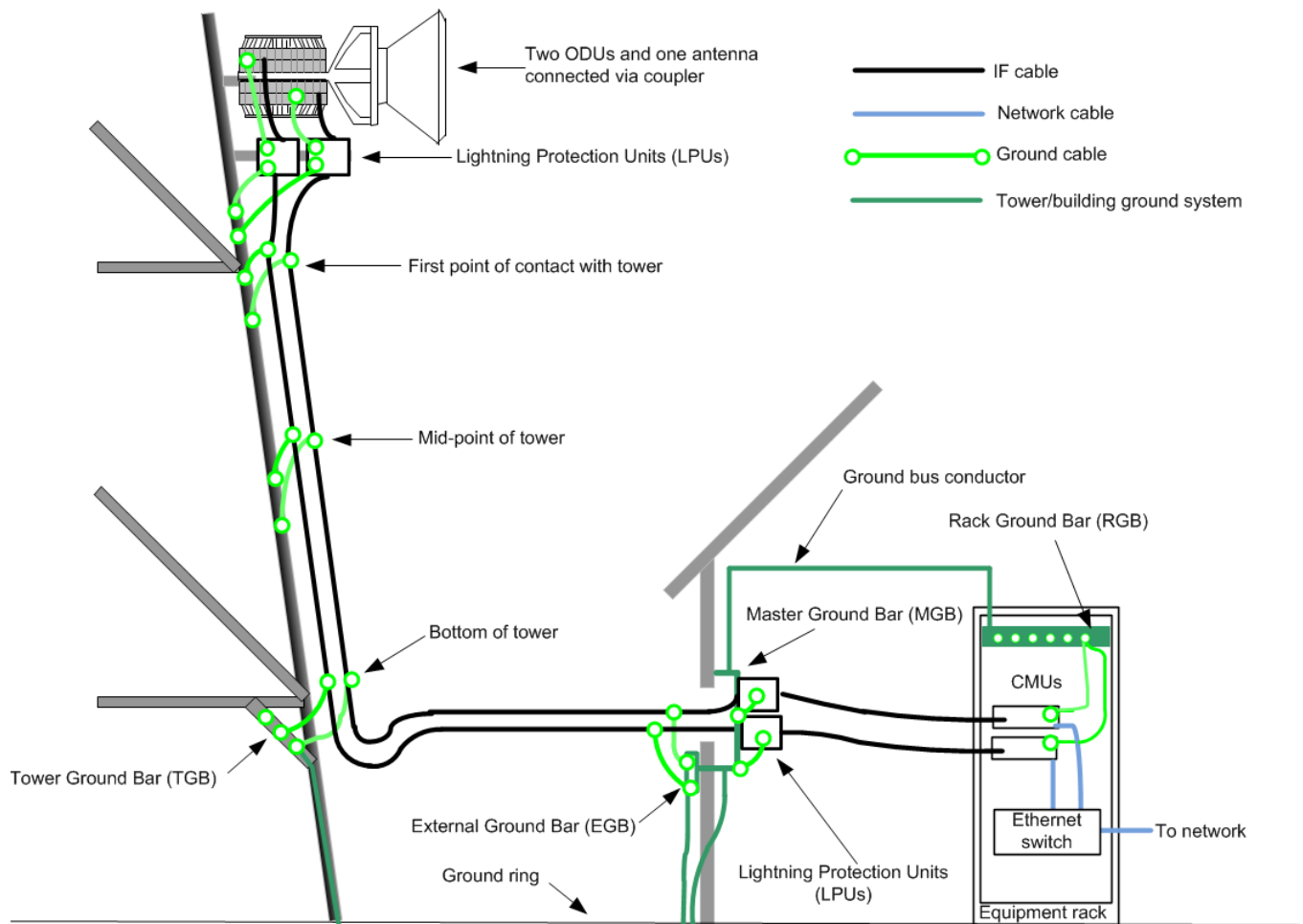


Figure 39 Grounding and lightning protection on mast or tower (protected end)

Protection requirements for the ODU on a high rise building



Note

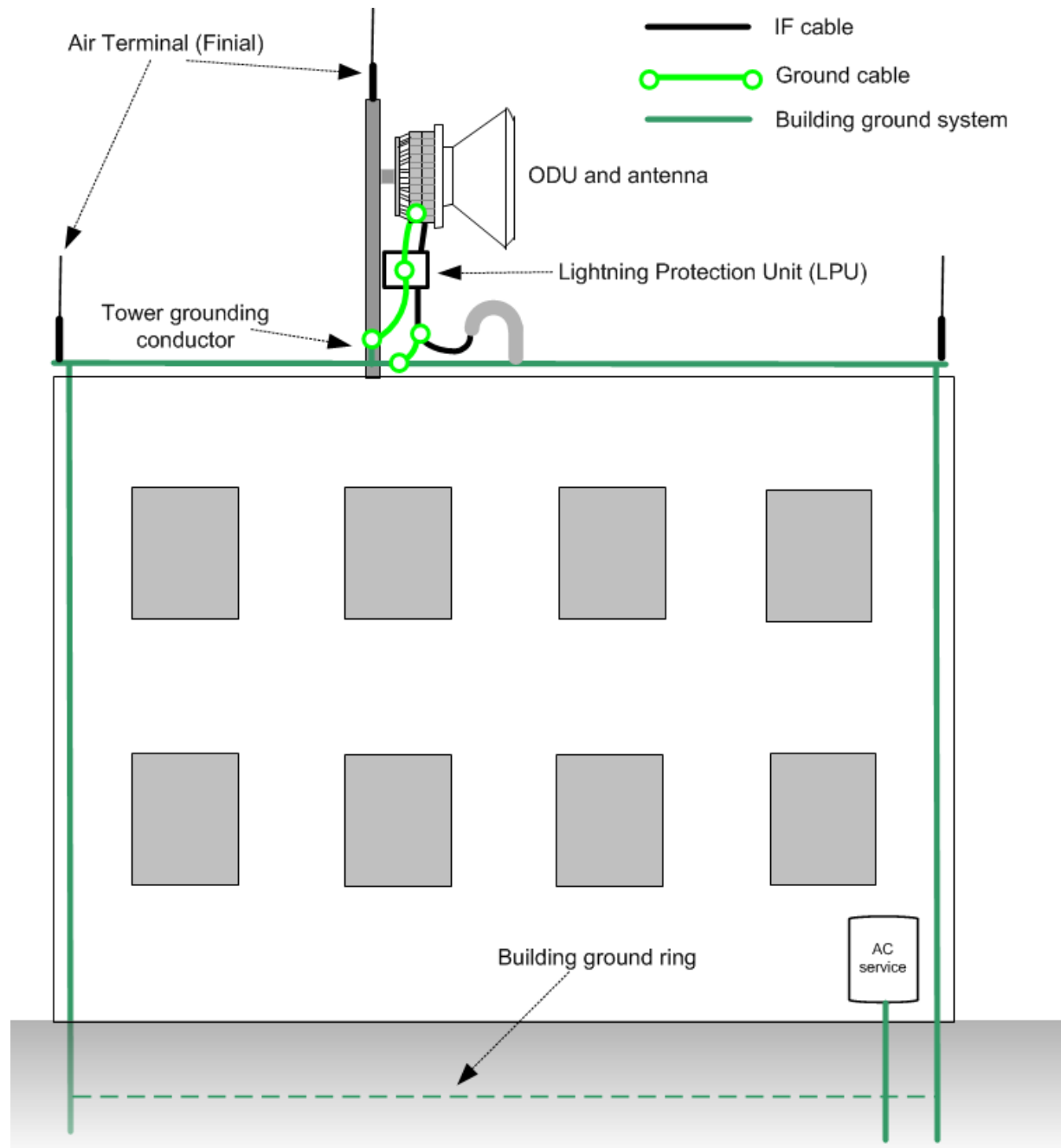
Applies to ODU deployments only.

If the antenna or ODU is mounted on a high rise building, with cable entry at roof level ([Figure 40](#)) and the equipment inside ([Figure 41](#)), then ensure that the installation meets the following requirements:

- The antenna and ODU are below the lightning terminals and finials.

- A grounding conductor is installed around the roof perimeter, to form the main roof perimeter lightning protection ring.
- Air terminals are installed along the length of the main roof perimeter lightning protection ring typically every 6.1m (20ft).
- The main roof perimeter lightning protection ring contains at least two down conductors connected to the grounding electrode system. The down conductors are physically separated from one another, as far as practical.

Figure 40 Grounding and lightning protection on building

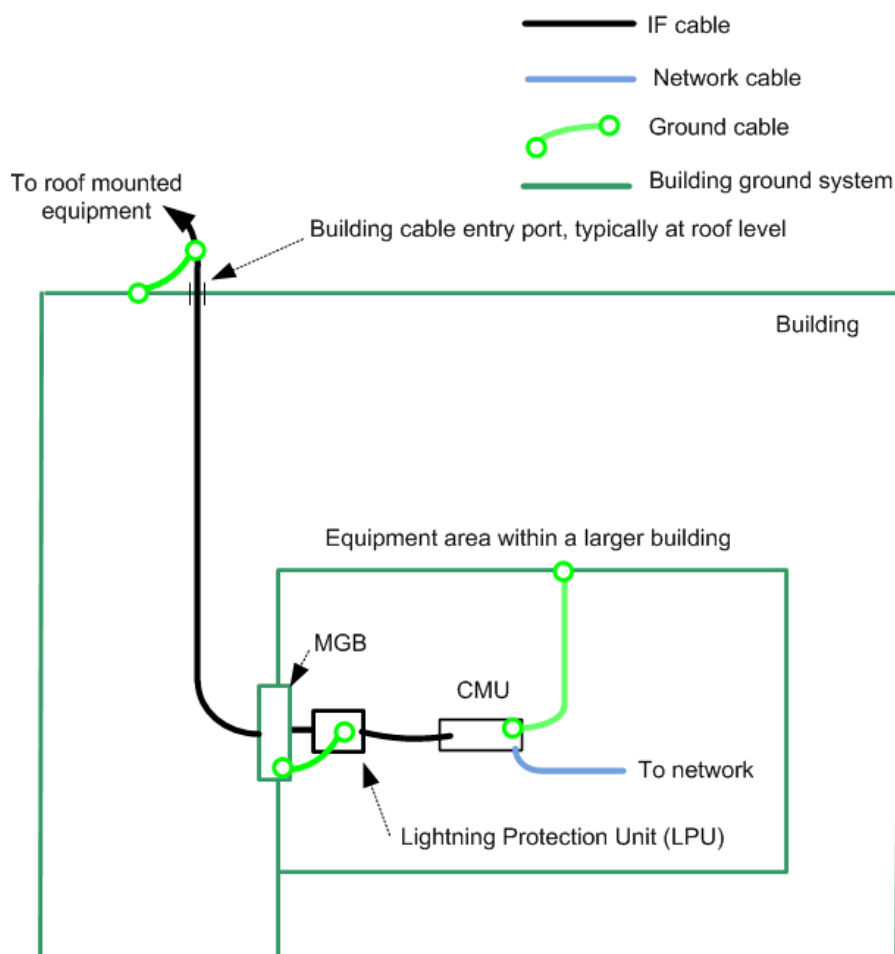


Protection inside the building

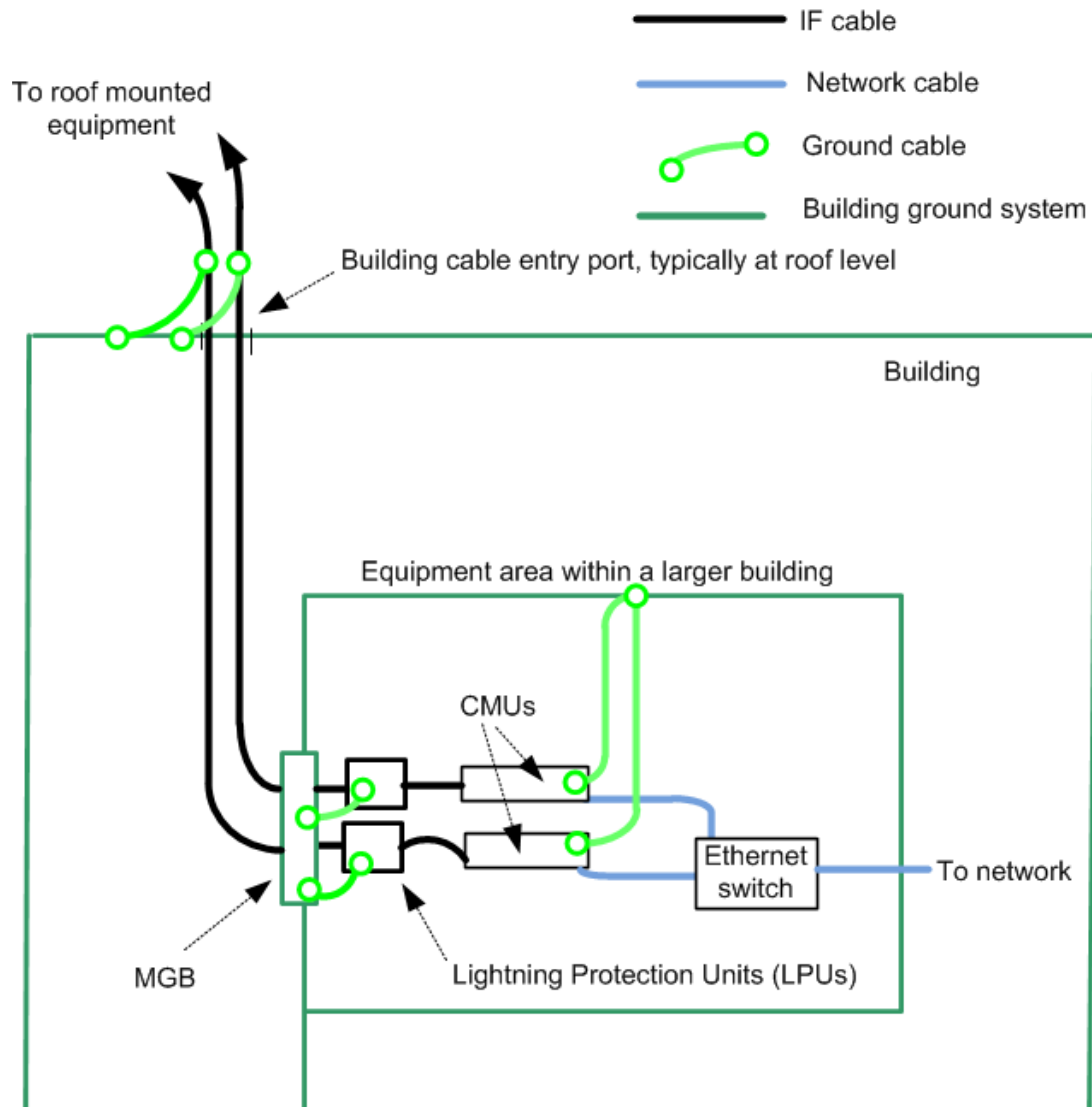
Inside multi-story or high rise buildings (Figure 41), ensure that the installation meets the following requirements:

- The IF cable shield is bonded to the building grounding system at the entry point to the building.
- The IF cable shield is bonded to the building grounding system at the entry point to the equipment area.
- An LPU is installed within 600 mm (24 in) of the entry point to the equipment area.

Figure 41 Grounding and lightning protection inside high building



In a 1+1 HSB protected end, prior to connecting CMUs via the protection interface, connect the front panel ground stud of both CMUs to a common ground (Figure 42).

Figure 42 Grounding and lightning protection inside high building (protected end)

Protection requirements for the IRFU

**Note**

Applies to IRFU deployments only.

Ensure that all IRFU installations meet the following requirements:

- The CMU and IRFU are grounded at their chassis bonding points to the building grounding system (Figure 43).
- The waveguide and antenna are grounded according to their manufacturers' instructions.

Figure 43 Grounding requirements for the IRFU and CMU

