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PoE Switch Transmission Distance



Overview

The standard PoE switch distance limit is 100 meters, as defined by Ethernet transmission properties.

Key Takeaways

The standard PoE switch transmission distance is up to 100 meters (328 feet), but with high-quality cables, extenders, or fiber solutions, it can be extended significantly.Standard Distance Limit

PoE (Power over Ethernet) switches transmit both data and electrical power over a single Ethernet cable. According to IEEE standards (802.3af, 802.3at, 802.3bt), the maximum distance for reliable PoE transmission is 100 meters (328 feet), which aligns with standard Ethernet cabling limits . Exceeding this distance can cause voltage drops, power loss, and signal degradation, potentially leading to unstable device operation or network disconnection .

Factors Affecting Transmission Distance
• PoE Standard:
• 802.3af (PoE): Up to 15.4W per port, 100 meters maximum.

• 802.3at (PoE+): Up to 30W per port, distance remains 100 meters.

• 802.3bt (PoE++ Type 3/4): Up to 60–100W, but higher power can reduce practical distance due to voltage drop .

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• Cable Quality:
• Solid copper Cat5e, Cat6, or Cat6a cables perform better than copper-clad aluminum (CCA) or low-quality cables. High-quality cables can sometimes extend effective transmission to 120–200 meters under optimal conditions .

• Environmental factors like temperature can further reduce effective distance; for example, high temperatures may reduce transmission by 15% .

• Device Power Requirements:
• Devices with higher power demands may experience reduced effective distance due to voltage drop along the cable .

Extending PoE Distance

Several methods allow PoE deployment beyond the standard 100 meters:

• PoE Extenders: Inline devices that regenerate both power and data, allowing multiple 100-meter segments to be chained for longer distances .

• Fiber Optic Conversion: Ethernet signals are converted to fiber for long-distance transmission (kilometers), then converted back to Ethernet with PoE delivered at the endpoint using PoE injectors or splitters .

• Long-Distance PoE Switches: Some industrial or specialized PoE switches support extended modes, reducing port speed or using intelligent power management to reach 200–250 meters .

• Cascading Switches: Deploying multiple PoE switches in series can extend network reach, though each segment should remain within 100 meters to maintain signal integrity .
Practical Recommendations
• Use high-quality, solid copper cables to maximize distance and minimize voltage drop.

• For distances beyond 100 meters, consider PoE extenders or fiber media converters.

• Evaluate the power requirements of connected devices to ensure sufficient delivery over longer runs.

• In industrial or outdoor environments, specialized long-distance PoE switches can provide stable operation up to 250 meters or more . By understanding these factors, you can design a PoE network that reliably delivers both power and data to devices, even over extended distances.

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The PoE switch has an Ultra PoE Network chipset that can transmit data up to 300 meters at 100 Mbps and up to 800 meters at 10

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Long Range PoE+ Solutions

The Edimax Long Range PoE+ Series Switch features flexible and selectable DIP switches for separating PoE ports. Select to

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These switches integrate PoE and fiber optics, providing power and data transmission over long distances. Know

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What''s more, since 802.3af/at only supports data transmission at a maximum distance of 100m/328ft, when using a

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