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SUMMARY

Grounding and lightning protection are critical for keeping a wireless network performing 100 percent of the time. Electrical surges within the network can cause significant damage and expense if not properly addressed.

PROBLEM

Many technicians and installers are not familiar with proper grounding techniques or they take shortcuts to save time and money. The result is a poorly performing grounding system which won't show any faults until it's too late.

SOLUTION

The proper design of a grounding system is critical and starts with testing to identify the site's resistance ground. In most cases, resistance of 5 ohms or less is required for proper grounding. If that threshold is not met, additional design elements, including soil enhancement, must be used.

Four primary categories must be fully addressed to ensure a properly operating ground system that will protect a site:

RF SURGE PROTECTION

RF cables are highly conductive and can quickly and easily draw a surge to the heart of your wireless network. Proper grounding techniques require taking any surge off both the inner and outer conductors.

Products: Surge arrestors, grounding kits, ground buss bars, arrestor trapeze kits.

GROUNDING RING

A properly functioning grounding system begins with the grounding ring, the centralized network for quickly dispersing unwanted energy away from the site. Buried in the ground surrounding the site, all components of the grounding system are connected to the ground ring, including the external infrastructure.

Products: Exothermic molds and weld metal, ground wire, ground rods.

INTERNAL SHELTER GROUNDING

Proper grounding inside the shelter is a critical last line of defense from an electrical surge. Similar to the external grounding ring, a grounding halo is installed around the interior of the shelter. All active components are grounded to the racks or cabinets that secure them, with all racks and cabinets being connected to the grounding halo.

Products: Ground wire, ground lugs.

AC PROTECTION

Electrical impulses resulting from lightning and 'dirty' power can cause surges that harm sensitive network equipment. Proper grounding of all AC at the exterior of the building and again at the connection of the equipment to AC is critical to ensure the highest level of protection.

Products: AC surge protection, breaker boxes, line conditioners.

REAL WORLD EXAMPLES

Situation: A value-added reseller (VAR) had installed a small ISP on an old tower that was not properly grounded. During an unusually busy summer storm season, the access point failed and needed to be replaced three times. The warranty on the AP was voided due to lack of lightning protection, so the VAR had to replace the unit for free.

Problem: The VAR was renting space on a tower he assumed was properly grounded, when in fact the tower owner neglected this protection in order to save money.

Solution: The VAR grounded the tower with a ground rod kit. Then, he added a tower-mounted ground bar and cable grounds to help protect the cable runs. Inside the shelter, he added a cable surge arrestor. Costs were kept to a minimum and the site has now gone one year without damage.

Situation: A local police department had a tower and radio for dispatching 911 calls. The equipment was built with proper grounding and surge protection in place.

Problem: Due to the tower's high elevation, it received lightning strikes almost weekly. Some were so powerful that they overcame the grounding prevention and damaged costly equipment. The police needed a way to reduce the number and severity of strikes.

Solution: Static electricity can build up around sites and act as a magnet for lightning. The customer installed a static discharge unit, which reduced accumulated static buildup, helping to prevent lightning from striking the tower.

Situation: A cell carrier uses copper grounding bars on its sites to protect against damage from lightning. At many of the sites, it is experiencing a high rate of theft of copper grounding hardware due to the high cost of copper.

Problem: The sites are experiencing increasing rates of theft from criminals who steal copper and sell it for its high recycling value. The sites must be constantly monitored, and techs frequently check the site for missing hardware.

Solution: On all sites, the carrier installed theft-deterrent copper ground bars, which are made of tinned copper and stamped with the message 'Stolen—Do Not Recycle.' Additionally, ground bar lock boxes were installed on the sites that had been most frequently targeted in the past. The result was a virtual elimination of copper theft.



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