

# Managing for the threat from Electromagnetic Interference

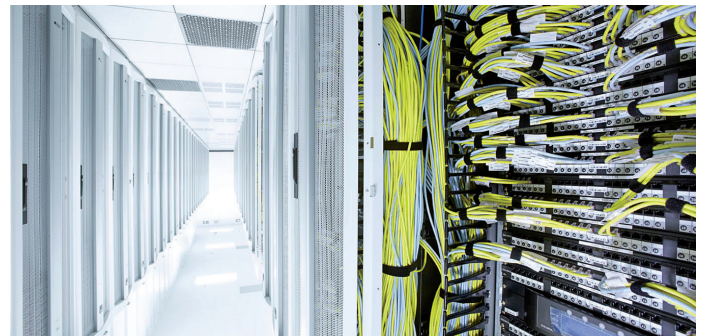
Data centers are particularly vulnerable to attack by electromagnetic pulse (EMP) or electromagnetic interference (EMI). Brian Groh, Director of Global Account Sales for ABB's Data Center Industry Segment offers his expertise on how to deal with it.

## Why should data center operators be worried about EMI or EMP?

EMP is simply a burst of energy, and at a low level the resulting interference is something we experience all the time. But the interference that we're talking about here is so potent it not only disrupts communication, it damages electronic equipment. You can build a radio-frequency weapon into a carry-on suitcase. It will be silent, won't leave a trace, and can put out enough energy to destroy electronics 100 feet away. Such weapons emit a pulse that essentially delaminates the chips in modern electronics and causes them to short-circuit. Testing indicates that data is secure against EMP once it's been stored to a magnetic disk. But anything electronic is susceptible.

## Of the many things data center operators must consider, how real is this threat?

It hasn't been a high priority for most people, but there have been documented EMI attacks. A report from the U.S. Navy cited an intentional one at a Netherlands bank by a man who had been denied a loan. There have also been unintentional ones; like pipeline control disasters that resulted when a Navy ship left its high-power radar on while in port. And traditional reliability measures don't address the risk. The Uptime Institute's Tier 1-4 reliability classifications are based on uncorrelated failures: If the power goes out, the UPS (uninterruptible power supply) keeps everything up until the generators take over.



But EMP creates a correlated failure; the same problem that shuts down transformers will ruin the UPS and prevent the generator from turning on. The concern is real enough that the Uptime Institute is developing "operational sustainability" standards.

A couple years ago, there were about 50 EMP-proof data centers in the United States – things like large financial centers. It takes a big effort to be able to claim a data center is EMP-proof.

But if you have a data center that's critical to your operations – and who doesn't? – there are some reasonable measures to protect against electromagnetic threats.



### What are they?

- First, distance is your friend. Anything portable will have a range limited to a couple hundred feet. So the best thing is to place the data center away from parking lots, roads and easy points of access. If this isn't practical, limit access to the widest perimeter possible. Screen bags coming in, and don't offer access to rooms above and below your data center.
- Second is shielding and filtering. You may not have to shield everything. The goal is to keep critical systems running, and in any data center these should already be identified. Critical servers can be isolated in shielded racks, along with filtering of power, communications and ventilation access to those racks. High voltage transformers and transmission lines can also be affected by EMI. This is a more common concern for electric utilities. But transformers are costly and take a long time to replace, and transmitted power quality is a big concern; so some very large data centers may find it worthwhile to protect onsite substations. ABB offers technologies for this.
- Third is to virtualize systems. More companies are running multiple data centers in a cloud topology – enabled by the metering, monitoring, managing and reporting capabilities of DCIM (Data Center Infrastructure Management) systems such as ABB's Decathlon. If your data centers are truly replicated and accessible across geographies, then you don't necessarily need to protect the physical data center. In an attack, you would lose local equipment, but operations would continue.

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