SIEMENS

Federal Communications Commission

White Paper

Siemens is a strong supporter of the National Electrical Code® and state and local codes that are based on it. We advocate for the proper installation of electrical products that comply with the NEC® and applicable standards.

A requirement for the installation of Arc Fault Circuit Interrupters in dwelling units first appeared in the 1999 edition of the NEC®. Since that time, the areas in a dwelling unit where AFCI protection is required have gradually expanded and now include most areas in a dwelling unit.

AFCIs are a proven technology intended to detect and interrupt arcs below the current level that can be interrupted by standard circuit breakers. They operate by looking for signal characteristics that may indicate that an unwanted arcing is occurring on a branch circuit or in a cord connected to it. One of the characteristics that some AFCIs look for is high frequency electrical "noise".

Siemens is trying to reduce the incidence of unwanted tripping of AFCI circuit breakers through various means. One cause of unwanted tripping is the use of noncompliant LED drivers or electronic transformers. It is incumbent on all manufacturers to produce products that meet applicable standards and are suitable for their intended use. In the case of luminaires intended to be installed in dwelling units, they must comply with the FCC RF emissions regulations.

The Electronic Code of Federal Regulations (the law) can be found here:

https://www.ecfr.gov/cgi-bin/text-idx?SID=c1212b18d3c585d10d7b64809159931c&mc=true&node=pt47.1.15&rgn=div5#se47.1.15_13

Section 15.1(a) identifies the scope of this part. "This part sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license." LED lighting devices intentionally generate RF energy via electronic power conversion or digital circuitry, but are not intended to radiate RF energy by radiation or induction and thus they are classified as unintentional radiators according to the FCC rules.

Section 15.3(z) Identifies an unintentional radiator as "A device that intentionally generates radio frequency energy for use within the device or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation nor induction." LED drivers/ballasts are unintentional radiators as they are not meant to emit RF, which is why drivers/ballasts are typically in some type of box.

The FCC OET (Federal Communications Commission Office of Engineering and Technology) Laboratory Division published a notice on June 17, 2016 that can be found here:

https://apps.fcc.gov/kdb/GetAttachment.html?id=K0pZdRE7biF3aggO4XZ8cw%3D%3D&desc=640677%20D01%20RF%20LED%20LIGHTING%20v01&tracking_number=20518

This notice discusses Radio Frequency LED Lighting Products, or RF LED lighting and clarifies how the FCC rules apply to these products. "RF LED lighting devices employ either an independent or an integrated electronic driver that operates at RF frequencies similar to those used in digital electronic products. As such, RF LED lighting devices are subject to the Part 15 rules for unintentional radiators, and are subject to the "verification" equipment authorization procedure. These devices are required to meet the line-conducted and radiated emissions limits in Sections 15.107 and 15.109, respectively." Also stating, "Manufacturers and users should therefore note that lighting devices are required to cease operation, if harmful interference occurs."

Further, OET Bulletin No. 62 published in December 1993 describes "What happens if one sells or imports non-compliant digital devices?" on page 9.

https://transition.fcc.gov/bureaus/oet/info/documents/bulletins/oet62/oet62rev.pdf

As explained earlier, the form of authorization that is required for a digital device depends on how the device will be marketed. The FCC rules are designed to control the marketing of digital devices and, to a lesser extent, their use. If someone

purchases a non-compliant digital device, uses it, causes interference to authorized radio communications, and is the subject of an FCC interference investigation, the user will be told to stop operating the device until the interference problem is corrected. However, the person (or company) that sold this non-compliant digital device to the user has violated the FCC marketing rules in Part 2 as well as federal law and may be subject to an enforcement action by the Commission's Field Operations Bureau that could result in one or more of the following:

- forfeiture of all non-compliant equipment
- $100,000/$200,000 criminal penalty for an individual/organization
- a criminal fine totaling twice the gross gain obtained from sales of the non-compliant equipment
- an administrative fine totaling $10,000/day per violation

Per the OET Bulletin, "digital devices fall into two categories -- Class A and Class B. Class A digital devices are ones that are marketed exclusively for use in business, industrial and commercial environments. Class B digital devices are ones that are marketed for use anywhere, including residential environments."

As Siemens continues its efforts to reduce unwanted tripping of AFCI circuit breakers, we highly encourage lighting manufacturers to comply with the law and manufacture lighting devices that meet the FCC RF emission regulations for products intended for use in residential applications. We also highly encourage our customers to purchase and install FCC compliant lighting devices for two benefits – decrease unwanted tripping and avoid possible consequences by the Commission's Field Operations Bureau as described above.

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