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Florida Power & Light

Advanced Meter Infrastructure & Distribution Automation

RF Exposure Survey

Report generated date: June 10, 2011
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1 Executive Summary

This report demonstrates that Smart Meters and supporting radio devices used by Florida Power and Light (FPL) and examined in this report **meet all safety requirements detailed by the Federal Communications Commission and other regulatory agencies**. FPL has contracted with Sitesafe, Inc. (Sitesafe), an independent radio frequency (RF) regulatory and engineering consulting firm, to evaluate the RF emissions from Smart Meters including their associated communication network and the network for the Distribution Automation (DA) system. Sitesafe measured the power density of the wireless components of both these networks and compared those measurements to levels regulated by the Federal Communication Commission (FCC). The power density of all the equipment tested well below the regulatory limits.

Sitesafe conducted the measurements at FPL's Springtree substation, surrounding repeater installations, and a nearby maintenance yard on November 15, 2010. Additional measurements were made at private residences on November 16, 2010. Maximum RF levels were recorded at different distances with respect to the wireless transmitters. Levels were recorded outside the residence near the active meter and at various locations inside a home. This report contains a detailed summary of the measurements and the findings of that study.

This study evaluates the Silver Spring Smart Energy Platform wireless modems deployed in both Smart Meter and DA networks. The Smart Energy Platform modems operate in a mesh network to transmit stored power usage readings and receive control commands. The radios operate in the 915 MHz Industrial, Scientific and Medical (ISM) band. The smart meters also include a ZigBee wireless modem to communicate with Home Area Network (HAN) devices.

Measurements were made in the 915 MHz band where the Smart Energy Platform operate and the 2.4 GHz band where the ZigBee modems operate.

The peak power density measured for any device operating on 915 MHz at a horizontal distance of one foot is 92.0 microwatts per centimeter squared ($\mu W/cm^2$)(15.1% of the Maximum Permissible Exposure - or MPE - value) and at a horizontal distance of ten feet is 4.5 $\mu W/cm^2$ (0.7% of MPE). These measurements represent an Access Point (AP) mounted approximately thirty feet above ground. Peak levels are the instantaneous or maximum levels from the devices.

We draw attention to the duty cycle of the meter units in the 915 MHz band. Because these units transmit approximately 2 minutes per day, a 0.134% duty cycle, these peak measurements are very conservative, or high representations of the RF emissions. Even assuming a worst case transmit time of 1%, the maximum exposure at 915 MHz at one foot is less than 1 $\mu W/cm^2$ (0.2 % of MPE). *See* Section 3.5 Considering Duty Cycle for details.

The FCC most stringent exposure requirement at this frequency is the general public limit, (610 $\mu W/cm^2$). The exposure at one foot from a Smart Energy Platform modem is

approximately 600 times less than the Maximum Permissible Exposure (MPE) limit. At ten feet it is at least 13,000 times below the MPE limit.

The cumulative effect of multiple meters mounted at the same location is simply a linear addition of power. Even if a person could get within 1 foot of 100 Smart Meters the exposure would be 14.1% of the maximum permissible exposure limit. Therefore it is physically impossible for multiple meter installations to exceed the MPE levels.

The study confirms the significance of directionality of the emissions by contrasting the measurements recorded outside the residence three feet in front of the meter (measurement 149) and inside the residence two feet behind the meter (measurement 155). These measurements show a decrease in the signal levels inside the residence compared to outside the residence going from 40 times below the MPE limit to over 6,000 times below the MPE limit. The decreased measurement inside the residence is primarily due to the directionality of the smart meter antenna and RF emission pattern, the shielding of the meter enclosure, and attenuation from the building materials

Finally, compared with other commonly found radio frequency devices such as cellular and cordless phones, WiFi computer networks and microwave ovens, the Smart Meters create very low RF levels.