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ATTACHMENT A



Federal Communications Commission  
Washington, D.C. 20554

August 6, 2010

Ms. Cindy Sage  
Sage Associates Environmental Consultants  
1396 Danielson Road  
Montecito, CA 93108-2857

Dear Ms. Sage:

Thank you for your letter of March 15, 2010, in which you request that we review compliance with FCC radiofrequency (RF) exposure limits for the "Smart Meter" technology being implemented by utilities across the country. In particular, you expressed concern about multiple adjacent Smart Meter installations used to service multiple dwellings such as condominiums, and the effect of increased data traffic on exposure from collector or controller units.

The FCC Equipment Authorization (EA) program in the Office of Engineering and Technology has taken a very conservative approach to RF exposure compliance for low-power network devices such as Wi-Fi base stations and Smart Meter transceivers. For such devices that are not expected to be used close to the body, it is generally unnecessary to perform routine specific absorption rate (SAR) evaluations as field strength or power density is a sufficient and appropriate measure of exposure. The maximum field strength at a distance can be derived from the effective radiated power (ERP). Also, FCC field strength limits, like the SAR limits, are time-averaged. Accordingly, for devices that will not be used within 20 centimeters of the body, we rely on the "source-based" time-averaged ERP and require that it be less than our specified values of 1.5 or 3 watts, depending on frequency,<sup>1</sup> in order to ensure compliance with our exposure limits. This does not imply that FCC exposure limits will be exceeded at distances less than 20 cm, but only that detailed evaluation of the SAR is not required if the 20 cm separation distance can be maintained.

It is useful in considering this issue to recognize that the power level specified on the Grants of Equipment Authorization issued by the EA program is the peak power as this is the power relevant to interference concerns. For exposure evaluations, however, the average power is relevant, which is determined by taking into account how often these devices will transmit. Since the purpose of these devices is to provide very infrequent information they transmit in occasional bursts. Thus, for exposure purposes the relevant power is maximum time-averaged power that takes into account the burst nature of transmission, and based on the typical maximum time-averaged transmitter power for many of these devices, they would generally be compliant with the local SAR limit even if held directly against the body.

With respect to multiple adjacent Smart Meter installations, since the antennas for each device are mounted individually on each utility meter, the separation distance from people for most of the transmitting antennas is relatively large compared to 20 cm and the

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<sup>1</sup> See Section 2.1091(c) of the FCC rules.

meters' contributions to the total potential exposure at any location are small, as only the nearest few transmitters can add meaningfully to the total. Further, as a practical design matter, when several of these meters are placed in a cluster, they have to communicate with a single controller. In order to ensure that the controller receives the information properly, only one transmitter can communicate with the controller at a time, eliminating the potential for exposure to multiple signals at the same time.

The general issue of cumulative exposure from an arbitrary group of transmitter installations or from all transmitters distributed in the environment can appear to be complex, but as discussed, the need for orderly communications requires that a few sources normally dominate. In addition, the exponential decrease in signal strength over distance and additional signal losses due to non line-of-sight conditions for distant sources ensures that only the contributions of nearby transmitters are significant.

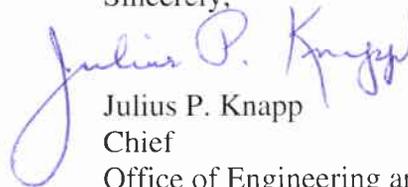
In summary, compliance for Smart Meters is determined according to the operating and installation requirements of each type of meter during equipment certification, and is based on the maximum transmission duty cycle for the device, including relay functions. Necessary installation requirements to maintain compliance for each meter are specified in the Grant. Irrespective of duty cycle, based on the practical separation distance and the need for orderly communications among several devices, even multiple units or "banks" of meters in the same location will be compliant with the public exposure limits. These conditions for compliance are required to be met before a Grant can be issued from the EA program and auditing and review of Grants is a routine function of the FCC laboratory.

With respect to interference to medical devices, which you also raise in your letter, Smart Meters typically operate under Part 15 of the FCC Rules. Those rules specify power limitations to avoid interference. The Smart Meter wireless technologies used today are not significantly different from Wi-Fi devices, cell phones and other typical consumer products. Certain medical devices may need specific precautions in many other environments; these are generally considered during FDA approval of the individual medical device.

I hope that this information will be helpful. In addition, some technical information on the subject has been developed by the Electric Power Research Institute (EPRI) and we have enclosed that information for reference.

Please know that the FCC is continually monitoring the issue of RF exposure and related health and safety concerns, both in the general terms of the continuing propriety of its regulations, and in individual cases where substantive concerns are raised.

Sincerely,



Julius P. Knapp  
Chief

Office of Engineering and Technology

# ATTACHMENT B



Federal Communications Commission  
Washington, D.C. 20554

April 21, 2011

The Honorable Lynn C. Woolsey  
U.S. House of Representatives  
1050 Northgate Drive, Suite 354  
San Rafael, California 94903

Dear Congresswoman Woolsey:

This is in reference to your letter on behalf of the EMF Safety Network ("EMF"). EMF alleges that "Smart Meters" installed by Pacific Gas and Electric (PG&E) violate the FCC equipment authorization, which included conditions regarding RF exposure. As explained below, we have no information before us that would warrant action against PG&E or the equipment at issue.

As general background information, the FCC's exposure limits are derived from recommendations for human exposure to RF fields by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and the National Council on Radiation Protection and Measurements (NCRP), and by the U.S. Environmental Protection Agency (EPA), the Food and Drug Administration (FDA) and other federal health and safety agencies. These recommendations were developed by scientists and engineers with extensive experience and knowledge in the area of RF biological effects and related issues. The exposure limits were developed to ensure that FCC-regulated transmitters do not expose the public or workers to levels of RF energy that are considered by expert organizations to be potentially harmful.

In the case of Smart Meters, the FCC has no data or reports to suggest that exposure is occurring at levels of RF energy that exceed our RF exposure guidelines. In contrast, the California Council on Science and Technology recently released a report<sup>1</sup> that found that "[s]cientific studies have not identified or confirmed negative health effects from potential non-thermal impacts of RF emissions such as those produced by existing common household electronic devices and smart meters." With no indications that the Smart Meters in question might not comply with FCC exposure limits we have no reason or authority to order them removed or their operation discontinued.

RF measurements reported by others indicate that Smart Meters produce exposures of no more than 65% of the FCC limit at the face of the meter when programmed to transmit continuously. The devices normally transmit for less than one second a few times each day and consumers are normally tens of feet or more from the meter face, so the actual exposures are typically thousands of times less than this "worst case" measurement condition. The actual separation and operating conditions under which various Smart Meter devices can maintain compliance are reflected in the test reports for each device.

<sup>1</sup> "Health Impacts of Radio Frequency from Smart Meters," January 11, 2011. Available at: <http://www.ccst.us/news/2011/20110111smart.php>

EMF Safety Network asserts that PG&E has violated four conditions of its equipment authorization in particular. They are: (1) professional installation; (2) a separation distance of at least 20 cm from all persons; (3) no collocation or operation in conjunction with other transmitters; and (4) end-users must be provided with antenna installation and transmitter operating conditions for satisfying RF exposure compliance.

The grants of equipment authorization routinely list the four conditions cited by EMF for the broad class of transmitters that include most Smart Meters. As a practical matter, as explained below, adherence to those conditions is not necessarily required for Smart Meters to achieve compliance with our RF exposure guidelines. Smart Meters are generally installed professionally by the utility company and they own the equipment. Accordingly, the utility is responsible for ensuring compliance with any installation conditions listed on the grant of equipment authorization.

The 20-centimeter (7 7/8 -inch) separation distance that is specified on the grant of equipment authorization is a conservative measure and the test reports generally demonstrate that the devices in question would comply at lesser distances. Indeed, the radiating structures (antennas) associated with the devices (from which the 20-centimeter distance is to be measured) lie inside the electric meter enclosure, so a *de facto* minimum distance from that structure is always maintained. Because of this minimum separation and because of the low duty cycle associated with these smart meters, we have no information before us that would suggest that the devices would not be in compliance at lesser distances. Moreover, recent measurement data from EPRI<sup>2</sup> indicate that Smart Meter devices do not exceed our guidelines even when a person touches the meter case.

Similarly, the requirement that the device not be "collocated" with other transmitters is a reference to antennae in very close proximity to each other — a proximity that is not physically possible given the separation provided by individual meters' enclosures. Given the brevity and infrequency of transmissions described above, there is no reason to suspect that a device is likely to cause exposure in excess of our guidelines even when collocated with similar devices. The suggestion that "manufacturers have tested [each of the two] antennas [in the Silver Spring Networks device] in isolation and individually, and not in combination" is incorrect, inasmuch as the two internal transmitters are approved as "composite" devices, and we confirm that they have been evaluated with the two transmitting antennas operating at the same time. We have no information before us that would suggest that the device would not be in compliance when collocated with numerous similar devices.

With regard to the provision of information to end users and installers, this condition is typically met by the manufacturer placing appropriate cautionary statements in the installation manual. The manuals are often not available to the public, since the "end user" in this case is the utility, but they are reviewed by FCC staff to assure compliance with this condition. We have

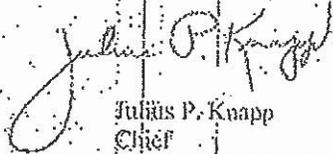
<sup>2</sup> Electric Power Research Institute, "An Investigation of Radiofrequency Fields Associated with the Itron Smart Meter," December 2010.  
[http://www.epri.com/portal/server.cfm?nav=CommunityPage&cached=true&equipment=QbiMtr&parentid=2&control=SetCommunity&CommunityID=404&RaiseDocID=0000000001021126&RaiseDocType=Abstract\\_id](http://www.epri.com/portal/server.cfm?nav=CommunityPage&cached=true&equipment=QbiMtr&parentid=2&control=SetCommunity&CommunityID=404&RaiseDocID=0000000001021126&RaiseDocType=Abstract_id)

double-checked installation manuals for the devices mentioned in the EMF letter, and all have appropriate statements therein.

Finally, with regard to the request for copies of grants of equipment authorization, that information, typically including copies of laboratory test reports supporting the grant, is available from our website at: <http://www.fcc.gov/oet/ca/fccid/>

I hope that this information will be helpful.

Sincerely,



Julius P. Knapp  
Chief  
Office of Engineering and Technology