**EPRI Comment: Sage Report on Radio-Frequency**

**(RF) Exposures from Smart Meters**

**February, 2011**

**Sage Associates Response**

**February 14, 2011**

SUMMARY

EPRI (The Electric Power Research Institute) conducts research on issues of interest to the electric power industry, and is largely funded by electric utilities in the United States. It has produced a comment dated February 2011 on the Sage Associates Smart Meter RF Assessment (January 1, 2011).

We are gratified that this organization has detailed its opinions about the technical approach and conclusions of our Report. It allows for a fair and open discussion on whether our Report has properly addressed potential FCC violations for uncontrolled public access, conducted the correct technical analysis, and whether the conclusions of the Sage Report are reasonable. EPRI’s comment validates that the Sage Report has done so.

EPRI has presented no evidence of technical errors in the approach or calculations in the Sage Report, so the public and policy makers can rely on our conclusions and recommendations.

EPRI did not present calculations using the FCC OET Bulletin 65 equations that are fundamental to predicting RF levels. Thus, no apples-to-apples comparison can be made from their selective presentation of examples of RF levels. EPRI gave none of the basic information needed to check their figures. They provided no comprehensive assessment using the same FCC OET 65 equations, nor the range of possible duty cycles or reflection factors, nor specifying what power output, gain, effective radiated power (ERP) or other critical factors were used in their selected examples.

The FCC’s OET Bulletin 65 Equations provide the correct way to predict RF power density levels from smart meters, in advance of deployment.

Testing laboratories in the United States have used FCC OET Bulletin 65 equations to meet FCC compliance testing requirements.

The FCC has issued Grants of Authorization based on FCC OET 65 testing, including RF Exposure studies based on FCC OET 65 predictions to validate manufacturer requests for FCC compliance.

Such Grants of Authorization are “the piece of paper” that demonstrate the FCC has certified a particular smart meter to comply with FCC public safety limits, based on test results submitted by certified laboratories. Deviations in the installation or operation of smart meters may result in non-compliance with the limitations on the Grant of Authorization. Such Grants are relied upon by other governmental agencies, such as public utility commissions, who hold the FCC responsible for compliance determinations.

EPRI’s comment letter mischaracterizes information presented in the Sage Report, and then attacks its own mischaracterizations.

For Example

The Sage Report did properly apportion the power density contributions of each antenna to ERP calculations, as is documented on page 32-33 of the Report.

EPRI mischaracterizes the Sage Report by wrongly attributing that “*duty cycle need not be taken into account, and that continuous exposure should be assumed*.” This is incorrect (page 13, #1). The Sage Report provides comprehensive computer modeling results for duty cycles between 1% and 100%, at ten percent increments (see Tables A-1 through A16; see tables A17-A48). Time-averaging and reflections for 60% and 100% reflections are provided in the report, documented in the Methodology Section and both tables and text analysis are included throughout the Report.

Absent from EPRI’s comment is an acknowledgement of the FCC’s own requirement to use a 100% duty cycle where the public cannot be excluded. This is specifically discussed in the Sage Report on pages 22 -23 and 31-36.

*“It is important to note that for general population/uncontrolled exposures it is often not possible to control exposures to the extent that averaging times can be applied. In those situations, it is often necessary to assume continuous exposure.” FCC Bulletin OET 65, p, 10*

EPRI’s comment (page 13, #2-4) is incorrect in that the Report did not take into account a reasonable approximation of distance from multiple meters. The contributions of multiple meters were derived by considering the distance and angle of each of the multiple meters from the reference point. Power density calculations in accord with FCC OET 65 were then used for multiple RF source predictions. Multiple meters were weighted according to their increasing distance from the point of occupied space in all calculations.

Having misrepresented key sections of the Sage Report, EPRI then tries to shift the discussion off-track and substitutes other methods of testing of smart meters that are based on either very low power density levels (limited number of measurements with no idea of duty cycle, reflections or other important factors) or nonsensical applications such as SAR, which is a method for testing cell phones and personal wireless devices, which smart meters are not.

EPRI comments at length on its views on reflection factors. The Sage Report includes two reflection factors specified by FCC OET 65 and two additional reflection factors that take into account newer, published scientific studies that show greatly increased RF power density can occur where there is highly reflective surface area. The Hondou studies (Hondou, 2002 and Hondou, 2006) support using higher reflection factors, as discussed in the Report. These studies find up to 1000 times or 2000 times the RF levels can occur in certain, highly reflective environments but would not be predicted using only the the more conservative FCC OET 65 equations.

The Sage Report nonetheless did not use reflection figures as high as measured in Hondou, 2002 or Hondou, 2006. The Sage Report uses only part of this predicted increase. We used 1000% (121 times rather than 1000 times) and 2000% (441 times rather than 2000 times) that of the Hondou studies.

EPRI is free to opine about what it considers reasonable, but provides no evidence that some interior environments cannot contain highly reflective environments that will increase interior RF levels. Further, the reader can read and reason. Some members of the public and decision-makers can decide which factors are reasonably applied, and draw conclusions accordingly. At least the Sage Report provides a clear and technically correct basis over the range of possible RF levels from smart meters.

It should be required of the utilities deploying the meters to do likewise (provide comprehensive, systematic RF power density predictions using all relevant factors, in run-out tables for power density versus distance, at various reflection factors and all duty cycles, including 100% in accord with FCC OET 65).

Neither the utilities involved, nor the CPUC, Division of Ratepayer Advocates or EPRI have provided their own studies on RF power density and compliance findings using FCC OET Bulletin 65 and specified equations, and adhering to the same requirements contained in that protocol. If they had done so, the calculations would be very similar or exactly that published in the Sage Report. None of these groups has found technical flaws in the Sage Report - which properly applied the FCC OET Bulletin 65 formulas. The Sage Report found many instances where wireless meters will violate FCC public safety limits in the manner they are installed and operated, and no evidence has been offered that demonstrates its conclusions to be in error.

For every type of smart meter installed with a utility’s service area, this includes but is not limited to the manufacturer, the FCC Id number, the make and model information, a copy of the RF Exposure Report from the testing lab and Grant of Authorization certified by the FCC. It includes the operating frequency for each antenna (or range of frequencies), antenna pattern characteristics for each antenna, the maximum power output, maximum antenna gain, maximum duty cycle mechanically possible considering all signals that may be transmitted through it (this includes the meter itself, piggybacking of signals from nearby meters, power transmitters installed on appliances), which antennas can transmit simultaneously, the dimensions of each antenna within the meter and the actual ‘as-built’ separation of each antenna, and other key factors critical to independent evaluation of RF emissions and exposure levels.

EPRI points out that in 2005, the IEEE (the Institute for Electrical and Electronics Engineers, Inc) adopted new measures to relax existing public safety limits, including those for RF exposures to the eyes and testes. The IEEE also adopted a new 10-gram volume of tissue, replacing a one-gram volume of tissue to allow dissipation of thermal energy (SAR). IEEE’s recommendation was to increase the tissue volume to 10 grams (a five-fold increase in allowable energy). It is notable that the FCC did not agree, and did not adopt these IEEE recommendations.

The public is not well served, nor do policy-makers have sufficient information on impacts and adverse consequences of an enormously costly new wireless technology without full disclosure of RF emissions and resulting exposures to families in their own homes, schools, public buildings, businesses, hospitals, libraries, shopping, entertainment and transportation.

The issue of health effects as presented by EPRI simply reflects their continuing view that there are divergent views. We agree with this, but underscore that industry and its close representatives and partners generally say they will only consider ‘*clear and consistent evidence to document a causal role of RF exposures in connection with human cancer or other disease endpoints’*. This is to be expected from industry.

But, policy makers must not just look after the interests of industry, but take good public health planning principles into account. When there is reasonable evidence for risks from new technologies, it is not in the public interest, nor the economic interests of the State to wait endlessly for all parties to agree there is “causal evidence or proof” position in order to take reasonable actions to protect public health. This is particularly true when considering the wisdom of widespread, involuntary public exposures to new technologies for which there is substantial evidence (but not yet proof) of possible health harm to millions of people. It could cost billions to fix in later years, result in economic harm to the State and its residents, and cause even deeper dissatisfaction with the State’s regulatory agency performance.

No positive assertion of safety can be made by the parties involved in this issue without better, independent information. Currently, the data made available by the utilities that are installing smart meters is non-existent, piecemeal and without sufficient basis to verify. In addition, there are different types of meters being deployed, so a full accounting of each one should be public information.