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**Diplomate of the American Board of Family Practice**

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**To the honorable Boardmembers hearing the Smart Meter discussion on July 5<sup>th</sup>, 2011:**

**As a health care provider, boarded in Family Medicine with a special interest in environmental medicine, I have become increasingly alarmed over the numbers of patients coming to me with Idiopathic Environmental Intolerance (Electromagnetic field attributed symptoms), or IEI-EMF symptoms. I am treating one to three new cases a week since SDG&E began to install the Smart Meters.**

The symptoms most often reported to health care providers and noted on health care questionnaires by such organizations as the CDC and World Health Organization include the following:

fatigue, concentration difficulties, sleep disturbances, weariness, crankiness, obliviousness, headache, “gone” feeling, vertigo, increased heart rate, depressed mood, pressure in head, exhaustion, mood changes, pain in extremities, increased sensitivity to noise, equilibrium disturbances, increased sweating, twitching of the eyelids, impaired vision, conditions of fear, anxiety, itching, feeling of warmth inside head, faintness, increased sensitivity to medications and chemicals, nausea, loss of appetite, skin irritations, vomiting...(appearing in decreasing order of frequency of reporting).

**None of my patients report all of these symptoms. Dr Sears in her report to the Canadian Government made mention of the genetic variations (single nucleotide polymorphisms) in these individuals that contribute to the development of the symptoms and the mechanism of actions of the physiological responses experienced. “People may be genetically pre-disposed to sensitivities. As a result of genetic polymorphisms, some bodies have less effective enzymes for detoxifying chemicals and metabolizing drugs. This is more prevalent in patients with multiple chemical sensitivity and in Gulf War veterans who became ill. Interestingly, these genes are also more common in children who developed leukemia (the very young are particularly susceptible because the immature liver has low enzyme levels). In multiple chemical sensitivity patients, a higher prevalence of a gene that has been associated with a biochemical basis for panic disorder has been found.**

**This review indicates that physical factors contribute to environmental sensitivities. There remain many unanswered questions regarding sensitivities and the interplay between**

**biochemical, neurological and psychological processes. It is important for society to come to a common understanding, in order to offer the most efficient, effective care to people with environmental sensitivities.” (Attachment #1)**

**I run the Genovations Detoxigenomics profile on my patients, and have enclosed a sample of the defects (snp's) to show you the pathway weaknesses that the clients have in common as discussed in the Sears report.**

Authors Cindy Sage and David Carpenter began their report of the harmful effects of our wireless technology with this paragraph--

“Exposure to electromagnetic fields (EMF) has been linked to a variety of adverse health outcomes that may have significant public health consequences [1–13]. The most serious health endpoints that have been reported to be associated with extremely low frequency (ELF) and/or RF include childhood and adult leukemia, childhood and adult brain tumors, and increased risk of the neurodegenerative diseases, Alzheimer’s and amyotrophic lateral sclerosis (ALS). In addition, there are reports of increased risk of breast cancer in both men and women, genotoxic effects (DNA damage and micronucleation), pathological leakage of the blood–brain barrier, altered immune function including increased allergic and inflammatory responses, miscarriage and some cardiovascular effects [1–13]. Insomnia (sleep disruption) is reported in studies of people living in very low-intensity RF environments with WI-FI and cell tower-level exposures [85–93]. Short-term effects on cognition, memory and learning, behavior, reaction time, attention and concentration, and altered brainwave activity (altered EEG) are also reported in the scientific literature [94–107]. Biophysical mechanisms that may account for such effects can be found in various articles and reviews [136–144].” (Attachment #2)

The physiologically induced pathology mentioned by Sage and Carpenter are only a few of the affects that have been reported in the scientific literature. The *Bio Initiative Report* has a nearly complete listing of the conditions as of 2007, but many more have been confirmed since then.

Dr Havas made one of the most easily understood presentations on the potential hazards of the harmful radiofrequencies. In her report to the San Francisco City Council in May of 2007, she points out many pertinent points that the California Public Utilities should take into consideration and stop the unsupervised installation of “Smart Meters” on the homes and apartments of California citizens:

“The Federal Communications Commission (FCC) Guideline is similar to the international guideline ICNIRP guideline and is based on short-term thermal effects. This guideline is based on the assumption that if microwave<sup>3</sup> energy does not heat tissue it is not harmful. This assumption is incorrect. Adverse biological effects have been documented at levels below federal guidelines and there are no federal guidelines for non-thermal effects, nor are there guidelines for long-term exposure. The technological developments and uses of wireless devices are running well ahead of the policy decisions necessary to ensure their safety.”

As shown in the prior graph from the Havas report in Figure 1, the guidelines established by the US and many industrialized nations known to be “industrial friendly” are too high to ensure the safety of the citizens of their countries. Since California has been a leader among states in Building Standards, Car Emissions, removal of toxic chemicals such as BisPhenol A (BPA), and other safety measures, I am confident that the City of Santa Barbara may want to petition

the State of California Public Utility Board to limit levels of radiation into the homes of the citizens of California.

Dr Havas went on to show a Spanish study regarding the symptoms created by exposure to the EMFs of Cell Phone Towers: (Attachment #3)

By the end of 2011, San Diego Gas and Electric will have deployed over 2.4 million meters if their website is correct. That is 2.4 million homes being irradiated with wi-fi frequencies continuously throughout the day with intermittent surges of radiation. According to the Dr Sears report and the work of Dr Johansson of Sweden, 3% of the population will be severely adversely affected by even these “low doses”, and 16% (Sears) to 35% (Johansson) will have moderate adverse affects or symptoms from this exposure of the emissions of the wi-fi, such as the “Smart Meters”. (Attachment #4)

Remember, these “Smart Meters” are on 24 hours a day, not like a phone put to the head to talk, or using a wireless computer to do homework and then closed down. Besides, most of my patients are so sensitive, they have to beg their neighbors (whose units broadcast all over the neighborhood) to turn their computer routers off so they can sleep (documented interference with the delta waves and melatonin suppression by wi-fi emissions on the human brain). They do not use cordless or cell phones, wireless computers, LED screens, fluorescent lighting, or other EMF generating devices due to the adverse effects on their health.

SDG&E will tell you the meters only beam a short, intense burst for milliseconds every 30 to 60 minutes to the mother board, but this is inaccurate and deceiving since the meter talks to the “smart” energy efficient appliances in the home every seven seconds to regulate the amount of energy consumption. They will also tell you that there will be no increase in the electrical costs, but this is incorrect since the meter reads the time of use constantly and puts any use from 10 a.m. to 6 p.m. at the highest usage rate, often doubling or tripling the monthly bill as you have seen in the complaints to the State PUC. The energy is not constant, like a cordless phone or wi-fi baby monitor, but pulsed in bursts, which has been shown since the 1970’s to be much more dangerous to human health than a continuous flow of energy.

I have recently learned of a study by Dr Deitrich Klinghardt in 2007 in Seattle, where he took ten of his autistic patients and ten healthy children and asked permission to measure the non-ionizing radiation in the bedrooms where the mothers slept during their pregnancies. The results showed that mothers of the autistic children slept in bedrooms with 150 times the perverse energy fields than mothers of neurologically intact children. He strongly believes that the wi-fi energy of Smart Meters and other equipment generating such radiation interrupts the neurological development of the fetus in the womb and is one of the strongest factors in the significant rise of autism in developing nations.

With the proclamations of the countries Germany and Spain strongly urging pregnant women and children to not use cell phones and wireless devices due to their concern over the mounting

radiation of cell phone use as a Class 2B carcinogen, and wi-fi radiation has similar toxic effects on the cellular physiology of humans and animals. If you desire, I can present a power point summary to the council at any time in the future, but prior scheduling prevents me from attending today...

Upton Sinclair once said: "It is difficult to get a man to understand something when his salary depends upon his not understanding it".

I am glad that it is the citizens of Santa Barbara that you are working for!

Thank you for taking time to read this letter and review the documents attached. Please feel free to contact me if you have further questions.

Sincerely,

*electronic signature--DOH*

Dan O. Harper, MD

**From:** Daniel O Hirsch [<mailto:dhirsch1@cruzio.com>]

**Sent:** Monday, July 04, 2011 5:03 PM

**To:** [SupervisorCarbajal@sbcbos1.org](mailto:SupervisorCarbajal@sbcbos1.org); [dfarr@countyofsb.org](mailto:dfarr@countyofsb.org); [steve.lavagnino@countyofsb.org](mailto:steve.lavagnino@countyofsb.org); [jwolf@sbcbos2.org](mailto:jwolf@sbcbos2.org); [igray@co.santa-barbara.ca.us](mailto:igray@co.santa-barbara.ca.us)

**Subject:** July 5 Smart Meter Public Hearing - Departmental Action Item #2

4 July 2011

County of Santa Barbara Board of Supervisors  
County Administration Building  
103 East Anapamu Street  
Santa Barbara, CA 93101  
*via email*

Re: July 5 Smart Meter Public Hearing - Departmental Action Item #2

To the Honorable Board Chair Joni Gray, Vice Chair Doreen Farr and Boardmembers Salud Carbajal, Steve Lavagnino, and Janet Wolf:

I have been asked to provide to you a copy of a review I performed of claims made by the electric power industry regarding the relative radio-frequency (RF) radiation exposure from a SmartMeter compared to a cellphone. Advocates of the use of RF-based SmartMeters have asserted that the exposure is approximately one-hundredth of that from a cellphone, which makes potential risks from SmartMeters sound trivial. It would appear, however, that the actual differential is in the inverse: cumulative whole body exposure appears to be on the order of a hundred times that of a cellphone.

Because of concern that the electric industry's claims might be self-serving and erroneous, members of the State Legislature last year asked the California Council on Science and Technology (CCST) to perform an independent, science-based review of potential risks from SmartMeters, with a focus on the cumulative exposure that might result therefrom. Unfortunately, CCST merely repeated, essentially without question or independent analysis, the claims made by the Electric Power Research Institute (EPRI). In so doing, two fundamental errors were repeated without correction, the problem of comparing apples and oranges. When corrected, the conclusion is reversed.

EPRI (and thus CCST) compared the SmartMeter, taking into account its estimated duty cycle when the system is fully operational, with exposure to cell phones--without taking into account

the duty cycle for the cellphone (what fraction of the day it is broadcasting). CCST estimates a duty cycle of 1% for the cellphone, and when correcting for duty cycle assumed by CCST for both the SmartMeter and cellphone, the relative exposure is changed by about two orders of magnitude. In other words, EPRI and CCST estimated peak exposures rather than cumulative exposures, and the latter is critical. [CCST took into account the SmartMeter duty cycle when it is linked into a mesh system, as planned, so that each SmartMeter acts as a relay station transmitting not just its own data but relaying data from perhaps hundreds of SmartMeters at neighboring homes.]

Secondly, EPRI (and thus CCST) compared the whole body exposure from a SmartMeter to the exposure to the ear from a cellphone, again an apples-and-oranges comparison. When correcting so that one is comparing apples and apples--whole body exposure to whole body exposure--there is an additional two orders of magnitude correction needed.

Thus, when comparing the cumulative whole body exposure from a SmartMeter to that of a cellphone, using the duty cycle and intensity assumptions employed by EPRI and CCST, the cumulative whole body exposure from a SmartMeter appears to be on the order of one hundred times higher than that of a cellphone, rather than the other way around.

It is unclear at present whether RF radiation is carcinogenic. The International Agency for Research on Cancer (IARC), a division of the World Health Organization, recently issued a formal finding of RF radiation as a possible carcinogen. Some studies suggest increased brain cancer rates among people who have used cell phones half an hour a day for a decade; others do not show a positive finding. Given the long latency period for solid tumors and the relatively recent proliferation of cellphone use, it may be decades before that issue is put to rest scientifically.

Proceeding with involuntary emplacement of SmartMeters on millions of residences, with cumulative whole body exposures to people far in excess of that from cell phones, may amount to a huge public health experiment, without informed consent of the participants. If IARC's concerns turn out to be unfounded, there would be no harm from this massive experiment. If IARC's fear of carcinogenic effects from RF radiation ends up being correct, we may end up regretting such a move.

Current FCC standards for RF-emitting devices are decades old and based solely on thermal effects--how much RF radiation will produce sufficient heating of tissue to cause damage from the heat. The standards are not designed to provide protection against possible carcinogenic effects.

There are significant societal and ethical difference between voluntary use of a cellphone and involuntary exposure to RF radiation from SmartMeters installed without one's assent. Given the recent IARC designation of RF radiation as a possible carcinogen, It is my view that the utilities would be well-advised to transmit the data from SmartMeters via phone or power lines, rather than through RF radiation.

I understand that the industry has proposed to the Public Utilities Commission (PUC) that customers be permitted to opt out--but for an exorbitant price that would prohibit virtually any regular customer from doing so. They wish to charge people a couple hundred dollars as a single-shot cost and then up to about \$20 per month forever thereafter for the privilege of returning to the situation they were in before the SmartMeters were installed. If the utilities could operate with their regular analog meters at current pricing, there is no reason why consumers should have to pay thousands of dollars--what the utilities propose would be the cost to each household over the years--for the privilege of not being forced to change to a device that might cause cancer in them and their children.

In sum, I would respectfully suggest that the Board of Supervisors consider taking the position that utilities that wish to install SmartMeters at their customers' residences and places of work only install SmartMeters that transmit data through means that do not employ RF radiation (e.g., instead use phone lines, power lines, or human meter readers, as at present). At minimum, I would suggest the Board oppose the utilities' requests to the PUC to be able to charge customers for the privilege of not being exposed to RF radiation; there should be an opt-out option, without charge. Demanding thousands of dollars from people for the right to stay with the current system that doesn't expose your family to what IARC says is a possible carcinogen is unseemly.

Our report is attached.

Sincerely,

Daniel Hirsch  
(831) 336-8003



[Comments o....pdf \(985 KB\)](#) [ATT00196.htm \(0.8 KB\)](#)

Comments on the Draft Report  
by the California Council on Science and Technology  
“Health Impacts of Radio Frequency from Smart Meters”

by Daniel Hirsch<sup>1</sup>  
31 January 2011

Abstract

The draft report by the California Council on Science and Technology (CCST) does not appear to answer the questions asked of it by the requesting elected officials. Furthermore, rather than being an independent, science-based study, the CCST largely cuts and pastes estimates from a brochure by the Electric Power Research Institute, an industry group, issued some weeks earlier. The EPRI estimates appear incorrect in a number of regards. When two of the most central errors are corrected – the failure to take into account duty cycles of cell phones and microwave ovens and the failure to utilize the same units (they should compare everything in terms of average whole body exposure) **the cumulative whole body exposure from a Smart Meter at 3 feet appears to be approximately two orders of magnitude higher than that of a cell phone, rather than two orders of magnitude lower.**

It is strongly recommended that CCST revise its Draft Report and conduct actual measurements of cell phone, microwave oven, and SmartMeter RF cumulative whole body power densities. If measurements aren't made, then rigorous calculations correcting for cell phone and microwave oven duty cycles and whole body exposures should be made.

A summary figure below shows how rough estimates of the effect of those corrections suggest SmartMeters may produce cumulative whole body exposures far higher than that of cell phones or microwave ovens.

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<sup>1</sup> The assistance of two UCSC student research assistants, Bailey Hall and Catherine Wahlgren, in the preparation of this review is gratefully acknowledged.



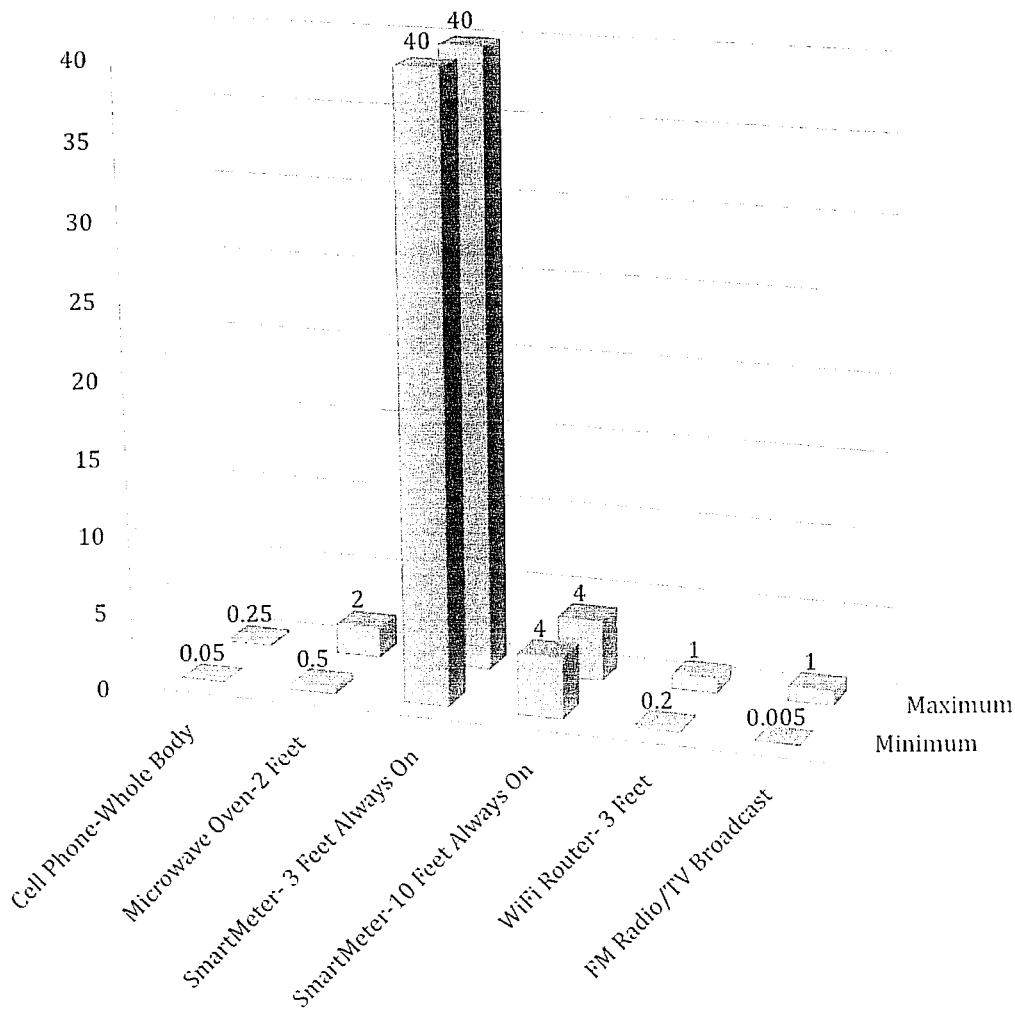


Figure A. Comparison of Radio-Frequency Levels to the Whole Body from Various Sources in  $\mu\text{W}/\text{cm}^2$  over time [corrected for assumed duty cycle and whole body exposure extrapolated from assumed cell phone dose at ear].

On 30 July 2010 Assemblymember Jared Huffman requested that CCST undertake an “independent, science-based study” of two questions: “whether FCC standards for SmartMeters are sufficiently protective of public health taking into account current exposure levels to radiofrequency and electromagnetic fields, and further to assess whether additional technology specific standards are needed for SmartMeters and other devices that are commonly found in and around homes, to ensure adequate protection from adverse health effects.”

Unfortunately, the Council draft report answers neither question.

In September, Assemblymember William Monning and Mill Valley Mayor Stephanie Moulton-Peters joined in the request, asking in particular that CCST review the central issue associated with the current FCC standards, which are decades old and based solely on protecting against prompt thermal effects (heating of tissue)—that they fail to take into consideration long-term and cumulative exposures to these devices and potential non-thermal health impacts (e.g., latent cancers).

Again, the Council’s draft report provides little if any useful information or analysis of this matter. There is no mention or analysis of the specific studies that have suggested, for example, a cancer effect from RF exposure such as the large, international study funded by the cell phone industry, the Interphone study, that found a significant increase in brain cancers in people who used cell phones half an hour a day for ten years. Given the long latency period generally for solid cancers, such a finding gives pause as to what might be seen over the long term. Some other studies have suggested an increased risk of brain cancer on the side of the head where the cellphone is normally used. Other studies, however, have not found an effect. Given the nature of the request from the elected officials for a review of this critical scientific issue—whether there is the potential for non-thermal health effects from cumulative, long-term exposure to RF radiation—one would have hoped that there would have been a more detailed analysis of this question in the report.

The report is candid, however, that at present the issue is unresolved. But it goes on to then say there is no basis for changing the FCC standards which are based only on prompt, thermal effects. One could equally well say there is no basis for maintaining the FCC standards, given the uncertainties about latent, non-thermal effects.

What the CCST draft report does focus on, however, is the relative exposure from SmartMeters compared to other RF-emitting devices in common use. Here, again, the draft report disappoints. The elected officials cited claims made by the electric utility industry regarding safety of SmartMeters and purportedly relative low exposures compared to other common devices and requested “an independent, science-based study.”

However, the CCST draft report does not appear to include much if any independent work on the subject but rather merely pastes in a table taken from an 8-page pamphlet released a few weeks earlier by the Electric Power Research Institute (EPRI), an advocacy group for the

electric power industry.<sup>2</sup> This EPRI table and the graph made from it constitute the core of the CCST report, and is reproduced here as Figure 1.

The EPRI pamphlet is not a peer-reviewed scientific study. It is a brief item for an advocacy group that is supported by industry. If the elected officials wanted the industry's views, it would have asked for them. Instead, it wished an independent, science-based study by an entity without the kinds of conflicts of interest EPRI has on this matter. But the CCST draft report is basically simply a cut-and-paste job from the EPRI brochure.

Note also that the estimate for exposure from a single SmartMeter contained in the EPRI item and repeated in the CCST draft is not a measured value but estimated—how is not made clear. EPRI's measurements were for a bank of ten SmartMeters; it didn't measure one alone but somehow estimated for it, despite the difference in how exposure falls off from one versus ten. The latter is inverse of the distance, the former inverse square of the distance. One presumes the electeds wanted actual measured values from an independent source, not a calculated value from the electric industry, without even an explanation of how it is was calculated and without independent verification.

CCST does correct one error made in the EPRI brochure whereby it reduced the presumed power density estimates for the SmartMeter by duty cycles of 1 and 5%. CCST rightly indicated that future duty cycles could be much higher as “new applications and functionality are added to the meter's communication module in the future.” For this reason, it assumed a 100% duty cycle in its calculations.

HOWEVER, CCST did not correct numerous other apparent errors from the EPRI brochure when it adopted EPRI's values. For example, for cell phone exposures, CCST did not correct for the presumed duty cycle of the cell phone (which CCST indicates on average is 1%). Nor did it convert the EPRI cell phone power density estimate into comparable units. EPRI (and thus CCST) compared a *whole body average* exposure to SmartMeter radiation to *peak exposure to the ear* for the cell phone. One needs to compare apples and apples, or whole body exposures to whole body exposures. Comparing the peak dose to the ear from a cell phone, when the rest of the body gets vastly less radiation, with a whole body exposure where all organs get roughly the same dose from a SmartMeter, doesn't seem appropriate. If there is a cancer effect, it is likely associated with the total RF energy the body receives.

Similar apparent errors were made in the comparison to microwave ovens. Again, the duty cycle of the microwave oven is ignored. It is used perhaps fifteen minutes a day, and it is unlikely people are 2 feet away from the device for the full time it is on. Its “down time” must be included if one is looking, as requested by the elected officials, at potential cumulative, long-term exposures.

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<sup>2</sup> The EPRI brochure was apparently released on November 17, providing little if any time for serious review of it by CCST prior to the release a few weeks later (with the holidays intervening) of the CCST report on which it was based.

[Additionally, the values given for microwave oven exposures by EPRI and adopted without changed in the CCST draft report seem questionable. Three references are given in the EPRI report, although for which claim each applies is not made clear. The first reference, the ICNIRP report, does not in fact give measured values for microwave ovens, but instead reports what the legal limit for leakage is, generally reported to be orders of magnitude above what typical exposures from microwave ovens really are. The second reference is to a 1978 paper by PG&E's consultant, RA Tell. That paper CCST has not made available for review, but it is over three decades old, and thus of little relevance to today's microwave ovens. The third reference is merely to a personal communication with Tell, without any information as to the content of that communication. When one checks the values reported by EPRI and uncritically adopted by CCST, it appears that the first value,  $5 \text{ mW/cm}^2$  at 2 inches from the device, is in fact not a measured value of typical exposures but the vastly higher legal limit for leakage. The literature in fact indicates that 50% of microwave ovens produce less than  $0.062 \text{ mW/cm}^2$  at 5 cm, or two orders of magnitude below the value reported by EPRI and reproduced by CCST without question. See, e.g., R, Mathes, "Radiation Emission from Microwave Ovens," *Journal of Radiation Protection*, Vol. 12, No. 3, September 1992. One presumes the leakage rate has been reduced even further since then.]

One recognizes that if one is comparing to FCC existing standards based solely on acute, thermal effects that duty cycle might be treated differently. But if there is a cancer effect, which is what the electeds asked CCST to study, a likely key aspect of the dose-response relationship is the cumulative whole body dose. For ionizing radiation, about which I have spent much of my career, the determining factor is largely how much radiation energy the body has absorbed. [There are of course other factors, such as the relative biological effectiveness (RBE) of different types of ionizing radiation and varying sensitivity of different organs.] So, if the question were how does SmartMeter and cell phone RF radiation compare to FCC limits, duty cycle may be treated in a different fashion. But since the question is what if FCC limits, based solely on thermal effects, may be inadequate to protect against cancer and other non-thermal effects, then the duty cycle—which determines the cumulative total exposure received—and whole body exposure must be factored in. My fundamental recommendation is that the draft report should be revised to correct for these two factors.

I have taken the liberty, with the help of two student assistants, to demonstrate the potential impact of some of these corrections.

Figure 1 is simply the CCST Figure 1, which in turn was largely taken from the estimates in the EPRI pamphlet. Units were simply converted by CCST from  $\text{mW/cm}^2$  to  $\mu\text{W/cm}^2$  and it corrected the duty cycle for the SmartMeter, otherwise the data are unchanged from EPRI's estimates. One will note that the estimated exposure from the cell phone is just to the ear, in direct contact with the cell phone, whereas the other comparisons, including the SmartMeter, are for whole body exposures, and that the duty cycle of the cell phone and microwave oven were not corrected. In other words, the chart compares a SmartMeter that is always on with a cell phone or microwave oven when they are being used, even though 99% of the time they are not in use. This overestimates the cumulative exposure by a factor of 100 for the cell phone and microwave oven, and dramatically skews the comparison.

Figure 2 fixes the error regarding duty cycle for the cell phone and microwave oven, markedly altering the comparison. The minimum cumulative exposure over time from the SmartMeter at 3 feet is 80 times the minimum cumulative exposure from the microwave oven and four times the minimum cumulative exposure from the cell phone, for example. This does not involve any correction of the while-on exposure values for either the cell phone or microwave oven, only the duty cycle factor.

Figure 3 provides a very rough approximation of the correction of the cell phone at the ear estimate to a whole body estimate so it is comparable to the whole body estimate for the SmartMeter. *It should be stressed that neither this estimate nor that in Figure 4 using a different approach is intended to be a definitive figure, but is intended to be exemplary of the kind of change to the comparison a detailed analysis may produce. It is my recommendation that CCST carefully measure, or at minimum thoroughly calculate, the average power density over the whole body from a cell phone held at the ear. We here have made two very rough estimates just to make the point what a far more detailed analysis may show.*

The value used for the peak cell phone power density for a cell phone held to the ear in the CCST draft report is taken directly from the EPRI pamphlet, without apparent independent review or correction. According to p. 6 of the EPRI pamphlet, the value it gives apparently is not a measured value but an estimate. How the estimate was arrived at is not detailed in the brochure. All that is said is in footnote 1, “Based on a 3-inch 250mW antenna emitting in a cylindrical wavefront.” A quick calculation to try to reproduce what EPRI must have done indicates that if it merely assumed that all of the energy from a 250mW cell phone was transmitted by holding directly against the ear into a circular area with a 3 inch diameter, the power density in that small circular area around the ear would be 5 mW/cm<sup>2</sup>. That is precisely the upper value given by EPRI in its table. We don’t know if that is what EPRI did, since it doesn’t tell us what it did and CCST does not appear to have tried to confirm the asserted value. But in any case, 5 mW/cm<sup>2</sup> from a 250mW cell phone would indeed appear to require that that power be deposited solely in that very small circular area.

Averaging over the full potentially exposed surface area of the body (presuming only half the body surface could be exposed to the cell phone from any one angle), the whole body exposure would be approximately on average 0.25 mW/cm<sup>2</sup> given the maximum value to the ear of 5 mW/cm<sup>2</sup> put forward by EPRI and the CCST draft report and correcting as well for the duty cycle. **The SmartMeter thus would produce 160 times more cumulative whole body exposure than the cell phone assuming this estimate for whole body exposure.** This is shown in Figure 3.<sup>3</sup>

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<sup>3</sup> In these graphs we have used the values for a microwave oven at 2 feet put forward by EPRI and repeated by CCST even though, as discussed above, they appear questionably high. Note that measured values indicate typical measured microwave oven RF fields 5 cm from the oven are in the range of 0.062 mW/cm<sup>2</sup>, whereas the EPRI estimates used by CCST are for comparable values 2 feet away, which, if the exposure were drop by inverse square of the distance, should be very much lower. It is unclear whether EPRI is actually referring to measured values or to the legal limits, the latter being irrelevant in this context.

Since the EPRI estimate for cell phone peak power density at the ear is unexplained as to its derivation, we have also made a very rough estimate of whole body exposure from a cell phone from an independent line of calculation. Taking the values EPRI (and thereby CCST) put forward for exposure at three feet from a 250 mW SmartMeter, and noting that EPRI assumed the cell phone would also be 250mW, one can make a rough estimate of power density for the whole body from a cell phone held at the head. The exposure at one's waist would be approximately three feet from the source, just as in the assumed case of the SmartMeter. Presuming that the dose falls off as the inverse square of the distance, a very rough estimate of power density averaged over half the surface of the whole body, and taking into account duty cycle, yields a cumulative cell phone whole body power density of roughly  $0.75 \mu\text{W}/\text{cm}^2$ . **Using this way of estimating suggests the SmartMeter would produce 50 times the cumulative whole body exposure as a cell phone.** The results of this comparison are found in Figure 4.

We are here using the duty cycles proposed by CCST itself in its draft report. We recognize other duty cycles can be considered. Perhaps one should presume maximum duty cycle in the future for SmartMeters, when all additional features are incorporated, might be only 50%, for example. But other factors also need to be considered, including exposures from banks of SmartMeters attached to an apartment building, and the exposure from all the devices within a home that are planned to be constantly communicating by RF with the SmartMeter.<sup>4</sup>

It is strongly recommended that CCST revise the report and perform actual measurements. At minimum, revised calculations that correct for duty cycle and cumulative whole body exposure should be conducted.

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<sup>4</sup> It is noted that EPRI claims a diminished dose in back of a bank of SmartMeters, but it is unclear that that claim can be relied upon. The particulars of the specific test done by EPRI, in connection with the manufacturer of the devices (who has an obvious interest in findings suggesting safety), are not spelled out. Furthermore, it is unclear how the SmartMeter can communicate with devices inside the home—the key purpose—if the back of the device blocks most of the signal from getting through.

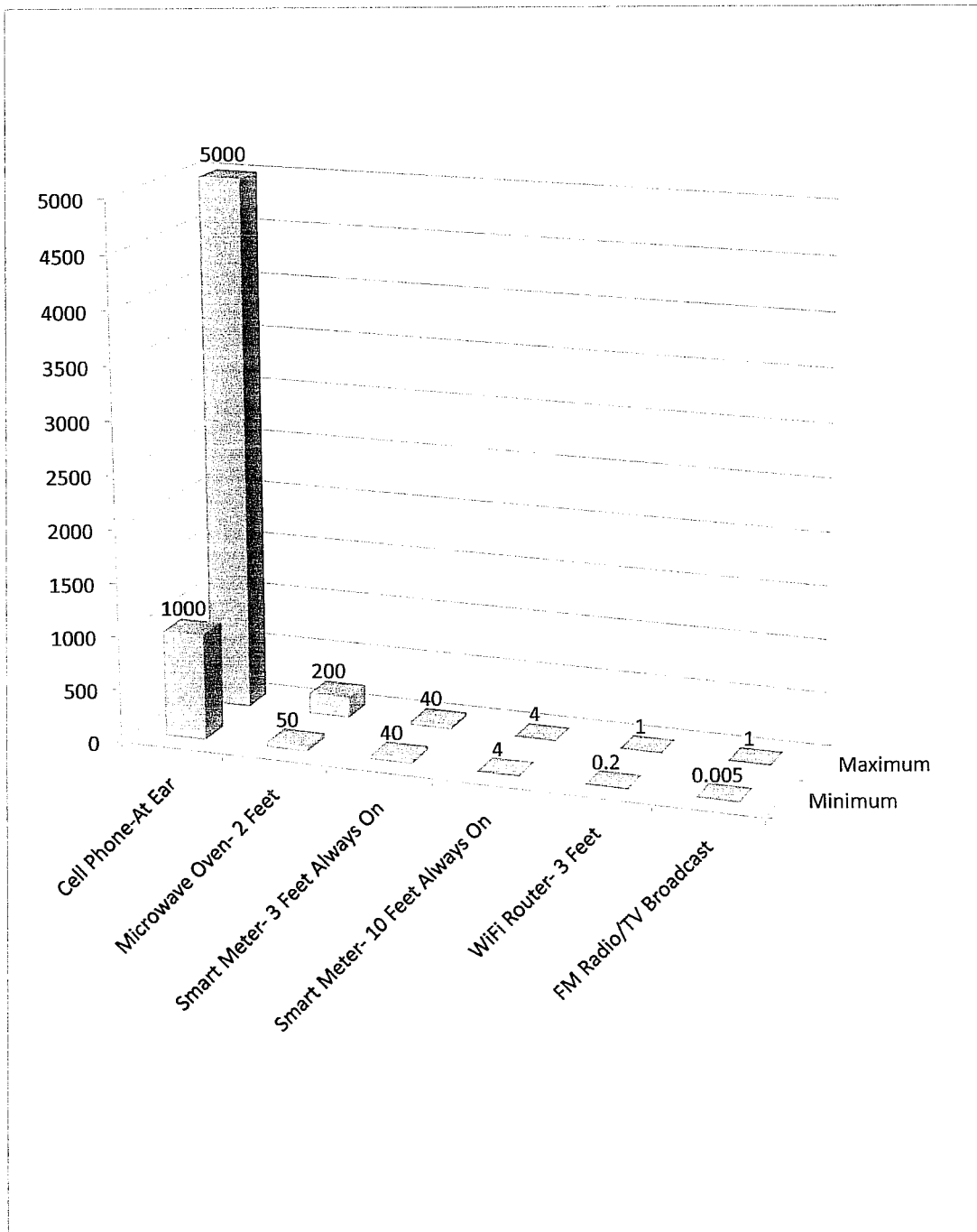


Figure 1: Graph from CCST Report in  $\mu\text{W}/\text{cm}^2$ —uncorrected for whole body exposure or duty cycle

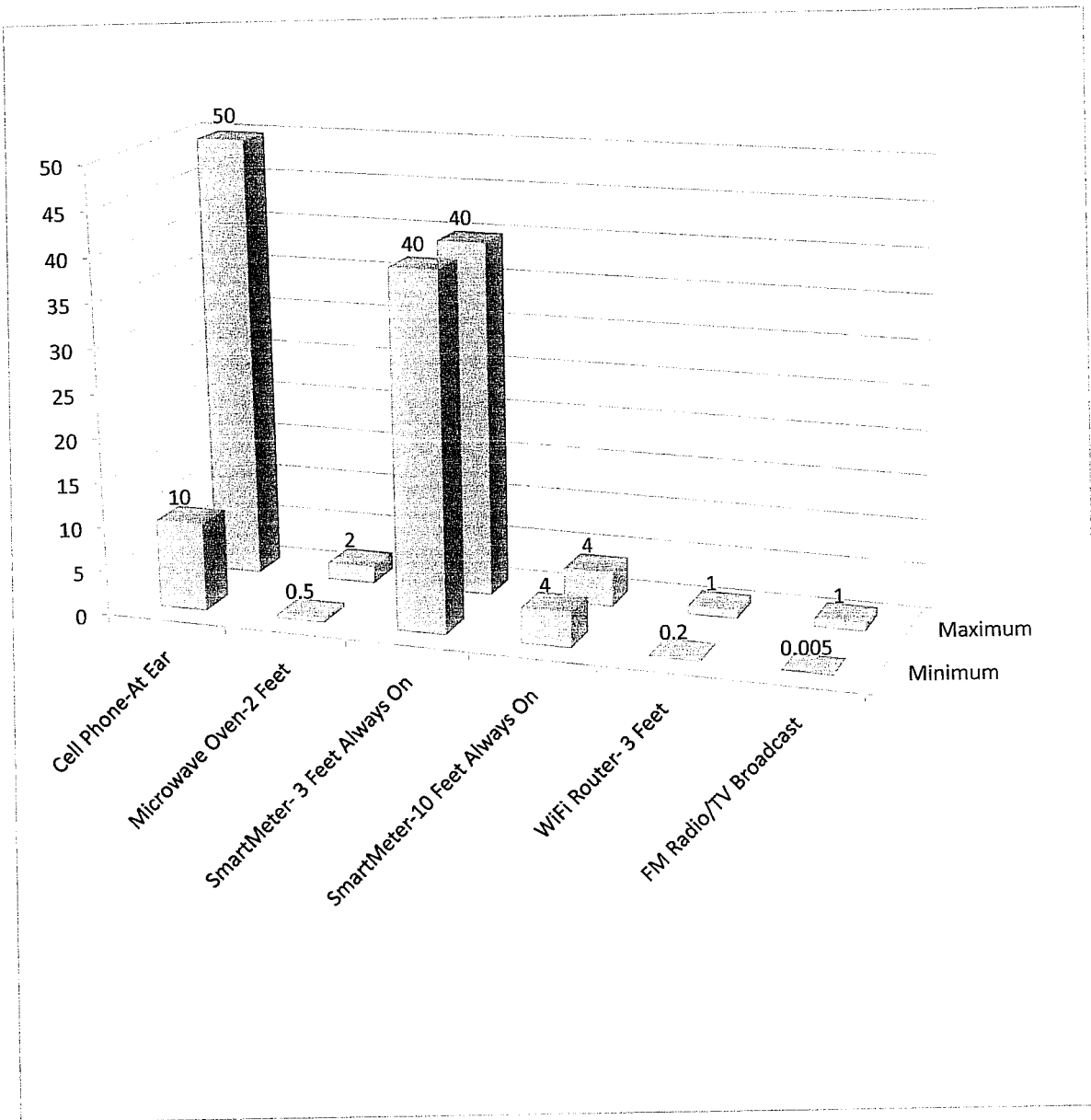


Figure 2. Comparison of Radio-Frequency Levels from Various Sources in  $\mu\text{W}/\text{cm}^2$  over time [corrected only for assumed duty cycle].



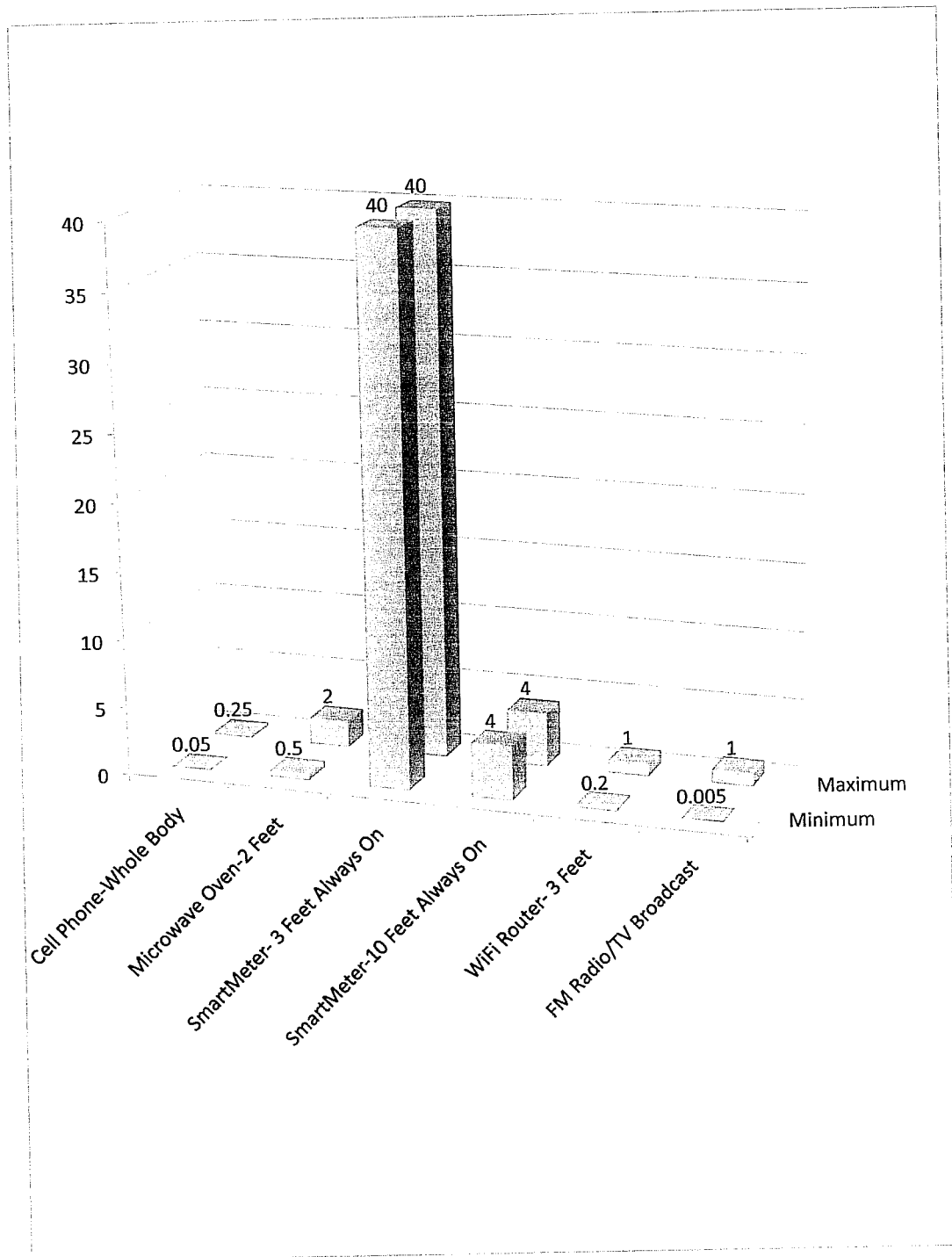


Figure 3. Comparison of Radio-Frequency Levels to the Whole Body from Various Sources in  $\mu\text{W}/\text{cm}^2$  over time [corrected for assumed duty cycle and whole body exposure extrapolated from assumed cell phone dose at ear].

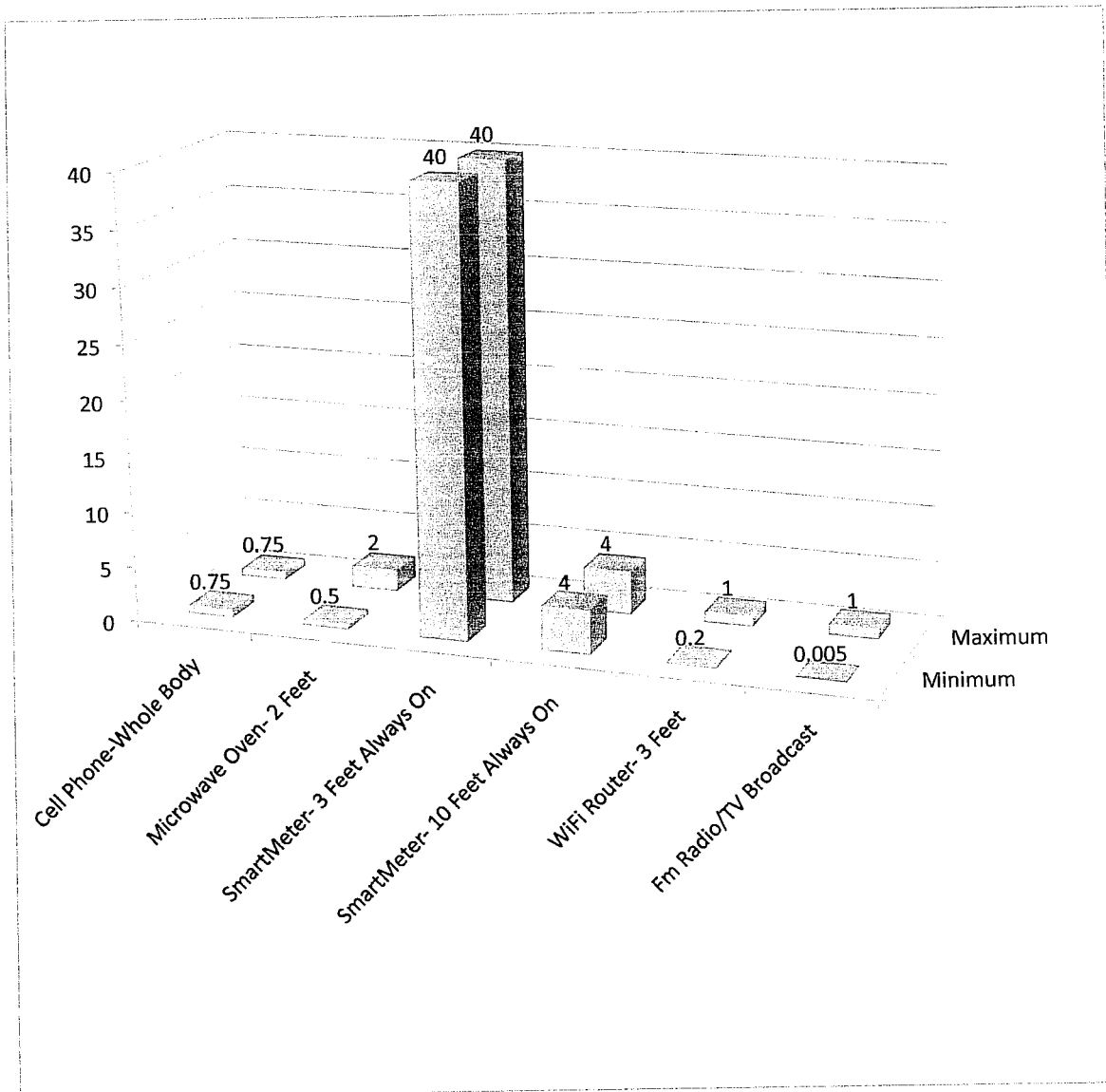


Figure 4. Comparison of Radio-Frequency Levels to the Whole Body from Various Sources in  $\mu\text{W}/\text{cm}^2$  over time [corrected for assumed duty cycle and whole body exposure extrapolated from EPRI/CCST SmartMeter estimated levels at 3 feet].