

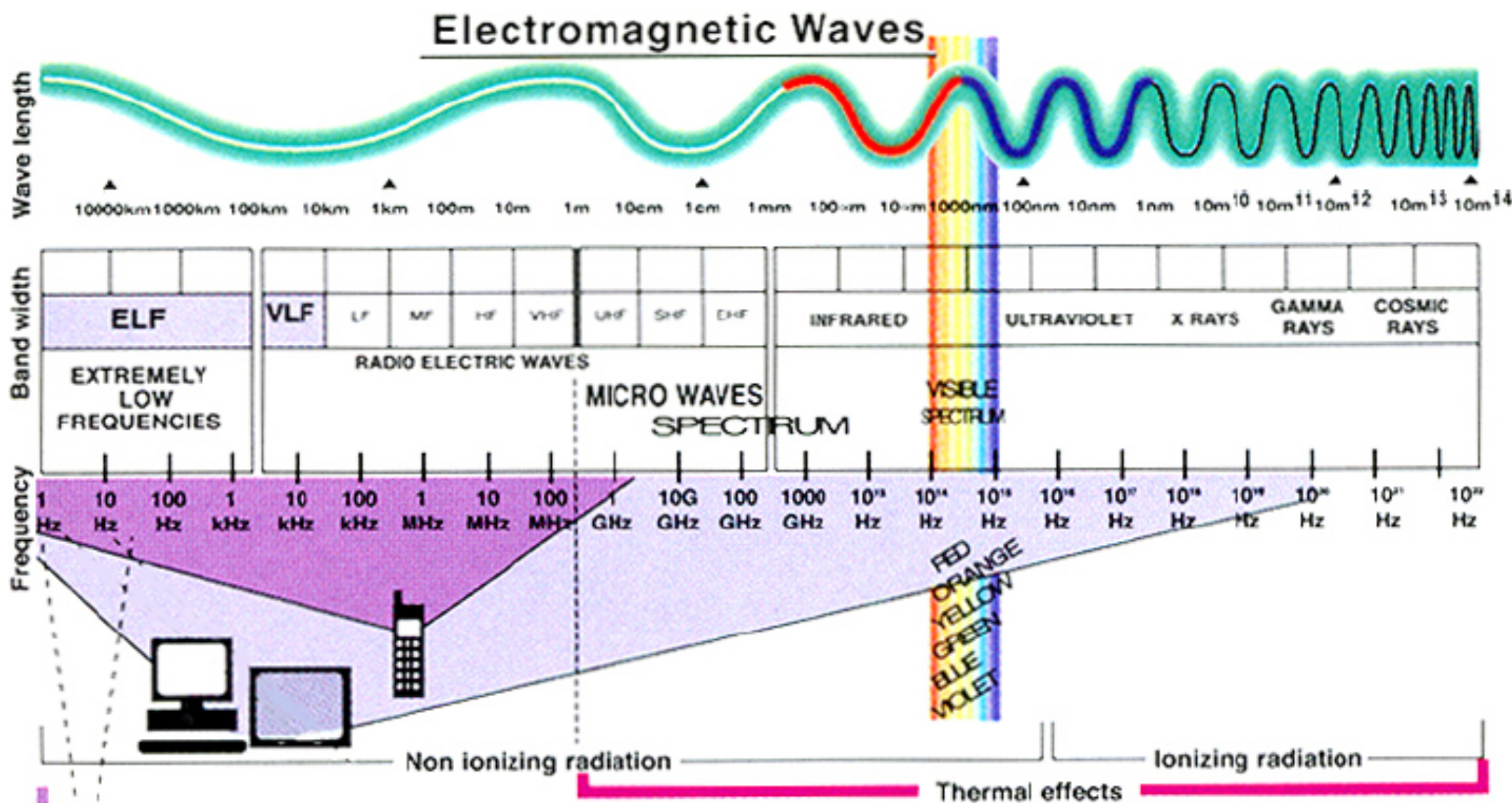
Adverse Health Effects from Radiofrequency (RF) Radiation with a Focus of AMI Meters

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Who Am I?

- I am David O. Carpenter, a public health physician who received both AB and MD degrees from Harvard University. I chose public health and research over clinical practice.
- My initial involvement of electromagnetic field (EMF) effects was during my tenure as Chair of the Neurobiology Department at the Armed Forces Radiobiology Research Institute in Bethesda. I then became the Director of the Wadsworth Center for Laboratories and Research at the New York State Department of Health, where one of my responsibilities was to administer a research program on health effects of magnetic fields coming from electricity. After that program ended I became the spokesperson for EMF issues in New York State until I moved to the University at Albany as Dean of the School of Public Health. When I stepped down as Dean I became the Director of the Institute for Health and the Environment, which has been designated as a Collaborating Center of the World Health Organization, a position I hold today.

Electromagnetic spectrum



Radiofrequency (RF) EMFs

- These are the communications frequencies, ranging from AM and FM radio, TV, mobile phones, and radar.
- Wi-Fi, AMI smart meters and wireless anything use RF fields to communicate between a generator and a receiver.
- Driverless automobiles will use EMFs for navigation.
- Microwave ovens use RF. The fact that you can cook your potato in a microwave oven is proof that communication frequencies can have biological effects.

FCC “Safety Standards” for Exposure to RFR.

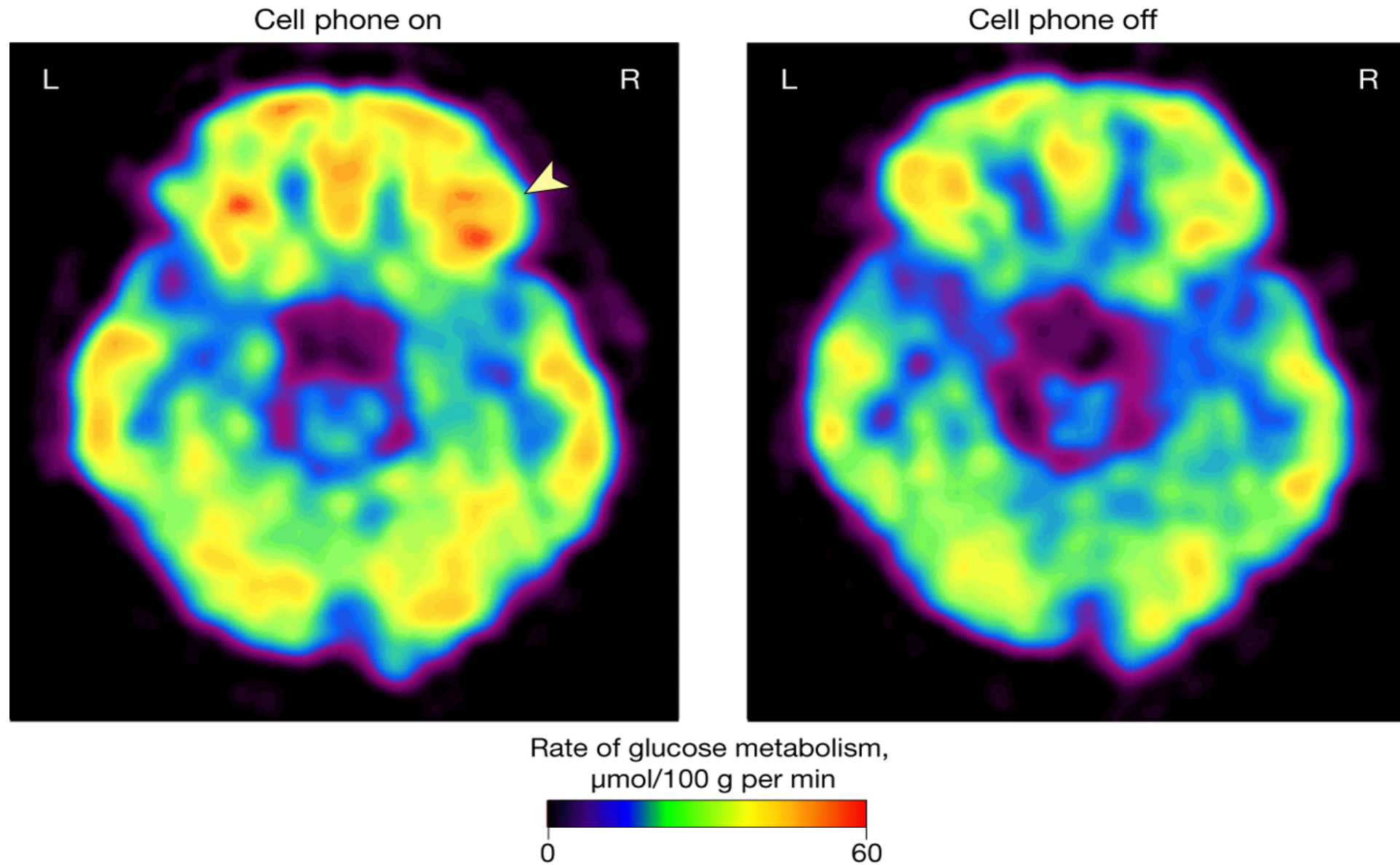
- In the US it is the Federal Communications Commission that has this responsibility. Almost all members come from the industry. They have absolutely no health expertise.
- The position of the FCC is that the only concern due to RF radiation is tissue heating, like that you get from your microwave oven.
- There are thousands of scientific studies showing adverse effects at much lower intensities than those causing tissue heating.
- While the average RF emission from a AMI meter does not exceed the FCC guidelines it is sufficient to cause adverse health effects in some people.

Health Risks to Humans From Existing Cell Phone Radiofrequency Radiation

- **Cancer:**

- **Brain Cancer:** Gliomas on the side of the head where the cell phone is normally used and glioblastoma, a very dangerous cancer that is almost always fatal.
- **Acoustic neuroma, a Schwannoma of the auditory nerve.** This is a tumor, not a cancer, but in a bony canal.
- **Cancer of the parotid gland and thyroid gland in the cheek and throat, near to where a cell phone is used.**
- **Probably other kinds of cancer, depending upon what part of the body is most exposed.**

Glucose metabolism and cell phones (Volkow et al., 2011)



National Toxicology Program (NTP) and Ramazzini Institute Reports

- The NTP project was a 2-year exposure of rats to cell phone intensities of RF-EMFs.
- “Following exposure to GSM- or CDMA-modulated cell phone RFR there were increases in the incidence of malignant Schwannoma of the heart....Several other weaker responses were observed with both modulations, including malignant glioma in the brain, adenomas in the pituitary gland... and pheochromocytomas of the adrenal cortex,”
- “A significant increase in DNA damage was observed in hippocampus cells of male rats exposed to CDMA modulation.”
- The Ramazzini Institute study was similar but at an intensity like that from cell towers. They founds essentially the same cancers as the NTP study but at lower levels of exposure.

Other Health Effects

- Reproductive harm: Reduced sperm counts and infertility in men, some increase in spontaneous abortion and premature birth in women.
- Effects on brain function: Reduced learning ability, especially in children. Impaired memory in adults. This is a special problem in wireless computer classrooms in schools.
- Electro-hypersensitivity: In some people development of headaches, insomnia, heart palpitations, tinnitus and a general feeling of ill health.

RFR and Male Fertility

- In a meta-analysis for 185 studies of 42,935 men, there has been a 50-60% decline in sperm counts in between 1973 and 2011 (Levine et al., 2017).
- Isolated human sperm exposed to 1.8 GHz RFR show reduced motility and vitality, mitochondrial generation of reactive oxygen species and DNA fragmentation (Delullis et al., 2009). Sperm placed near a wireless laptop for four hours showed DNA fragmentation and reduced motility (Avendano et al., 2012)
- There was a significant decrease in sperm counts in men carrying their mobile phone in their trouser related to time spend sending or receiving calls (Al-Bayyari, 2017)

Symptoms of Electro-Hypersensitivity (EHS)

- EHS is one of a series of syndromes, called “ideopathic environmental intolerance” or “medically unexplained symptoms” characterized by fatigue, headache, weakness, memory impairment, sleep disturbances and a general feeling of ill health.
- EHS frequently co-exists with chronic fatigue syndrome, multiple chemical sensitivity, Gulf War Illness, fibromyalgia and several other less common diseases.
- The cause of each of these disorders is unknown, but at least for some of them there is an initial triggering event.

Historical Perspectives on EHS

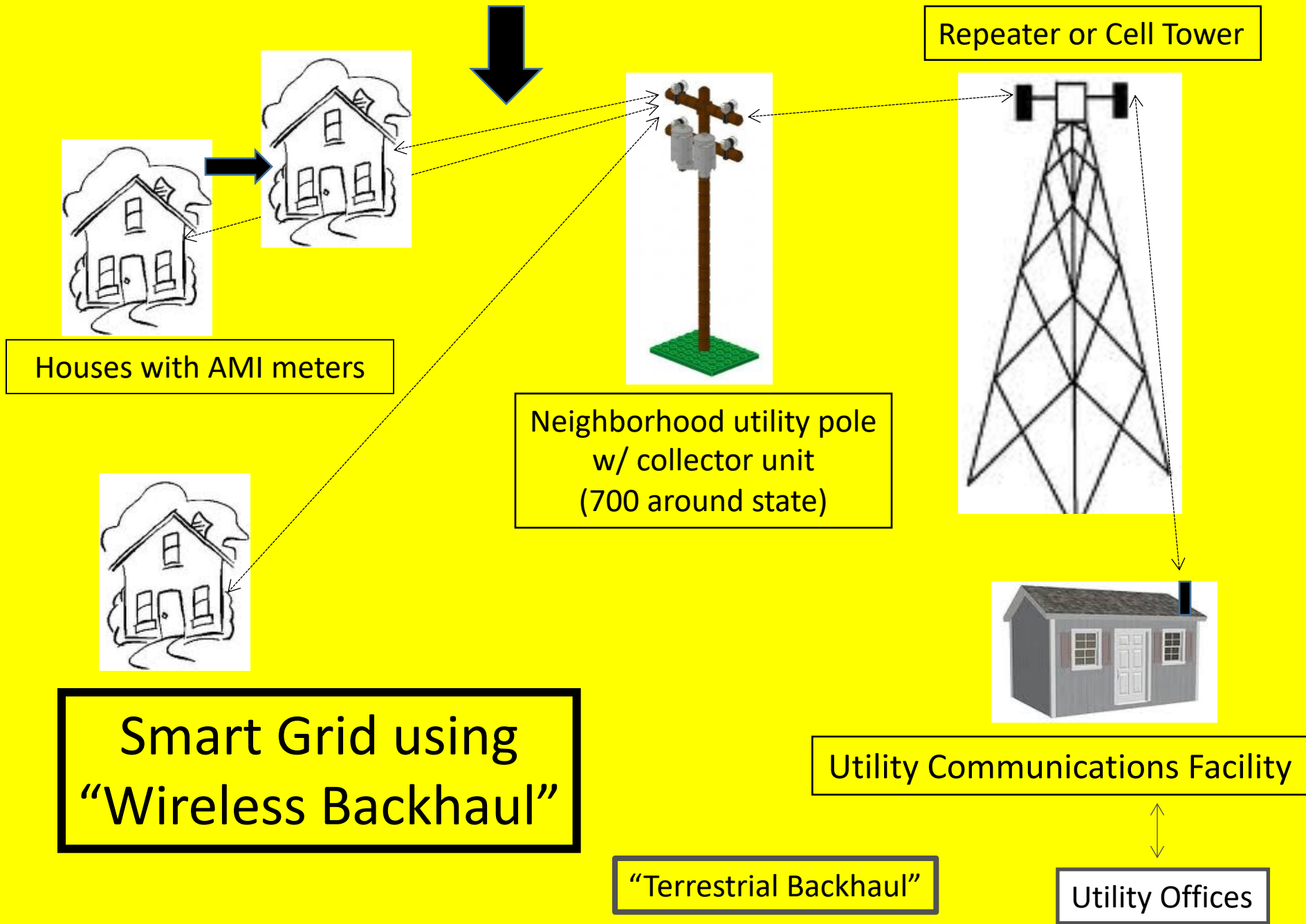
- Western countries have considered that there can be no adverse biological effects of electromagnetic fields (EMFs), including radiofrequency (RF) fields, that are not mediated by tissue heating.
- The Soviets, on the other hand, reported years ago that individuals experienced headache, fatigue, difficulty in concentration, depression, emotional instability and irritability when exposed to RF fields at intensities much lower than those causing measureable tissue heating.

Health Effects of RF Radiation

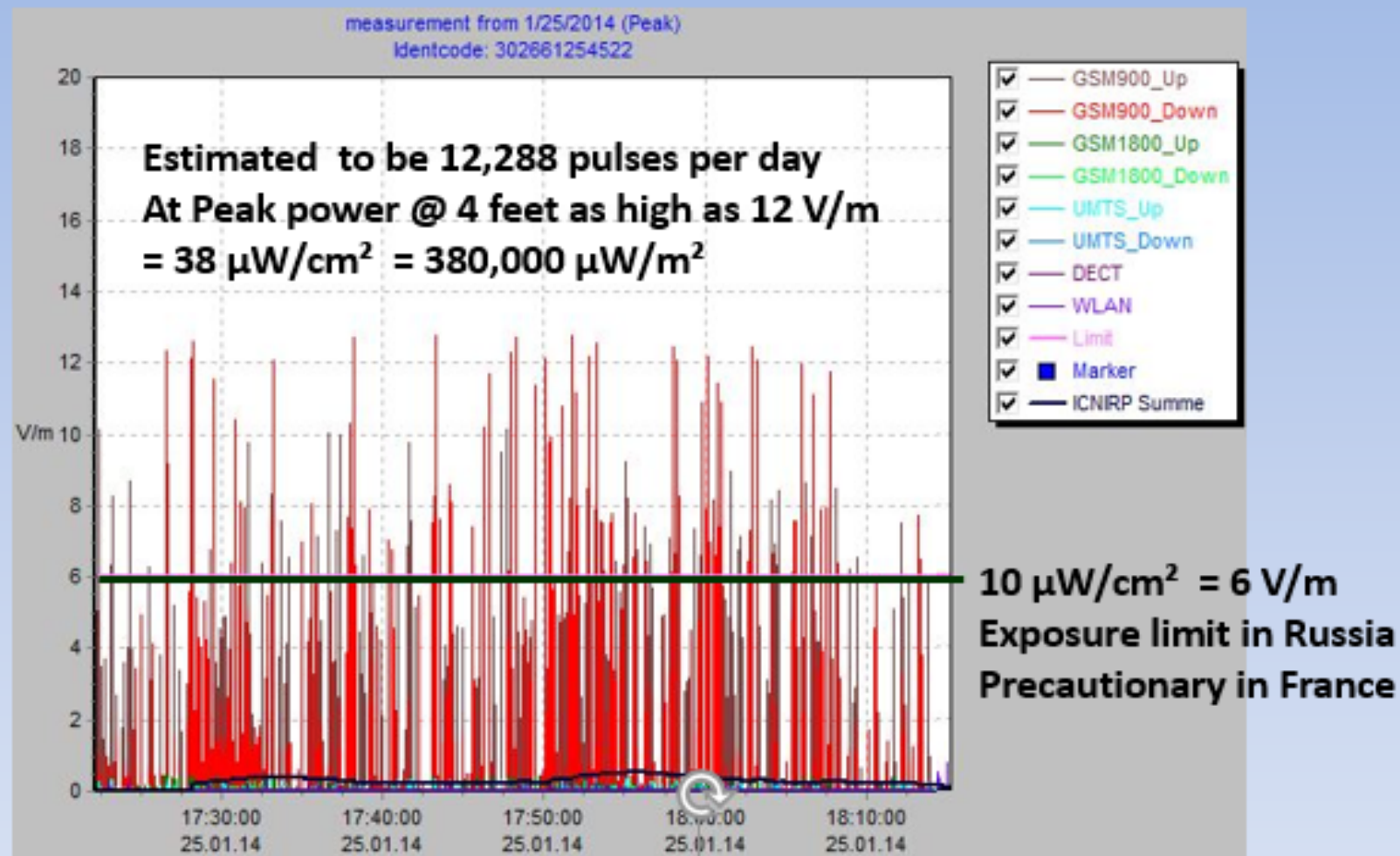
- Beginning in 1953 the US Embassy in Moscow was irradiated with microwaves at up to 0.18 W/m^2 and frequencies from 0.6 to 9.5 GHz.
- While no elevations of cancer were found, many people developed “microwave sickness”, consisting of headaches, insomnia, irritability and emotional lability.
- “Microwave sickness” is EHS!

Reports of Excessive Exposure to Radar

- Forman et al. (JOM 24: 932: 1982) reported on two men accidentally exposed to radar microwaves. Both exhibited symptoms of headaches, insomnia, irritability and emotional lability even after a 12-month follow-up.
- Schilling (OEM 54: 281: 1997) reported on three men acutely exposed to 785 MHz RF who immediately developed EHS symptoms that lasted over a 3-year follow-up. Later (OM 50: 49: 2000) he reported on six antenna engineers acutely exposed in two separate incidents. Four developed EHS with no improvement over 3-4 years follow-up. Headache, loss of stamina, malaise and lassitude were the major symptoms.



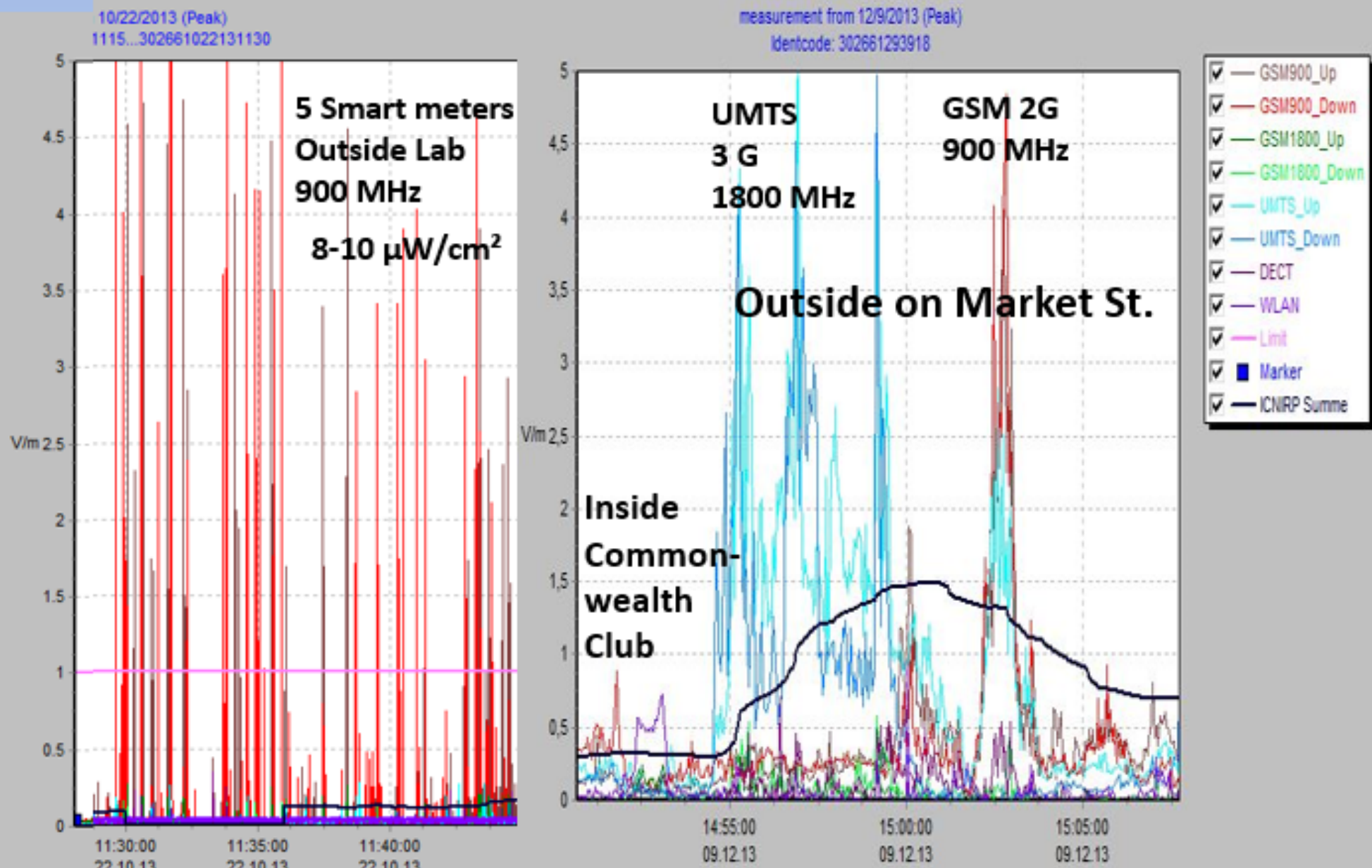
Daily Pulses Generated by Smart Meter



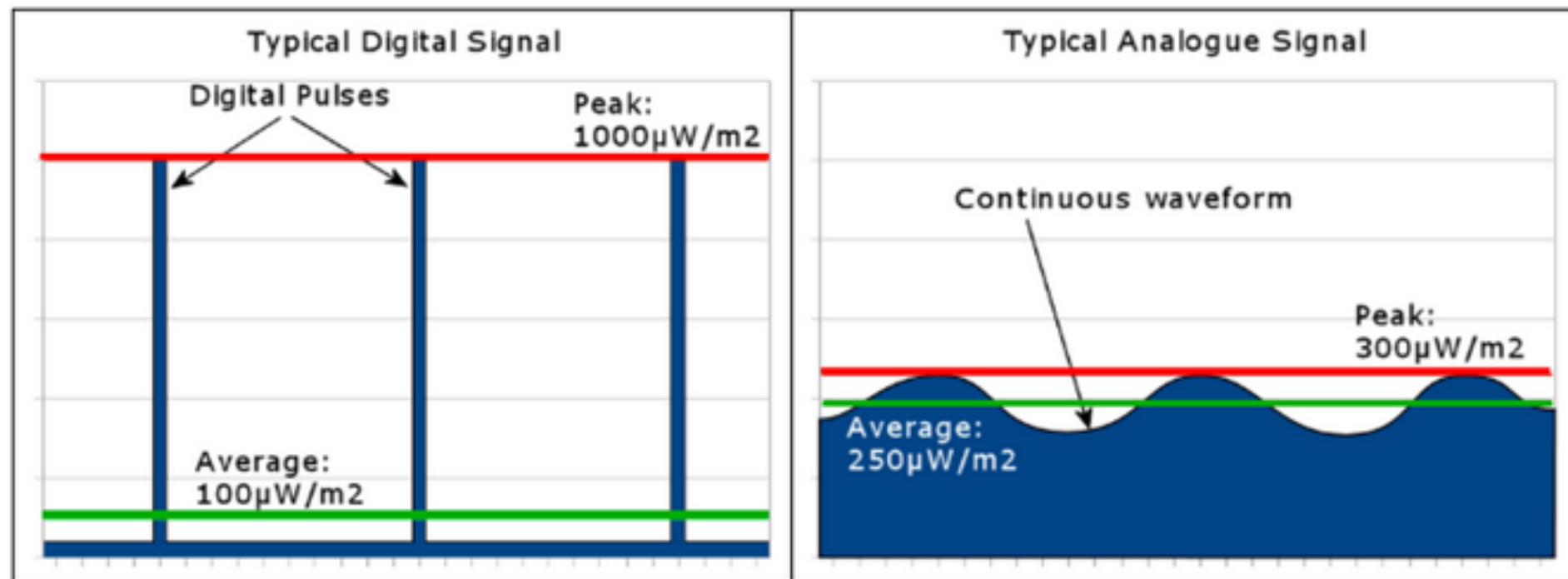
- Depends on Duty Cycle and other meters in the Mesh network
- Data from 5 meters shows 340 pulses in 40 minutes = 12,288/day
- Emissions are brief (5 msec), but fast pulses affect nervous system

Smart Meters @ 8 feet : Market St. San Francisco

15 minutes on Oct 22, 2013 15 minutes on Dec 9, 2013



Peak Levels in Digital Signals are Higher



- Smart Meters send out high intensity short pulses
- Peak pulse intensities trigger biological systems more powerfully
- Average power levels underestimate the problem

EHS: Somatic Response is not Conscious

Int J Neurosci. 2011 Jul 28. [Epub ahead of print]

ELECTROMAGNETIC HYPERSENSITIVITY: EVIDENCE FOR A NOVEL NEUROLOGICAL SYNDROME.

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Abstract

ABSTRACT Objective: We sought direct evidence that acute exposure to environmental-strength electromagnetic fields could induce somatic reactions (EMF hypersensitivity). **Methods:** The subject, a female physician self-diagnosed with EMF hypersensitivity, was exposed to an average (over the head) 60-Hz electric field of 300 V/m (comparable to typical environmental-strength EMFs) during controlled provocation and behavioral studies. **Results:** In a double-blinded EMF provocation procedure specifically designed to minimize unintentional sensory cues, the subject developed temporal pain, headache, muscle-twitching, and skipped heartbeats within 100 s after initiation of EMF exposure ($P < 0.05$). The symptoms were caused primarily by field transitions (off-on, on-off) rather than the presence of the field, as assessed by comparing the frequency and severity of the effects of pulsed and continuous fields in relation to sham exposure. The subject had no conscious perception of the field as judged by her inability to report its presence more often than in the sham control. **Discussion:** The subject demonstrated statistically reliable somatic reactions in response to exposure to subliminal EMFs under conditions that reasonably excluded a causative role for psychological processes. **Conclusion:** EMF hypersensitivity can occur as a bona fide environmentally-inducible neurological syndrome.

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American Academy of Environmental Medicine Recommendations Regarding
Electromagnetic and Radiofrequency Exposure

- The AAEM recommends that:
- Patients with (certain) medical conditions and disabilities be accommodated to protect their health.
- No Smart Meters be on these patients' homes;
- Smart Meters be removed within a reasonable distance of patients' homes depending on the patients' perception and/or symptoms;

2011 Survey after Smart Meters Installation

- 443 respondents to a survey, 93% over 40 years of age
- 78% from California, 73% women, 49% reported EHS
- 76% had meters installed neighborhood > 6 months, 41% had meters installed in their homes
- Complaints:
 - Sleep Issues = 49%
 - Stress, anxiety, irritability = 43%
 - Headaches = 40%
 - Ringing in Ears = 38%
 - Heart Problems / palpitations = 26%



- Source: [Halteman, Ed \(2011\) Wireless Utility Meter Safety Impacts Survey](http://emfsafetynetwork.org/wp-content/uploads/2011/09/Wireless-Utility-Meter-Safety-Impacts-Survey-Results-Final.pdf). Available at <http://emfsafetynetwork.org/wp-content/uploads/2011/09/Wireless-Utility-Meter-Safety-Impacts-Survey-Results-Final.pdf>

Advanced Metering Infrastructure (AMI)

Customers will gain control of their water usage via an information portal. AMI technology improves customer experience by providing access to near real-time water-usage information and helping to quickly recognize potential leaks and other home plumbing issues, which can significantly reduce bills and save money. An additional benefit is a decrease of WSSC Water's carbon footprint by reducing the number of trucks that we have on the road.

Conclusions

- EHS is real, but not everyone is electrosensitive. There is something about the signals from AMI smart meters that makes them particularly provocative, probably the very rapid rise and fall of the signals.
- EHS is related to other disease syndromes characterized by similar symptoms. Much more study is needed to determine what are the triggering events and especially what are the mechanisms of action.
- AMI meters benefit the utility but not the consumer.
- Individuals who become ill from AMI meters placed on their home should have the ability to “opt-out” because they are dangerous to the health of those who are sensitive to RF signals.

Neptune Smart AMI Water Meter R900

Technical sheets document transmissions numerous times a day:

“transmits a mobile message that includes the meter reading data and the unique E-CODER)900iID every 14 to 20 seconds.

The E-CODER)R900i also transmits a high power fixed network message every seven and one half minutes ...”

“RF Exposure Information

This equipment complies with the FCC RF radiation requirements for uncontrolled environments. To maintain compliance with these requirements the antenna and any radiating elements should be installed to ensure that a minimum separation distance of 20 cm is maintained from the general population.”

https://www.neptunetg.com/globalassets/products/literature/publication_im-e-coder-r900i-12.18.pdf