

2017-12-03

Dear Executive,

I am responding to your request for a 3-page executive summary of my Open Letter to the community. The text of this correspondence is 3.5 pages. I have included additional pages that contain references that you do not need to read.

Professional Background I am a degreed Electronic Engineer (University of Virginia) with more than 46 years as a research and development engineer and senior technology development program manager with constant involvement during that time period with measurement and characterization of electromagnetic fields (EMF).

In the last 7 years of my aerospace career, I was Chief Engineer and Program Manager of the LACE satellite development. I had 500 engineers and scientists reporting to me. It was a \$154 million program. It was a highly successful mission.

During my aerospace career I was deeply involved in Electromagnetic Compatibility (EMC) and the attendant disciplines of EMF measurement and characterization both for the afloat U.S. Navy as well as 17 Earth-orbiting satellites, 3 upper stage boosters, 2 primary space launch vehicles and 1 shuttle-attached space mission. I remain focused today on the mission of mitigation of EMF in the environment, as a consultant and a designer. A brief accounting of my work experience is in Reference 17. It includes a link to my full resume, awards and published papers.

[1] **Mechanism In The Physiology For Effects To Human Life**

It is critical to understand the mechanisms in the physiology for effects to human life from EMF. Considering only the heating/thermal effect will invariably lead the analyst to consider only average power. Considering only average power will lead the analyst to the conclusion that a pulsing EMF source is "a plus" and therefore less virulent.

If one researches the thousands of studies done on this topic it will be found that:

---The **peak power** of the EMF is of great importance and plays a central role in the exact cellular mechanism of harm to human physiology

--- **Pulsing** can play havoc with various activities within the physiology that have their own frequencies at the same or near the pulsing repetition rate.

The actual minimum strength of an EMF signal that can be detected by and cause effects in the human physiology must be understood. **The use of FCC exposure standards is not the answer.** The presumption that reducing EMF by a small degree below the FCC threshold level, will make the EMF harmless, is incorrect.

If there is only one expert that you listen to as result of this letter, follow the link (**Reference 1**) to a video interview of **Dr. Martin Pall**, Physicist and PhD Biochemist.

FCC (Federal Communications Commission)

When an analysis is attempted on effects to human life from EMF, it is easy to "end up" in the heating/thermal effect consideration and reliance on FCC-stated allowable exposures. The FCC approach to setting acceptable exposure contains EMF levels that are excessively high. The FCC approach does not consider long term 24/7 effects and completely ignores the critical effects from pulsing EMF.

Other agencies within the US Federal government agree that the FCC limits are inadequate for a variety of reasons and **they have gone on record** (public record) to recommend that the FCC overhaul its limits. In a letter to the FCC, NIOSH (National Institute For Occupational Safety and Health) **clearly conveys that the FCC limits need overhauling**. In a compelling, 173 page letter and research report attachments, NIOSH presents a convincing case. See **Reference 2**.

See **Reference 3**, Harvard University, Edmond J. Safra Center for Ethics, **Captured Agency, How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates**

[2] Dynamic Range of Human Sensitivity To EMF

Human Hearing The strength of the smallest detectable sound that a normal person can hear, up to a sound that is so loud that it causes pain is: **1 trillion to 1** (120 db)

Human Sight From the smallest strength of light that a human can possibly detect (2 photons of green light) to light that is so strong it is at the threshold of pain, the ratio is approximately: **100 trillion to 1** (140 db).

Could the EMF sensitivity of human physiology also have a wide dynamic range?

Apparent EMF Dynamic Range of The Human Physiology

Many times, people who promote Smart Meters assume that the human is only sensitive near the (excessively high) FCC maximum exposure levels, and that even a small amount of reduction of the EMF strength with increased distance (Range, the so-called $1/R^2$ effect) will result in EMF levels that are somehow, harmless. This argument is used to discount the EMF effect on an individual from Smart Meters throughout ones neighborhood. **It is my considered opinion that this idea of the $1/R^2$ effect bringing about a sudden cessation in physiological effect with increased Range, is far from correct.**

The considerable research in this area, evidenced in part by References 5-9 suggest a dynamic range of at least 10,000 to 1 or as much as 10,000,000 to 1.

See Reference 5 International Journal of Radiation Biology, Guler et al found increases in the DNA damage in both brain tissues and plasma. In this study, **EMF effect was found at 279 times lower than the FCC allowable exposure level.**

See Reference 6 In Biotech Histocam 2016, Turgut et al, 900 MHz electromagnetic field might induce oxidative stress causing morphological alterations in the heart. In this study, **EMF effect was found at 32 times lower than the FCC allowable exposure level.**

References 7, 8, 9 Arthur Firstenberg et al document a range of EMF strengths and the effects that have been studied. An impressively wide dynamic range, 10s of thousands to millions of times less than the FCC allowable exposures, is documented. When reading the referenced charts, keep in mind that the **FCC allowable level for 900 MHz is: 600 $\mu\text{W}/\text{cm}^2$ and the FCC allowable level for 2.4 Ghz is: 1000 $\mu\text{W}/\text{cm}^2$.** See **Reference 4**.

[3] Pulsing On and Off of An EMF Signal

Those who promote Smart Meters will often cite that the pulsing is, somehow, "a plus". They will mention that pulsing can effectively lower the average power and since they are only considering the simple heating/thermal effect of damage to the physiology, they count the inclusion of pulsing as better than no pulsing. They are ignoring crucial responses of the human physiology to pulsing, as the following researchers discuss.

Reference 10 Andrew Goldsworthy, PhD, *The Biological Effects of Weak Electromagnetic Fields*. Dr. Goldsworthy writes: "It would appear that the mobile telecommunications industry had not done their homework before electing the pulse frequencies for their digital communications, since they virtually all fall within this biologically active range; e.g., [1] 2G GSM cell phones (217Hz), [2] TETRA (17.6Hz), [3] DECT phones (100Hz), [4] WiFi (10Hz), [5] 3G UMTS signals with time division duplex (100Hz and 200Hz), all of which are potentially harmful."

Reference 11 The negative health effect of pulsing EMF is even seen at ELF (Extremely Low Frequencies). *International Journal of Neuroscience, Electromagnetic Hypersensitivity: Evidence for a Novel Neurological Syndrome*, A.A. Marino, PhD, et al

An electro-sensitive female medical doctor reported little or no physiological complaints when: 1] no EMF was applied and 2] when EMF was applied constantly but no pulsing. However, when the EMF was made to pulse at a low frequency (10 Hz) significant symptoms arose including; temporal pain, mild-to-strong headache, skipped heartbeats, and muscle twitch.

Reference 12 Carl F. Blackman, PhD, in his paper *Disruption by the Modulating Signal* he reveals important insights and mechanisms and offers recommendations with regards to pulsing EMF.

Briefly Dr. Blackman writes:

"There is substantial scientific evidence that some modulated fields (pulsed or repeated signals) are bioactive, which increases the likelihood that they could have health impacts with chronic exposure even at very low exposure levels. Modulation signals may interfere with normal, non-linear biological processes."

[4] Number of transmissions per day

In the context of smart-meters, be wary when you see or hear that the "number of transfers per day" is x. A "transfer" means conveying information, such as usage information. The question is, does the smart-meter fire up and transmit EMF for any other reason? If so, what are the total "transmissions" **for any reason?**

Below is a report published by 6 doctors that chronicle the difference between what the utility company claims as the transmissions per day and the truth of their EMF radiations per day.

Reference 13 West Coast Example of Excessive Transmissions Per Day

Paul Dart, M.D., et al. Pacific Gas and Electric repeatedly told customers that their Smart Meters transmitted 6 times per day. In the response to a court order, PG&E changed their story and provided documentation from the manufacturer showing more than 10,000 transmissions per day coming from every meter in the community.

Keep in mind that the true dynamic range of humans is such that the transmissions from many, many neighbors is also incident upon everyone, and might well be felt and cause physiological effects. How many total transmissions is that in a day, that one person feels? 100,000? 1,000,000?

[5] Responding To Claims That There Is No Research That Shows Harm to Human Physiology from EMF

Reference 14 US Navy study in 1972 cited **2,311 studies** on EMF harm to life.

Reference 15 **360 research reports** cited on harm to life from EMF, Beatrice Alexandra Golomb, MD, PhD Professor of Medicine

Reference 16 **More than 120 research reports** cited on harm to life from EMF.

Published papers by Andrew Marino, PhD and colleagues at Louisiana State University

Reference 13 **More than 100 research reports** cited on harm to life from EMF.

Paul Dart, M.D., et al

There are thousands of studies. What else must be said ?

Cell Phones and Smart Meters - Final Observations

Amongst the rhetoric voiced by supporters of Smart Meters is the statement that "everybody has a Cell phone". The suggestion here is that because everyone has a Cell phone, that Cell phones must therefore be safe. Why would anyone use a Cell phone if it were unsafe? Further, since everyone has a Cell phone, the addition of Smart Meters could not pose an additional EMF exposure problem.

To respond: 1] There are people who do not have Cells phones, indeed there are people who do not have computers and have never been "on the Internet", 2] there are people who have cell phones and only use them in emergencies, 3] the public is comfortable to use Cell phones since they have been told by the telecom industry that Cell phones are safe and the regulatory agency that is chartered with protecting "we the people" is effectively owned by the telecom industry, 4] even if every household had Cell phones, they are not operating, continuously 24/7 as Smart Meters do, 5] when someone uses a Cell phone it is voluntary, whereas the EMF from Smart Meters is imposed on all people without their consent, 6] the number of Cell phones in the world and the use of Cell phones by individuals does not in any way make Cell phones a kind-of standard of comparison for EMF safety.

The deployment of Smart Meters will create a 24/7 non-stop, dense, pulsing EMF electro-smog over the entire city, far more than that of Cell phones.

Appreciation: I would like to thank the scientists and architects who peer-reviewed this correspondence.

Sincerely,

Robert Palma
President, Chief Engineer, Midwest Research Corp.

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Reference 1 Dr. Martin Pall interview is found here:

<https://www.youtube.com/watch?v=ZAqmT9KJBC8>

Reference 2 The Department of Health and Human Services, the National Institute For Occupational Safety and Health (NIOSH). This letter (and attachments) are dated January 1994.

<http://www.rfreduce.com/robertsblog/research - niosh>

Reference 3 Captured Agency, How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates By Norm Alster https://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf

Reference 4 In FCC Bulletin OET 56, exposure levels are given for General Public, page 15.

https://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet56/oet56e4.pdf

Reference 5 In the International Journal of Radiation Biology, Guler et al in a research paper, Increased DNA oxidation (8-OHdG) and protein oxidation (AOPP) by low level electromagnetic field (2.45 GHz)

The authors say: "It may be concluded that low level EMF at 2.45 GHz MWR increases the DNA damage in both brain tissues and plasma"

The abstract and conclusions can be found here:

<https://www.ncbi.nlm.nih.gov/pubmed/24844368>

Reference 6 In Biotech Histocam 2016, Turgut et al, **Effects of long-term exposure to 900 megahertz electromagnetic field on heart morphology and biochemistry**

900 MHz electromagnetic field might induce oxidative stress causing morphological alterations in the heart.

The abstract and conclusions can be found here:

<https://www.emf-portal.org/en/article/30444>

Reference 7 http://www.goodhealthinfo.net/radiation/radio_wave_packet.pdf

Reference 8

https://maisonsaine.ca/wp-content/uploads/2013/12/CAVI_Society_attachment.pdf

Reference 9 <http://www.bioinitiative.org/report/wp-content/uploads/pdfs/BioInitiativeReport-RF-Color-Charts.pdf>

Reference 10 **Andrew Goldsworthy, PhD**, specifically discusses the pulsing (On and Off) of various microwave signals, on Pg 22, **The Biological Effects of Weak Electromagnetic Fields**;

http://rfreduce.com/robertsblog/Biol_Effects_EMFs_Dr_Andrew_Goldsworthy_2012_NZ2rev.pdf

Reference 11 International Journal of Neuroscience, Electromagnetic Hypersensitivity: Evidence for a Novel Neurological Syndrome, A.A. Marino et al

<http://andrewamarino.com/PDFs/173-IntJNeurosci2011.pdf>

An electro-sensitive female medical doctor was the test subject for this study. The subject reported little or no physiological complaints when no EMF was applied. Further, the subject reported little or no physiological complaints when EMF was applied constantly but no pulsing. However, when the EMF was made to pulse at a low frequency (10 Hz) significant symptoms arose including; temporal pain, mild-to-strong headache, skipped heartbeats, and muscle twitch.

Reference 12 Carl F. Blackman, PhD, in his paper Disruption by the Modulating Signal he reveals important insights and mechanisms and offers recommendations with regards to pulsing EMF.
<http://rfreduce.com/robertsblog/Disruption-by-the-Modulating-Signal-Blackman.pdf>

Reference 13 West Coast Example of Excessive Transmissions Per Day
Biological and Health Effects of Microwave Radio Frequency Transmissions
Paul Dart, M.D., (lead author), Kathleen Cordes, M.D., Andrew Elliott, N.D.,
James Knackstedt, M.D., Joseph Morgan, M.D., Pamela Wible, M.D.
Steven Baker (technical advisor)
<https://olis.leg.state.or.us/liz/201311/Downloads/CommitteeMeetingDocument/42624>

Reference 14 US Navy in 1972 cited **2,311 studies** on EMF harm to life.
Biological Phenomena ('Effects') and Clinical Manifestations Attributed to Microwave and Radio
Frequency Radiation
http://www.justproveit.net/sites/default/files/prove-it/files/military_radiowave.pdf

Reference 15 **360 research reports** cited on harm to life from EMF, Beatrice Alexandra Golomb,
MD, PhD Professor of Medicine, UC San Diego School of Medicine
http://rfreduce.com/robertsblog/Dr.Golomb_UC-SanDiego_School-of_Medicine_SB-649-5G-letter_2017-08-18b-1.pdf

Reference 16 **More than 120 research reports** cited on harm to life from EMF.
Published papers by Andrew Marino, PhD and colleagues at Louisiana State University
<http://andrewamarino.com/journalarticles.html>

Reference 17 Background Brief

Undergraduate at University of Virginia. While I was a full time student I worked continuously in both college radio broadcasting and commercial radio broadcasting. During my schooling, in my second year, I became the Chief Engineer of the college radio station, WUVA (640 KHz AM). In my third year of school, I became the Chief Engineer of WCCV FM (97.5 MHz). This is a 50 KW stereo FM station. In addition to the main 50 KW transmitter, I was responsible for operation, maintenance and repair of the auxiliary 3.4 KW FM transmitter, and a 5 KW AM transmitter, and 2 remote pickup transmitters and receivers at 26 MHz and 150 MHz.

Naval Weapons Laboratory, Electromagnetic Compatibility

As a graduate of University of Virginia's Electrical Engineering program, my first position in industry was at the Naval Weapons Laboratory in Dahlgren, VA. I worked in the Electromagnetic Vulnerability Division, the Electromagnetic Compatibility (EMC) Branch. Our Branch of 33 Electronic Engineers addressed and solved every EMC problem in the entire afloat US Navy. We worked from Extremely Low Frequencies (ELF), well into the microwave region (18 GHz).

In that position, I designed the first-ever HERO High Impedance Voltmeter to measure aircraft-to-deck RF (EMF) voltages. HERO is: Hazards of Electromagnetic Radiation to Ordnance. Numerous catastrophic incidents had occurred on US Naval aircraft carriers where RF (EMF) had inadvertently initiated ordnance. NOTE: ordnance is explosives.

Naval Research Laboratory (NRL), Electro-Explosive Subsystem Design

I was later hired at NRL and became the lead designer for Electro-Explosive Device (EED) Subsystems. For the uninitiated, these are not weapon systems. EEDs are used to accomplish staging, to release solar panels that were stowed for launch, and many other release and mechanical articulation functions. EEDs are used extensively in Aerospace because they are small, light, and highly reliable in their intended functioning. Unfortunately they are sensitive to inadvertent initiation by EMF.

Much care is required in the analysis and characterization of the **exact initiation mechanism**, as well as the **coupling mechanism** for EMF fields that induce voltages and currents into these devices.

The sensitivity of these EED devices covers an extremely broad range of frequencies.

Throughout my 23-year career I was deeply involved in this area. When the Space Shuttle came around I was one of 2 government engineers who set an EMC-Ordnance safety regulation in place for all Space Shuttle launches. NASA and the Air Force gave me an award for my efforts:

The award is here:

<http://rfreduce.com/award.html>

Current Professional Activities

For the past 26 years, in Fairfield, Iowa I have worked as a consultant in EMF environmental fields and with my brother Greg Palma, have produced various products that mitigate (reduce) EMF. Our principle activities are now in the arena of reducing the Dirty Electricity (DE) that is produced by inverters that are associated with solar and wind generating systems.

My complete resume, including papers published in refereed journals, is here;

<http://ketufile.com/whitepapers.php - resume>