

Case Study: Effect of Radio Frequency Radiation (RFR) and the Aires Defender Infinity on Endogenous Electromagnetic Energy of a 46-year old Healthy Female

Dr. Magda Havas, B.Sc, Ph.D.

Second in a Series of Studies, August 20, 2015



REPORT ON ORIGINAL RESEARCH

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Dr. Magda Havas, B.Sc., Ph.D.
Research of Subtle Energy
Environmental and Resource Studies
Trent University, 1600 West Bank Drive
Peterborough, ON, K9J 7B8, Canada
mhavas@trentu.ca



Signature

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Magda Havas, B.Sc., Ph.D.
Research of Subtle Energy (ROSE)
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ABSTRACT

The effect of Aires *Defender Infinity* (i.e. shield), a product that the manufacturer claims protects against harmful electromagnetic radiation, was tested with a healthy 46-year old female who gets headaches when exposed to radio frequency radiation (RFR). She was exposed in a double blind study, to radio frequency radiation (RFR) simultaneously generated by a 2.4 GHz cordless phone base station, Wi-Fi router and wireless baby monitor. Background exposure increased from less than 0.04 mW/m² to a maximum of approximately 700 mW/m². The shield did not change the amount of RFR in the environment; nor did it affect low frequency electric and magnetic fields, dirty electricity or the amount of body current, all of which were low to begin with, however it did alter some physiological responses of subject being tested. Systolic blood pressure decreased slightly with RF exposure but was not altered by the shield. Orthostatic heart rate variability (HRV) indicates some minor stress associated with RF exposure that became more obvious during supine stage of HRV and after re-exposure to RF. The treatments had only minor effects on HRV parameters. The cardiovascular response measured by MaxPulse, an FDA class II medical device improved significantly with the shield. Improvements were noticed in (1) differential pulse wave index that represents overall cardiovascular health; (2) eccentric constriction or the constriction power of vessels from the left ventricle; (3) arterial elasticity; and (4) overall stress score. Gas discharge visualization measured an imbalance in body energy during RF exposure that was corrected when the shield was worn. In conclusion, the Aires *Defender Infinity*, worn around the neck, did not change the electromagnetic environment in a way that we could measure but it did improve cardiovascular parameters and body energy balance during RF exposure.

INTRODUCTION

A large population, exposed to various forms of electromagnetic energy, is becoming ill. This “illness” has been referred to as microwave sickness, neurasthenia, idiopathic illness, and—more recently—electrohypersensitivity (EHS). Many products to help people tolerate an electromagnetically polluted environment are available but few of them are independently tested by a third party to ensure they meet manufacturers’ claims. The purpose of this research is to test claims made by American Aires Inc, that their “products provide protection from harmful electromagnetic radiation.” One product, the Aires *Defender Infinity* (hence forth referred to as the shield), was the subject of this research. A 46-year old healthy female who complains of getting debilitating headaches when exposed to some types of radio frequency radiation (RFR) was tested and her reactions to RFR—generated by a 2.4 GHz cordless phone base station, Wi-Fi router, and a wireless baby monitor—with the shield and with no shield in a double-blinded study were tested. This is second in a series of studies of the Aires *Defender Infinity*.

METHODS

American Aires Inc (Defender Infinity)

Aires Technologies (www.airestech.com) provides a number of different products that “neutralizes harmful electromagnetic radiation.” We tested one of their products, Aires *Infinity*, which is part of their *Defender* series (Figure 1). According to the company,

Aires Defender product range includes devices that provide universal protection for the human body. These devices are designed as personal protectors, which are worn by the individual. Utilizing the full range of devices will help you reduce the harmful effects of electromagnetic radiation that are impacting your health today.



Figure 1. Aires *Defender Infinity* is worn around the neck in a pouch and has the size and weight of a credit card.

Monitoring Electromagnetic Fields in the Environment

Research was conducted in the afternoon of August 20, 2015 in an electromagnetically clean environment. Several electrosmog exposures were monitored including dirty

electricity (Stetzerizer microsurge meter, Model GS-M300-A, Graham Stetzer International Inc.); radio frequency radiation (electrosmog meter, range 10 MHz–8 GHz, on Max hold); and both electric and magnetic fields (Gigahertz Solutions NFA 1000-3D-NF Analyzer, for 5 Hz – 1000 kHz).

Three common household products that generate 2.4 GHz frequencies were tested simultaneously including a Wi-Fi router (Hawking Technology, HOWABN1)); the base of a cordless phone (2.4 GHz digital AT&T 2230), and a wireless baby monitor (Avent Philips). All of these devices continuously emit a digital beacon signal when plugged into an electrical receptacle. When unplugged the radiation stops immediately. Subject was blindfolded and did not know where or what the source of her exposure was or whether it was on or off. The devices were placed near the subject's right arm while reclining during the HRV orthostatic test. When subject stood up the radiation sources were further away and exposure was reduced. During the RFR treatments, the devices were on continuously while we monitored her response.

Maximum exposures to RFR and lower frequency magnetic fields were monitored by sweeping the subject's body (i.e. moving the meters up and down the body to determine maximum exposure). Electric field was measured in the middle of the chair when subject stood up. Dirty electricity was measured in a nearby electrical outlet.

Monitoring Electromagnetic Fields Associated with the Body

The EM fields associated with the subject's body were also measured using a Russian B & E meter (BE-METP-AT-002) that gives readings for both electric and magnetic fields that are both below and above 2 kHz as these frequencies react differently with the body.

Body current was monitored by attaching one lead from a Fluke 187 scope meter (true RMS Multimeter) to the electrical ground and the other lead to a medical ECG patch near the upper part of the sternum. This second lead was then held in the air and not attached to the body. This was used as a reference.

Monitoring Endogenous Electromagnetic Fields and Physiological Parameters

Heart rate and blood pressure were measured with a digital blood pressure monitor (Life Source, model UA-1030TCN, A&D Medical). Heart health was measured with MaxPulse an FDA approved class II medical device. Orthostatic HRV was monitored using Nerve Express, which is an FDA 510K cleared device for investigational use only in the U.S. Live blood was assessed with a pinprick to the finger and immediately viewed under a Nikon microscope. Levels of body energy, stress and the balance of organ energy were measured using Bio-Well technology. This electrophotonics technology

relies on gas discharge visualization (GDV) and was designed by Dr. Konstantin Korotkov, St Petersburg, Russia.

RFR Exposure

Subject was exposed the RFR during the HRV orthostatic test. The testing was done in the following order: orthostatic HRV; B&E; body current; live blood; MaxPulse, cardiovascular and vessel health; blood pressure and heart rate; and Bio-Well GDV. During the testing sequence the source of the RFR was kept on or off depending on treatment. The exposure of the subject would be similar to having an active Wi-Fi router, a cordless phone and wireless baby monitor at home and moving around within a confined space. Consequently the exposures differed depending on the distance of the subject from the base station. The subject was exposed for a total of approximately 35 to 45 minutes, although some of the testing (HRV) was completed after 10-minutes exposure.

RESULTS & DISCUSSION

Test Subject

The test subject is a 46-year old female who complains of headaches when she is exposed to cell phones, cordless phones, Wi-Fi routers and microwave ovens. The subject believes she is electrically hypersensitive and has been for the past 12 years. She feels better now due to avoidance of EMF exposure. Her current exposure to electricity, radio frequency radiation, dirty electricity and X-rays is below average, while her exposure to sunlight is now above average.

The following wellness indicators are based on her response to a questionnaire. She is not taking any prescription medication and generally is in good health. She is often tired and recently experienced hair loss. She sometimes gets headaches that can be debilitating and she occasionally experiences digestive problems and ovarian pain. She sometimes has joint pain and memory loss and difficulty concentrating, and occasionally has nausea. She has deteriorating vision and sometimes experiences pressure in/behind the eyes and teeth pain, and occasionally experiences ear pressure. She sometimes needs to clear her throat and experiences muscular-skeletal stiffness/tightness and occasional aches and cramps. This subject has several mercury amalgam fillings; experiences food sensitivities; and had a spinal (neck) injury 30 years ago in a car accident.

Testing Environment

The research was conducted in an electromagnetically clean environment with low levels of radio frequency radiation (RFR), dirty electricity (DE), extremely low frequency (ELF) electric field (EF) and magnetic field (MF) (Table 1).

Dirty electricity was below 25 GS units, which is well below the limits for the Republic of Kazakhstan (HSSP 2003). The Republic of Kazakhstan has Sanitary Norms that state that a person should not be exposed to more than 25 V/m under 2 kHz and no more than 2.5 V/m between 2-400 kHz. The same is true for the magnetic component, which goes from 0.250 μ T to 0.025 μ T for the same frequencies. Dirty electricity was lower than in most places due to the presence of Graham Stetzer (GS) filters in electrical outlets.

Background levels of RFR were below 0.04 mW/m². No active sources of radio frequency radiation were present in the test environment and no cell towers were visible from the test lab. Lights were off during testing and only two computers were functioning so levels of ELF EMF were also low.

Table 1. EMF levels in the environment and near and on the body.

Treatment	Exposure				E Field				Body Fields M Field		Current microAmps	
	RFR mW/m ² body sweep	DE GS units GS filtered	MF microT body sweep	EF V/m on chair	<2 kHz V/m	>2 kHz V/m	<2 kHz nT	>2 kHz nT	body	background		
A Reference	0.0364	16	0.35	4.1	1	0.02	0	0	0.37	0.34		
B RFR no Shield	685	22	0.41	6.2	1	0.04	0.02	0	0.46	0.35		
C RFR plus Shield	718	22	0.37	7.2	1	0.02	0.06	0	0.51	0.35		
D Shield	0.0002	20	0.32	4.9	1	0.2	0.1	0	0.43	0.34		

RFR = radio frequency radiation; DE = dirty electricity; MF = ELF magnetic field; EF = ELF electric field
RFR source = Wi-Fi router; cordless phone base station; wireless baby monitor

When the three devices (all generating 2.4 GHz) were plugged into an electrical receptacle, levels of RFR increased to approximately 700 mW/m² on the chair where the person sat during her orthostatic HRV test. This level is below Health Canada's Safety Code 6 Guidelines (2015) (4,400 mW/m²) but well above the Russian guideline (100 mW/m²), the Salzburg and BioInitiative (2007) guidelines (1 mW/m²), and the Building Biology guideline (0.0001 mW/m²) (see Appendix I).

The ELF magnetic field and electric fields increased slightly when the wireless devices were activated (Table 1). These values for ELF magnetic field and electric field respectively, were below Canada's limit (833 mG and 5,000 V/m); were close to the BioInitiative limit (0.1 μ T); and were above the strictest guidelines in the world for Building Biology—Germany for sleeping guidelines (0.02 μ T and 0.3 V/m) (Appendix II).

Based on our measuring protocol, the shield did not alter the amount of RFR in the environment; nor did it affect ELF EMFs, dirty electricity or the amount of body current flowing along the skin. According to the company, “Our technology does not block or reduce any EMR/EMF and instead it transforms it into a coherent holographic wave form.” This *transformation* cannot be measured with the equipment that was used in our research.

Subject’s Response to RFR and Shielding

Blood Pressure and Heart Rate: Heart rate remained constant and systolic blood pressure decreased slightly during RF exposure. This change is likely to be insignificant (Table 2).

Orthostatic HRV: Based on the HRV orthostatic test, subject had a high *chronotropic reaction* (>0.7) indicating some adrenal fatigue; a normal *compensation reaction* and a moderately good *fitness score* 9:5. She had sufficient energy to mount a response in the event of HRV sensitivity to RFR (Havas and Marrongelle 2012). According to the blind analysis, during RFR exposure (Treatment B), she experienced an alarm reaction (i.e. something helped or jolted her adrenals). During RFR with the shield (Treatment C), she experienced some artifacts while lying down indicating exposure or re-exposure to RFR. Indeed it was continuous exposure. Since she had competent adrenals this was a minor reaction. Treatment C was the most inflammatory response. During the final treatment with the shield and no RFR (Treatment D) subject rebounded lying down but not standing up. She is an average person with minimal reaction to the stress with a palliative reaction back toward normal (i.e. relief of symptoms) in treatment D. Her results for orthostatic HRV are provided in Figures 2–5.

Table 2. Heart rate and blood pressure during various RF treatments and shielding.

Treatment	RFR mW/m2 body sweep	Blood Pressure	Heart Rate bpm
(A) Reference	0.0364	122/85	63
(B) RFR no Shield	685	115/84	65
(C) RFR plus Shield	718	116/86	66
(D) Shield	0.0002	120/87	66

Live Blood Analysis: We examined the subject’s blood during each treatment and discovered an artifact reaction with her blood so are unable to provide an analysis.

Heart and Artery Health (MaxPulse): Subject’s reaction to RFR showed minor deterioration in DPI (differential pulse wave index that represents overall cardiovascular health); EC (eccentric constriction or the constriction power of vessels from the left ventricle; AE (arterial elasticity); and RBV (remaining blood volume in vessels after systolic contraction of the heart), which were all reversed with the Shield (Figures 6 & 8). When the RFR was turned off (treatment D) with the shield still on the body, improvements in physical stress, mental stress and stress resistance were noted resulting in an improved stress score that dropped from 51 to 37 (Figures 7 & 8).

DPI (differential pulse wave index) represents overall health and aging of the heart and arteries. DPI decreased from 80 (optimal) in the reference to 59 (normal) with RFR and increased again to 82 (optimal) with the RFR and Shield combination (Figure 8).

Aires Infinity Shield & RFR: 46-year old female
Heart Rate Variability: Orthostatic Test – Fitness

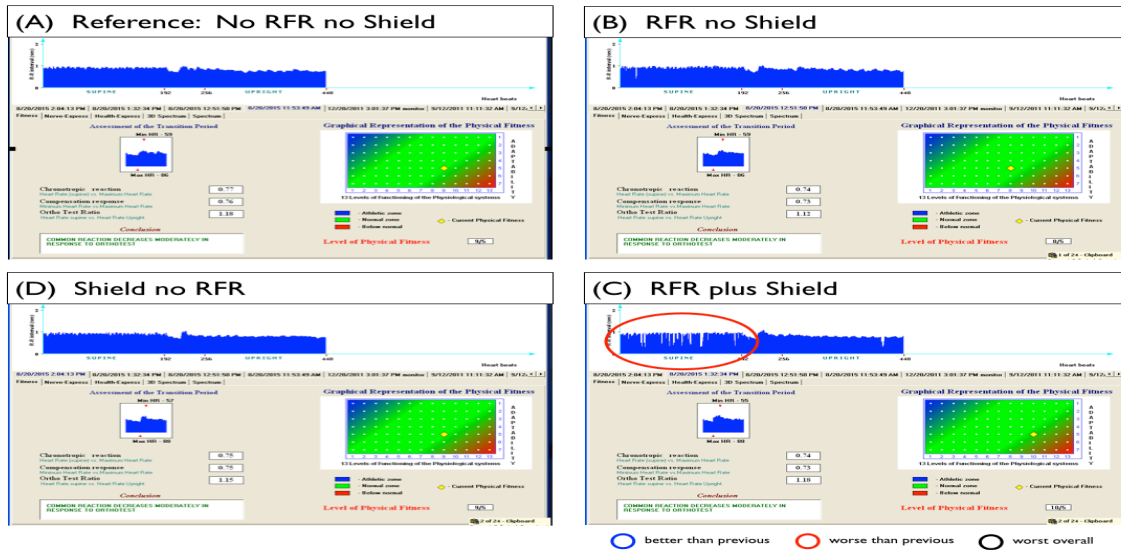


Figure 2. Nerve Express orthostatic HRV – fitness test – for 46-year old female exposed to four “treatments:” (A) Reference with no RFR; (B) RFR with no shield; (C) RFR plus shield; and (D) Shield with no RFR.

This pattern was repeated for **EC** (eccentric constriction), which began at 82 (optimal), dropped to 61 (normal range) with RF exposure and increased again to 86 (optimal) with RF and Shield. **AE** (arterial elasticity) dropped from an optimal (80) to normal (66) with RF exposure and increased to optimal again (84) with RF and Shield and then stayed optimal (84) when the RFR was turned off. **RBV** (remaining blood volume) changed slightly with treatments but remained within the normal range. Mental stress dropped

from normal to low (which is favorable) with the Shield and stress resistance increased from normal to high (also favorable) resulting in a lower overall stress score (Figure 8).

Aires Infinity Shield & RFR: 46-year old female
Heart Rate Variability: Orthostatic Test – Nerve Express

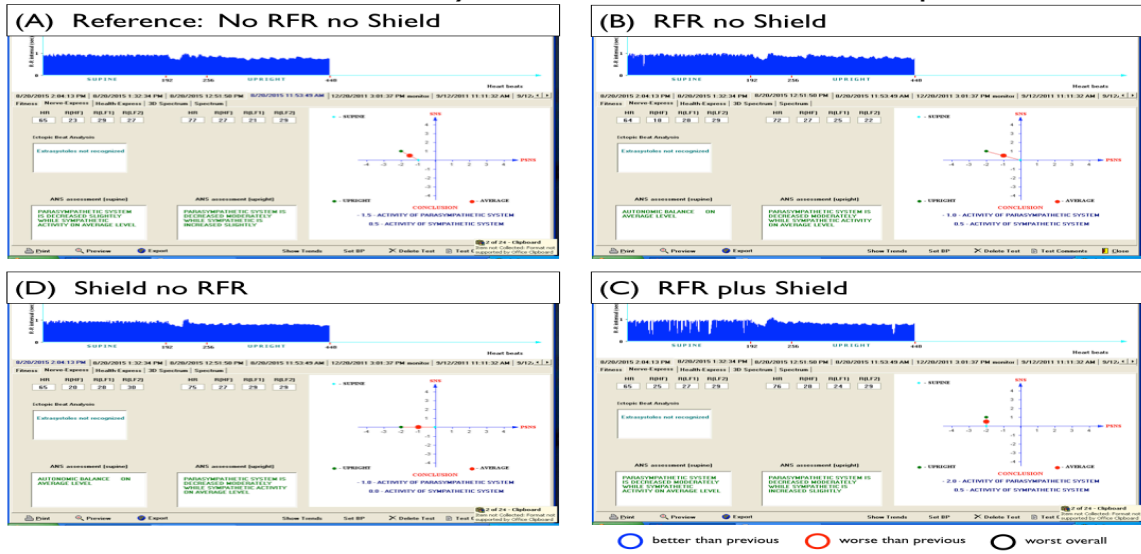


Figure 3. Nerve Express orthostatic HRV – nerve express – for 46-year old female exposed to four “treatments:” (A) Reference with no RFR; (B) RFR with no shield; (C) RFR plus shield; and (D) Shield with no RFR.

Aires Infinity Shield & RFR: 46-year old female Heart Rate Variability: Orthostatic Test – Health Express

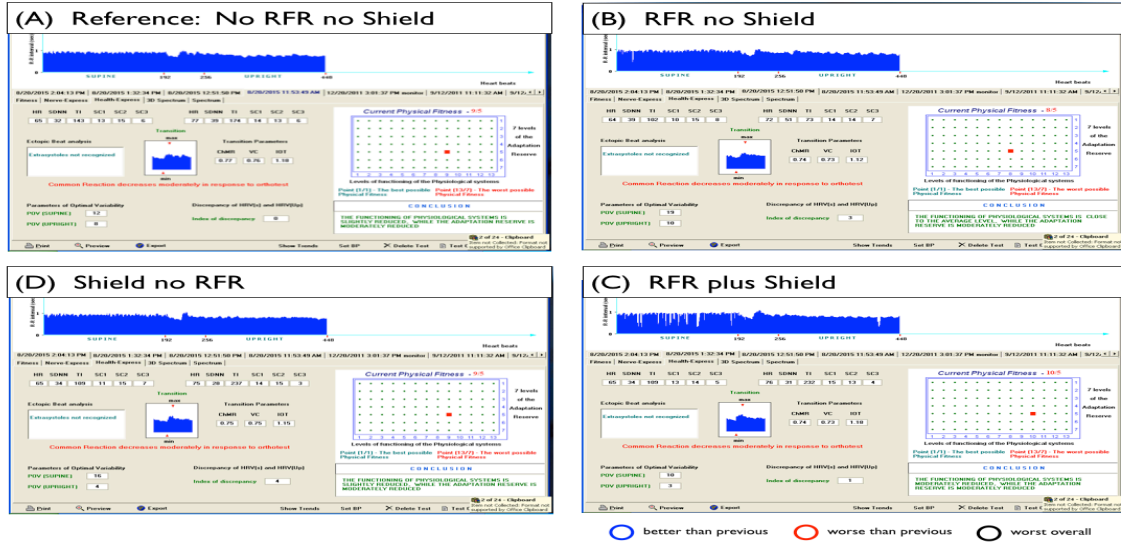


Figure 4. Nerve Express orthostatic HRV – health express – for 46-year old female exposed to four “treatments:” (A) Reference with no RFR; (B) RFR with no shield; (C) RFR plus shield; and (D) Shield with no RFR.

Aires Infinity Shield & RFR: 46-year old female Heart Rate Variability: Orthostatic Test – Spectrum

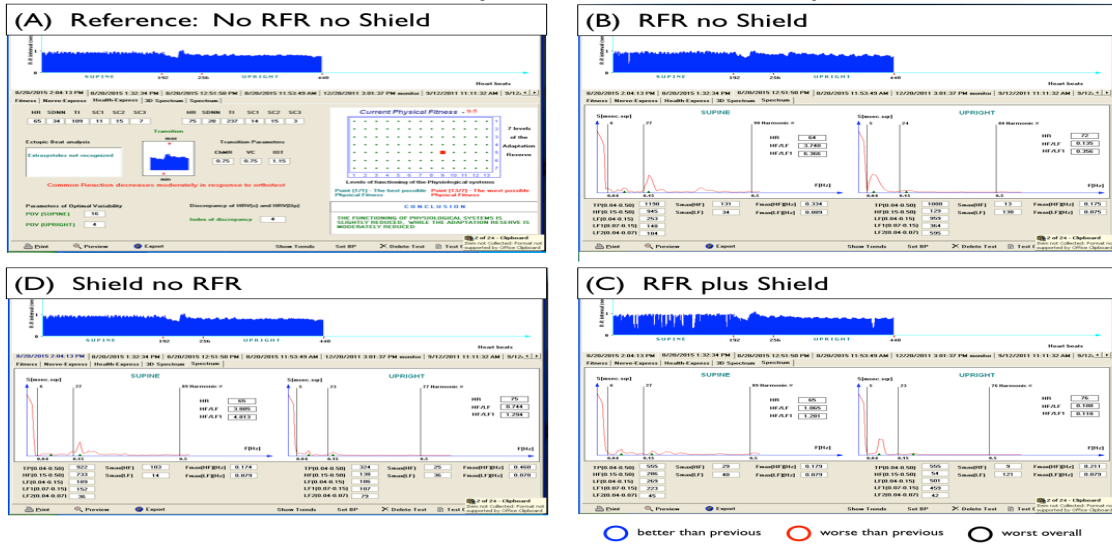


Figure 5. Nerve Express orthostatic HRV – spectrum – for 46-year old female exposed to four “treatments:” (A) Reference with no RFR; (B) RFR with no shield; (C) RFR plus shield; and (D) Shield with no RFR.

MaxPulse Report 1: Aires Infinity Shield & RFR – 46-year old female

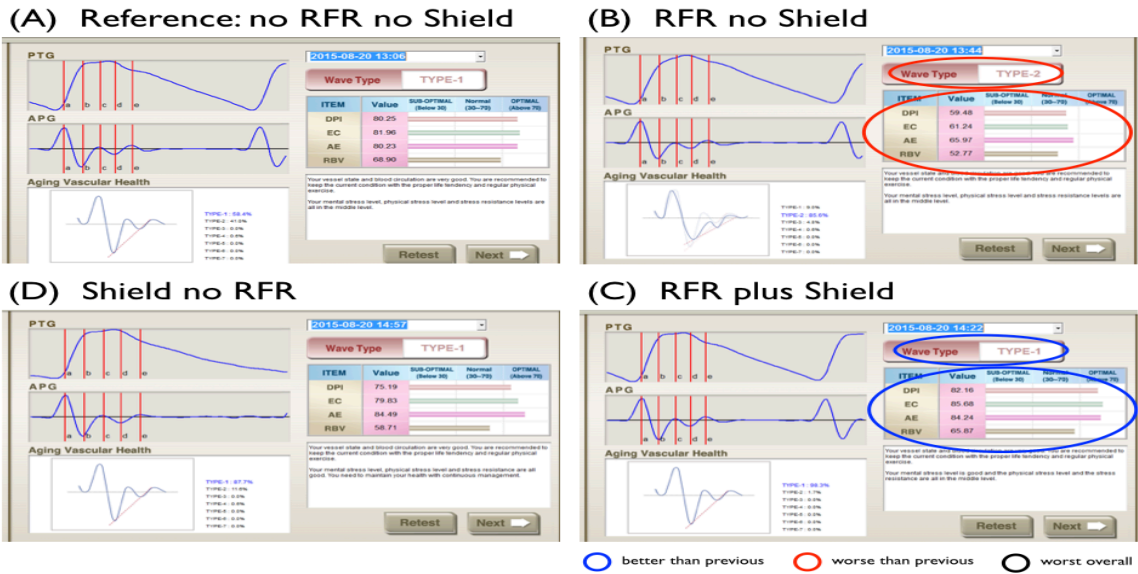


Figure 6. MaxPulse Report 1 for Aires Infinity Shield and RFR exposure of a 46-year old female. Coloured circles represent treatments showing improvements (blue) and deterioration (red).

MaxPulse Report 2: Aires Infinity Shield & RFR – 46-year old female

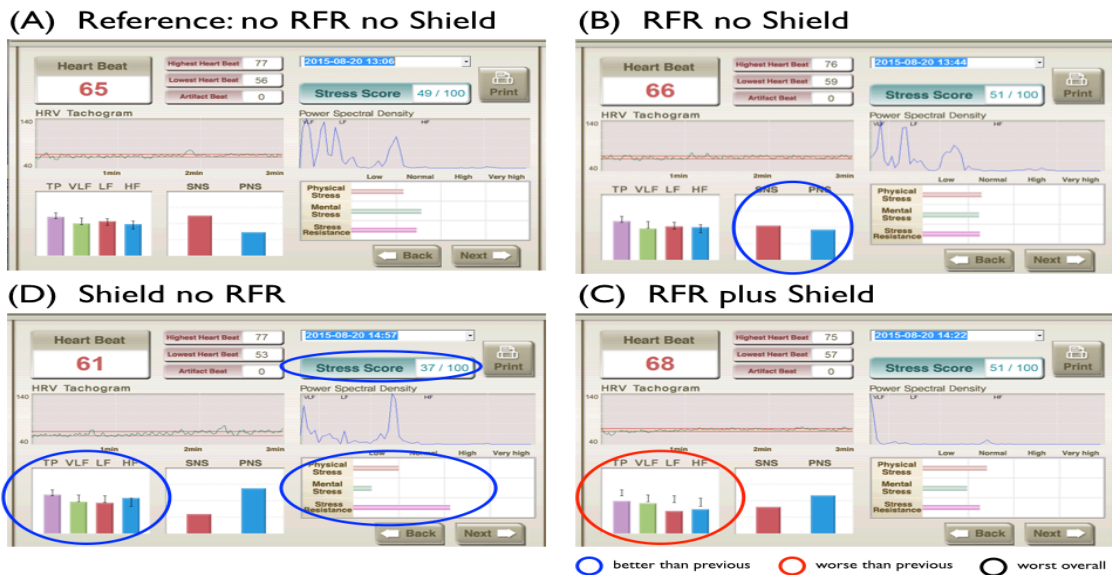


Figure 7. MaxPulse Report 2 for Aires Infinity Shield and RFR exposure of a 46-year old female. Coloured circles represent treatments showing improvements (blue) and deterioration (red).

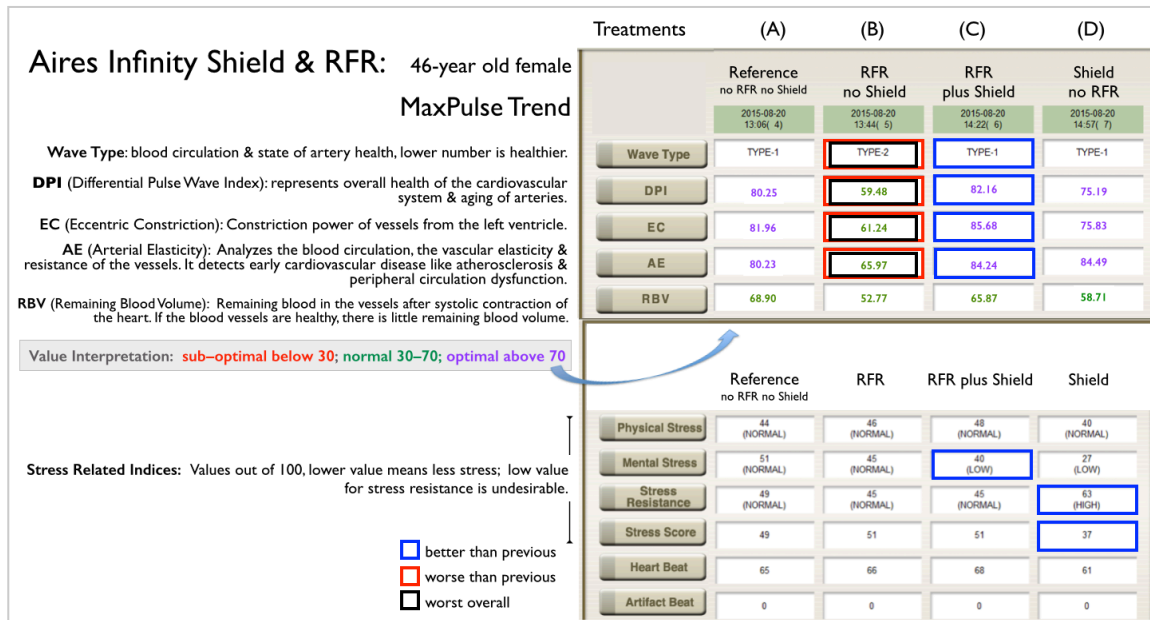
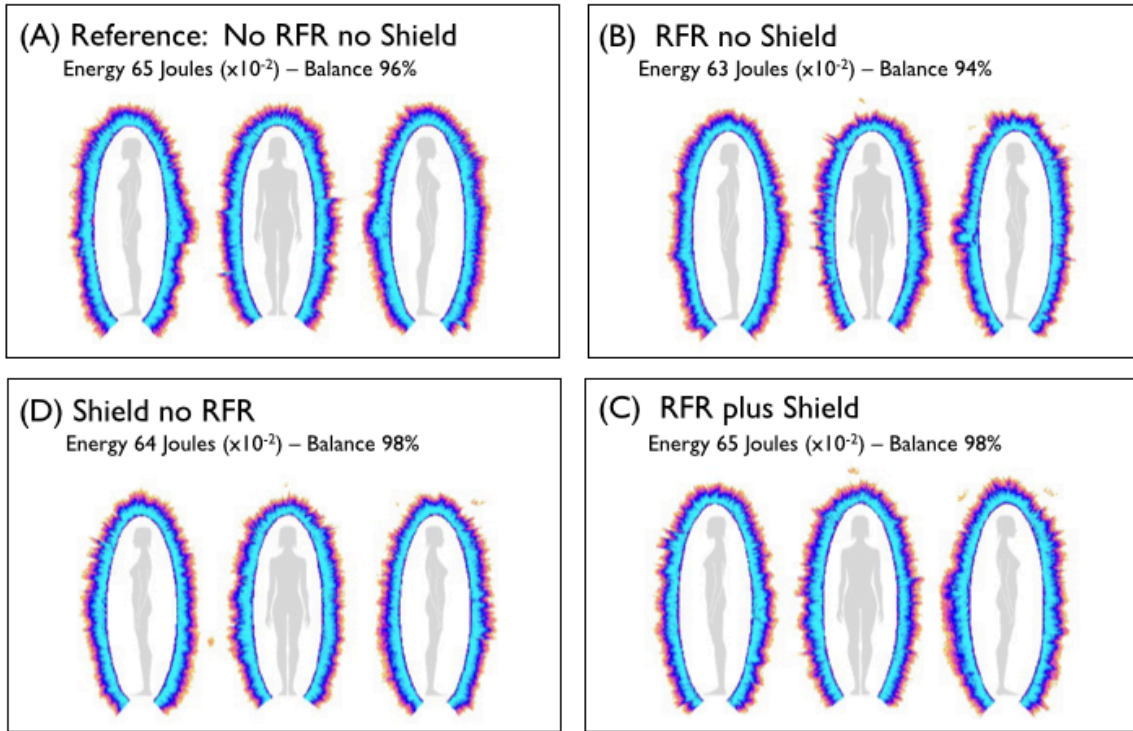


Figure 8. MaxPulse Trend for Aires Infinity Shield and RFR exposure of a 46-year old female. Coloured squares represent treatments showing improvements (blue); deterioration (red); and worst case (black).

Human Energy Field using Bio-Well: The human energy field was tested using a gas discharge visualization (GDV) technology, Bio-Well, designed in Russia by Dr. Konstantin Korotkov. Bio-Well is not a medical instrument, it is not designed for medical diagnostic, it allows for conducting energy analysis.

Slight changes were noted in the energy field and energy balance with RFR exposure that reversed with RFR exposure with the shield however none of these are changes is significant (Figure 9).

Bio-Well: Energy Field – Aires Infinity Shield & RFR – 46-year old female



Bio-Well is not a medical instrument, it is not designed for medical diagnostic, it allows conducting energy analysis. In case of health concerns, please consult your doctor.

Figure 9. GDV of body's energy field using Bio-Well technology showing body energy and balance with four treatments.

Visualization of the Chakras indicates a misalignment with RFR exposure and a return to balance with the Shield plus RFR exposure (Figure 10) indicating that the shield may have a beneficial effect.

The 46-year old female was relatively healthy and her organs and systems indicate that in Figure 11. No significant changes associated with RFR and shielding were noted.

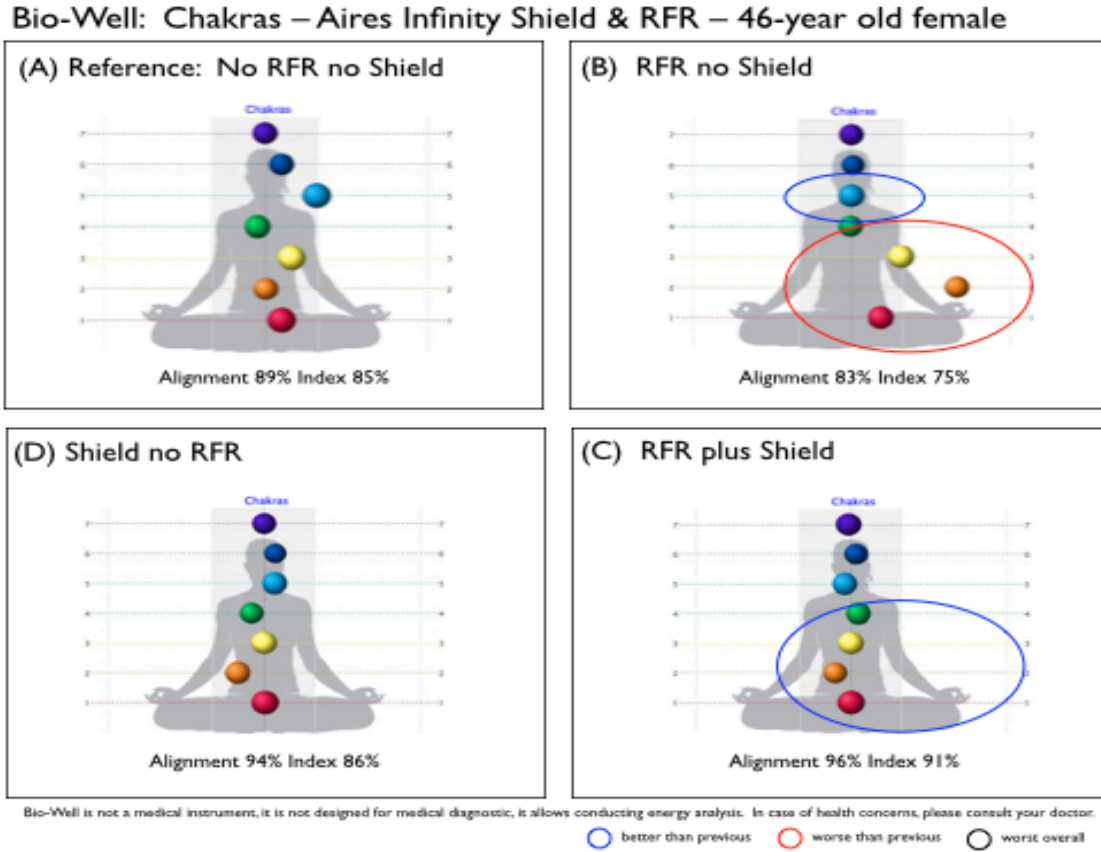


Figure 10. Changes in alignment of Chakras with four treatments of RFR and shielding technology.

An energy imbalance was observed with RFR exposure and this was reversed with shielding technology, once again indicating a beneficial effect (Figure 12).

When the data were sent out to a blind reviewer, an expert with Bio-Well technology, the response was that the subject did best during treatment D. The bio-field was most cohesive (Figure 9); the chakra alignment was best in D and a close second was C (Figure 10); for both homeostasis and energy function the best results are for treatment D. Treatment D is the shield with no RFR (Figures 11 and 12).

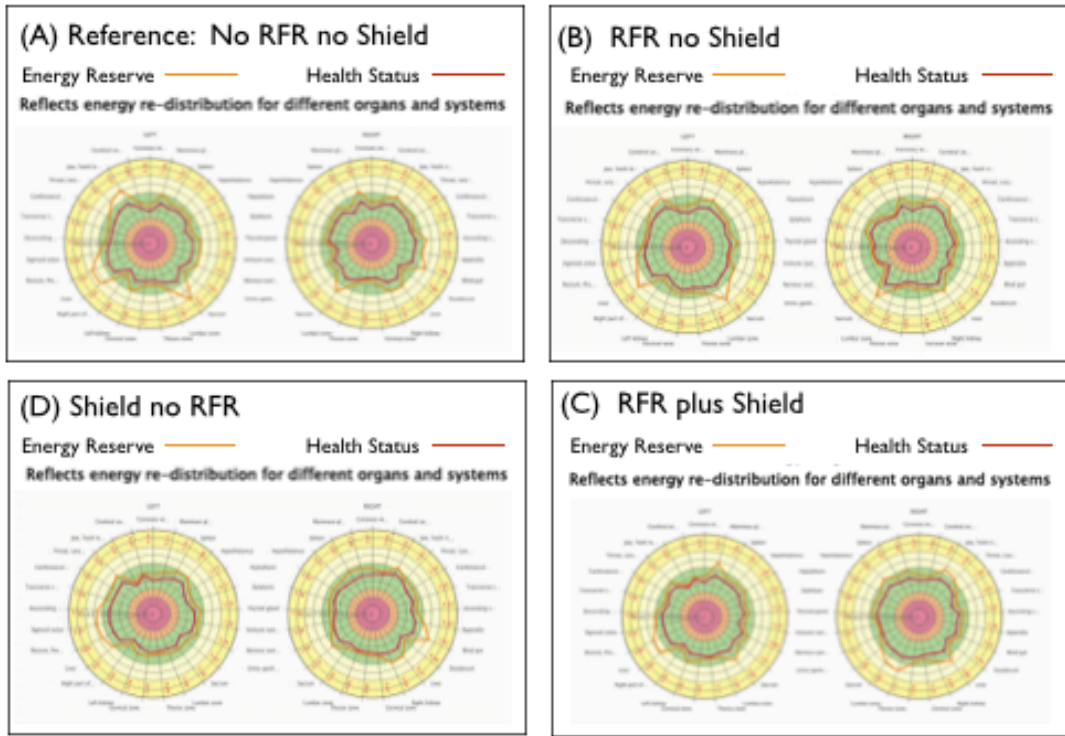
CONCLUSIONS

In conclusion, the Aires *Defender Infinity* did not block or reduce any of the electromagnetic radiation or fields monitored in the environment. This is in agreement with the claims made by the manufacturer of this technology. What they do claim is that their technology transforms EMR/EMF into a *coherent holographic waveform*. This

transformation cannot be measured with the equipment that we used in this research. Ultimately what is critical is how an individual reacts to the electromagnetic energy in their environment and that is why we measured the response of the individual being tested.

Systolic blood pressure decreased slightly with RFR exposure but was not affected by the Aires Infinity shield (Table 2). Heart rate remained constant with no effect of either the RFR or the shield.

Bio-Well: Energy Diagram – Aires Infinity Shield & RFR – 46-year old female



Bio-Well is not a medical instrument, it is not designed for medical diagnostic, it allows conducting energy analysis. In case of health concerns, please consult your doctor.

Energy parameters
 Green area – represent boundaries for practically healthy people;
 Yellow area – represent Energy deficiency (low level of stress in most cases is indication high level of physiological control);
 Red area – zone of attention.

Figure 11. Energy Reserve and health status of various organs and organ systems with RFR exposure and shielding.

Subject had a mild reaction while lying down during the orthostatic HRV testing to a RF re-exposure while she was wearing the shield indicating that prolonged exposure may be more stressful to this individual (Figure 2). Additional testing with prolonged exposure is required to see is this response is repeatable.

The greatest improvement (or protection) associated with the Aires *Defender Infinity* was documented by MaxPulse, an FDA approved Class II medical device that monitors heart

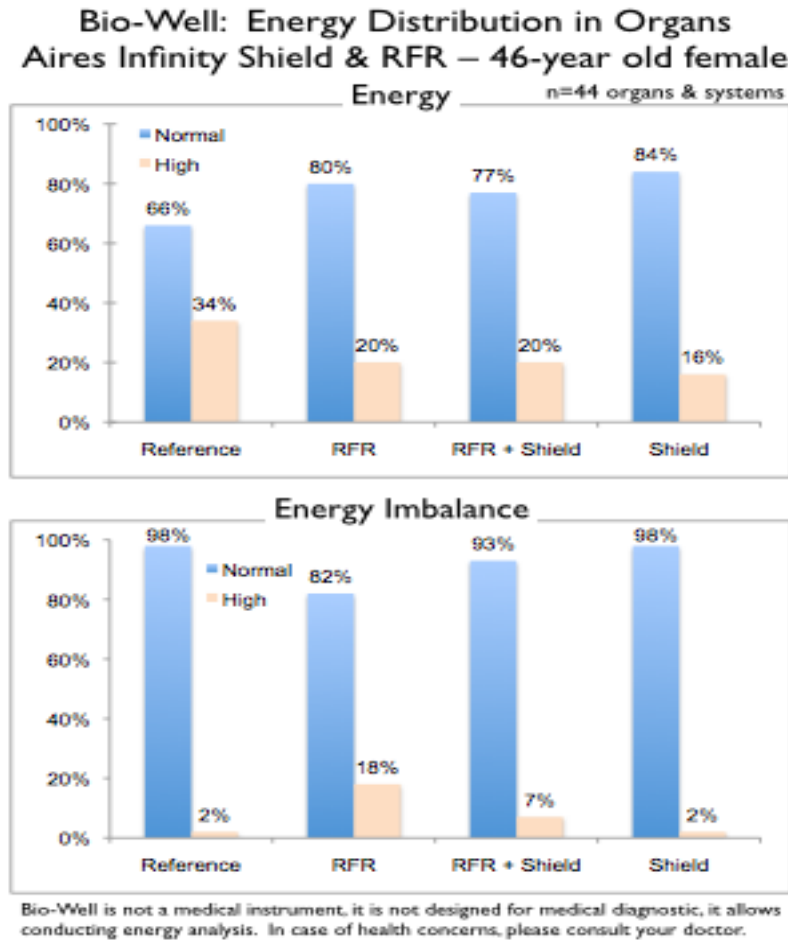


Figure 12. Energy distribution and energy balance in organs and systems with RFR exposure and shielding.

and blood vessel parameters. According to this test, with RF exposure heart and blood vessel parameters got worse for the following: (1) DPI (differential pulse wave index) represents overall health and aging of the heart and arteries; (2) EC (eccentric constriction), which measures the constriction power of vessels from the left ventricle; and (3) AE (arterial elasticity). All of these parameters improved when the shield accompanied RF exposure (Figure 8). Additional improvements were noted for mental stress. When the RFR was discontinued and the subject still wore the shield, stress resistance improved, as did the total stress score (Figure 8). These results for DPI, ED and AE are consistent with a previous subject (52-year old female) who was tested using a similar protocol (Havas, 2015).

In this study we conducted a live blood analysis, but experienced an artifact that seemed to affect rouleaux formation and hence we are unable to comment on these results.

With GDV testing we noticed a significant imbalance of the 1st, 2nd, and 3rd chakras with RF exposure that rebalanced itself with shield and RF exposure (Figure 10). Similar response to energy balance of organs and systems was observed (Figure 12). All of these results indicate a potential beneficial effect of the Aires *Defender Infinity*.

Subjective observations also coincided with these objective results. The subject felt better while wearing the shield and her facial features indicated less stress.

These results indicate that the Aires *Defender Infinity* does not alter the external (exogenous) electromagnetic environment, but that it does alter the internal (endogenous) electromagnetic environment. The Aires *Defender Infinity* appears to have a beneficial effect on body energy balance, and both heart and blood vessel parameters. Additional testing is recommended to see how consistent this response is among those who react to electromagnetic pollution.

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Appendix I. International Radio Frequency (RF) Exposure Limits for 1800 MHz-Range.

International Radio Frequency "RF" Exposure Limits for 1800 MHz Range
(Cell Phone, WiFi, Smart Meters, etc)

Location	Reference	Exposure time	Limit Based On	Lower by	mW/m ²	V/m
Most of Western Europe	IEEE C95.1-1999 and ICNIRP	30 minutes	Thermal / Heating	-	10,000	61.4
USA	(FCC) IEEE C95.1-1999 and ICNIRP	30 minutes	Thermal / Heating	-	10,000	61.4
Canada	Safety Code 6, Table 5 (2015)	6 minutes	Thermal / Heating	66 x	4,394	40.7
Russia	Sanitary Norms and Regulations 2.2.4/2.1.8.055-96	3 hours +	Biological Effects	100 x	100	6.14
China	UDC 614.898.5 GB 9175-88	3 hours +	Biological Effects	100 x	100	6.14
Italy	Sanitary Norms and Regulations 2.2.4/2.1.8.055-96	3 hours +	Biological Effects	100 x	100	6.14
Most of Eastern Europe	Sanitary Norms and Regulations 2.2.4/2.1.8.055-96	3 hours +	Biological Effects	100 x	100	6.14
Switzerland	Ordinance on Protection from Non-ionising Radiation (NISV)	Long Term	Precautionary	100 x	100	6.14
Toronto Board of Health, Canada	Proposed 1999	Long Term	Precautionary	100 x	100	6.14
Bio-Initiative Report recommendation	Bio-Initiative Report 2007	Long Term	Biological / Precautionary	10,000 x	1	0.614
Salzburg Resolution on Mobile telecommunication	Preventive public health protection, Salzburg, June 7-8, 2000	Long Term	Precautionary	10,000 x	1	0.614
European Parliament	Resolution 1815, Strasbourg, May 27, 2011	Long Term	Precautionary	10,000 x	0.106	0.2
Building Biology Guidelines Germany (Sleeping Areas)	SBM2008 - Level of No Biological Concern	Long Term	Precautionary	100,000,000 x	0.0001	0.006,14
Cell Phone Operational Requirements				10,000,000,000 x	0.000,001	0.000,061,4
Natural Cosmic Radiation	MAES 2000	Long Term	Natural Exposure	10,000,000,000,000 x	0.000,000,001	0.000,000,061,4
Average Indoor Urban Exposure Toronto, Canada	Safe Living Technologies Inc. 2011	Long Term			0.2 - 0.5	0.3 - 1.4

source: modified from Safe Living Technologies, Inc., www.slt.co

Appendix II. International EMF Exposure Limits for AC Electric and AC Magnetic Fields.

International EMF Exposure Limits for AC Electric and AC Magnetic Fields

50/60z (High Voltage Power Lines, Home Electrical Wiring, Power Cords, Appliances)

microT

Location	Reference	Limit Based On	AC Magnetic Field mG	AC Electric Field V/m
Canada	ICNIRP 1998	Nerve and Muscle Stimulation	833 0.833	5,000
USA	ACGHI 1998	Nerve and Muscle Stimulation	1,000 100	25,000
Germany	DIN/VDE	Nerve and Muscle Stimulation	50,000 5,000	20,000
Sweden	MRP	Biological / Precautionary	3 0.3	25
Sweden	TCO	Biological / Precautionary	2 0.2	10
Switzerland		Biological / Precautionary	10 1	
WHO "possibly carcinogenic"		Biological / Precautionary	3-4 0.3-0.4	
Bio-Initiative Report recommendation	Bio-Initiative Report 2007	Biological / Precautionary	1 0.1	
US Congress	Recommendation 1996	Biological / Precautionary	2 0.2	10
Building Biology Guidelines Germany (Sleeping Areas)	SBM2008 - Level of No Biological Concern	Biological / Precautionary	0.2 0.02	0.3
Natural Radiation	MAES 2008	Natural Exposure	0.0002 0.00002	0.0001
Average Indoor Urban Exposure Toronto, Canada	Safe Living Technologies Inc. 2011		0.4 to 2.0 0.04 to 0.2	5 to 25

source: modified from Safe Living Technologies, Inc., www.slt.co