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# MRET Wave Rider Technology

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## Abstract

This article is related to the experimental data revealing the ability of Wave Rider (WR) device (MRET noise field generator) to mitigate unwanted biological effects of technologically originated electromagnetic radiation (EMR). A number of publications in the scientific literature have raised concern about the individual and public health impact of adverse non-ionizing radiation from EMR exposure emanating from certain electrical and wireless devices commonly found in the home, workplace, school and community. Despite the many challenges in establishing irrefutable scientific proof of harm and the various gaps in elucidating the precise mechanisms of harm, epidemiological analyses continue to suggest considerable potential for injury and affliction as a result of non-ionizing radiation exposure. It would be a desirable to develop a technology that can mitigate such health risks. Wave Rider technology was recently developed to prevent health risks associated with the exposure to EMR. The core part of Wave Rider is MRET polymer compound. Due to the fractal geometry structure of MRET polymer compound and the phenomenon of piezoelectricity, this polymer generates subtle, low frequency, non-coherent electromagnetic oscillations (composite noise field) when exposed to electromagnetic field of 7.8 Hz and 14.5 Hz frequency oscillating in a repeating sequence for 5 seconds each time. MRET (Molecular Resonance Effect Technology) polymer compound is driven by the solenoid that encapsulates this polymer material. The composite noise field can modify RF signals as a result of superposition phenomenon. The superposition of composite noise field generated by WR on RF microwave signals leads to amplitude modulation of RF signals where random low frequency signal generated by WR is a modulating signal and original microwave signal is a modulated one.

The experiment conducted at MET Laboratory (A leading independent electrical testing & certification lab [1] (USA) shows that at the close proximity to Wave Rider there was found significant increase of the noise field spectrum content level in the range of 4 Hz to 50 kHz. Test conducted at NEMKO laboratory (Electromagnetic Compatibility & Telecommunications lab (USA) [2] confirmed that measured at the distance of 30 feet (9 meters) intensity of noise field spectrum generated by WR is several orders higher compared to the magnetic field intensity of human brain electroencephalographic activity in the range of Delta (1 Hz ) and Alfa (10 Hz) frequencies. It allows concluding that WR noise field signals may affect/resonate with brain wave signals and as a result normalize brain activity when human subject is exposed to man-made EMR.

To realize such assumption there was arrange a study at RF Exposure Laboratory. The protocol was designed to find out the effect of WR noise field spectrum on SAR (specific absorption rate) values of mobile phones. Another *in vitro* study was conducted at Molecular Diagnostic Services Inc. (USA) to verify the effect of WR noise field on metabolic activity of human Astrocytes exposed to microwave radiation of mobile phone. The results of both experiments clearly confirm WR preventive effect against unwanted biological effects of EMR.

**Keywords:** Astrocytes; MRET Noise Field Generator; Piezoelectric Effect; Fractal Geometry; Noise Field; Amplitude Modulation; Metabolic Activity.

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## Introduction

Electric devices and infrastructure and wireless communication are hallmarks of modern life. The proliferation of these technologies in recent years has dramatically increased our exposure to electromagnetic radiation. While the science on the health impacts of this form of radiation is inconclusive, many people are concerned about how long-term exposure to excessive EMR may impact human health and nature. In 2007, an independent, international collaborative of 14 scientists and public health and policy experts reviewed more than 2000 studies of health effects from EMR (*the BioInitiative project*). They concluded, "Chronic exposure to EMF is associated in some scientific studies with increased health risks that vary from impaired learning, headaches, mental confusion, skin rashes, tinnitus and disorientation to a variety of cancers, and neurological diseases like ALS and Alzheimer's"[3]. For this reason it would be desirable to develop a technology that can protect humans against possible health risks associated with exposure to man-made EMR. The objective of presented in this paper studies was to verify that Wave Rider technology can potentially mitigate unwanted biological effects of electromagnetic radiation.

Wave Rider technology is covered by US Patent. The core part of WR is a composite material – polymer of fractal structure. Due to the fractal structure of MRET polymer compound and the phenomenon of piezoelectricity this polymer generates subtle, low frequency, non-coherent electromagnetic field (composite noise field) when exposed to electromagnetic field of 7.8 Hz and 14.5 Hz frequency oscillating in a repeating sequence for 5 seconds each time. MRET polymer compound is driven by the solenoid that encapsulates the polymer material. The composite noise field can modify RF signals as a result of superposition phenomenon. The superposition of composite noise field generated by Wave Rider and RF microwave signals leads to amplitude modulation of RF signals where random low frequency signal generated by WR is a modulating signal and original microwave signal is a modulated one. *Amplitude modulation* consists of encoding information onto a carrier signal by varying the amplitude of the carrier. Amplitude modulation produces a signal with power concentrated at the carrier frequency and in two adjacent sidebands. When multiplying one signal by another the upper sideband represents the carrier plus the modulator and the lower sideband represents the carrier minus the modulator. The sideband power accounts for the variations in the overall amplitude of the signal. Realizing mentioned above it is possible to conclude that Wave Rider low frequency signal superimposed on RF carrier microwave field makes the resulting modulated spectral components of microwave field to resemble the characteristics of spatial incoherent field or noise field.

Litovitz *et al.* [4] proposed that living cells exist in an electrically noisy environment and these endogenous thermal noise fields are larger than those exogenous EMFs reported to cause effects. They suggested that only the EMFs that are temporally and spatially coherent such as radiofrequency fields could affect living cells while endogenous thermal noise fields, which cells do not respond to, were temporally and spatially incoherent. A number of observations have supported this theory. In one experiment, the cellular effects induced by acute microwave radiation were mitigated by superposing with electromagnetic noise *in vitro*. DNA damage induced by 1.8 GHz microwave radiation at the SAR of 3 W/kg and 4 W/kg was significantly higher than sham exposure ($p<0.001$) whereas no significant differences could be observed in other exposure groups compared with the sham exposure group ($p>0.05$). Electromagnetic noise alone did not increase DNA damage of HLEC, and when it was superposed on the radiofrequency field; the electromagnetic noise could block RF-induced DNA damage [5]. Another experiment demonstrated that microwave fields, amplitude modulated by an extremely low-frequency (ELF) sine wave, can induce a nearly twofold enhancement in the activity of ornithine decarboxylase (ODC) in L929 cells at SAR levels of the order of 2.5 W/kg. Similar, although less pronounced, effects were also observed from exposure to a typical digital mobile phone test signal of the same power level, burst modulated at 50 Hz. It has also shown that ODC enhancement in L929 cells produced by exposure to ELF fields can be inhibited by superposition of ELF noise [4].

## Method and Materials

1. The first experiment was conducted at FCC (Federal Communications Commission) certified NEMKO laboratory (USA) in order to evaluate emission data of Wave Rider device. The purpose of this study was to find out the intensity of noise field generated by WR. It was necessary to understand if WR signals can affect/resonate with human brain waves in order to normalize brain waves activity when human subject is exposed to harmful effects of EMR. The brain wave activity directly related to the function of the central nerves system, as a result it controls function of all organs in the human body. A new study from Sweden has been published by Eberhardt *et al*, [6] and is co-authored by veteran EMF researchers Leif Salford and Bertil RR Persson of Lund University. The study reports that cell phone GSM frequency exposure induces pathological leakage of albumin across the blood-brain barrier. Such effects have been reported in prior studies (for example, Salford 2003 ). The blood-brain barrier is a critical structure in the brain that separates the flow of blood through the brain from the brain matter itself. Blood contains toxins being carried to excretory organs and also certain molecules like albumin that can be lethal to brain tissue [6].

For this reason, three probe testing was conducted for Delta range (1 Hz cutoff frequency), Alfa range (10 Hz cutoff frequency) and Beta range (30 Hz cut off frequency) (Figure1).

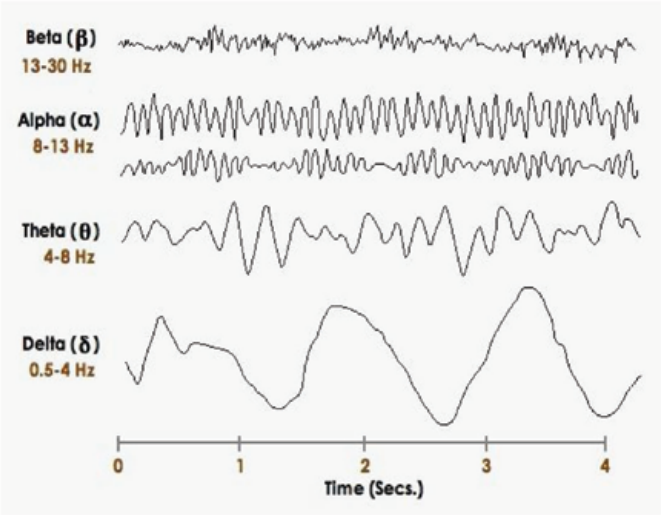


**Figure 1.** Brain wave frequency [7].

The results of the first experiment study show that the intensity of WR noise field in the range of Delta (1 Hz cutoff frequency) and Alfa (10 Hz cutoff frequency) activity at the distance of 30 feet (9 meters) is several orders higher compared to the magnetic field intensity of human brain activity.

| Table 1. | Wave Rider Measurement Results | | | |
|---|---|---|---|---|
| Frequency | Distance from | Magnetic field strength | | Magnetic flux |
| | WR | A/m | Oersted | density (gauss) |
| 1 Hz | 15 feet | 0.00106 | 0.00001332 | $1.332 \times 10^{-5}$ |
| | 30 feet | 0.00027 | 0.00000339 | $3.39 \times 10^{-6}$ |
| 10 Hz | 15 feet | 0.00113 | 0.0000142 | $1.42 \times 10^{-5}$ |
| | 30 feet | 0.00028 | 0.00000352 | $3.52 \times 10^{-6}$ |

* Conversion formula used: $A/m = 4\pi \times 10^{-3}$ Oersted

For most purposes, gauss and oersted are essentially equivalent. For example, a 1 oersted magnetic field strength in air is about equal to a 1 gauss magnetic flux density in air. It is well known that magnetic field intensity of human brain activity is in the range of $10^{-9} - 10^{-8}$ gauss [8].

It allows concluding that WR noise field signals can affect/resonate with brain wave signals and support normal brain activity when human subject is exposed to EMR.

The normalization of brain activity leads to the restoration of the blood - brain barrier (BBB) when human subject is exposed to EMR. Later on this effect of WR was found by Dr. Muriyama in Japan. He found when human subject is exposed to radiation WR noise field enhances blood supply to the frontal lobes of the subject's brain.

2. Another study-second experiment was conducted at FCC certified MET Laboratory (USA), report EMCS35370-GEN. Test was designed to find out characteristics and limits of electromagnetic signals generated by Wave Rider (WR). It was detected with the help of a Real Time Spectrum Analyzer (Agilent E4447A) the increase of the noise field spectrum content level in the range of 4 Hz to 50 kHz at close proximity to WR (Figure 2 and Figure 3). WR noise signals are more intensive in the range of low frequency (4 Hz) which means that WR effect matches the range of human brain waves. Test shows that WR generates noise field signals in low frequency range.

For many years, the US Army was concerned that many of their personnel operating radio, communications and other equipment showed symptoms of radiation poisoning, and realized they needed to protect themselves from harmful electromagnetic radiation. The research project was initiated in 1986 and funded in its first five years by the U.S. Army Walter Reed Army Institute Department of Microwave Engineering. The project was a large scale effort at the Catholic University of America's (CUA) Department of Physics [9]. Their researchers were the first to come up with the idea that there was some structural difference between electromagnetic fields that were natural and those that were man-made. Man-made electromagnetic fields radiate with steady, regular oscillations or pulses with constant frequencies. However, natural electromagnetic fields are highly irregular, with random and mixed frequencies and waveform. The researchers discovered that man-made frequencies had a detrimental, negative effect on biological cells, whereas the natural frequencies did not.

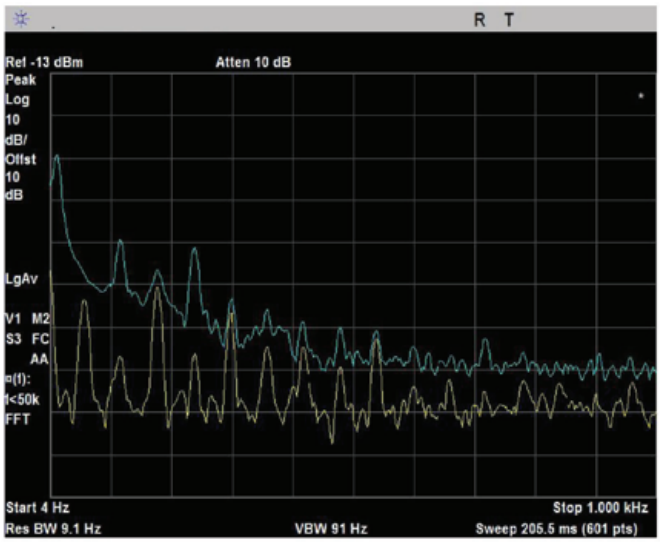


**Figure 2.** Antenna @ 0ft (4 Hz- 1 kHz). The plot was taken with the WR OFF (Yellow Trace) and ON (Blue Trace).

The researchers called this natural electromagnetic field with random and mixed frequencies and waveform, "Noise Field". A number of Universities all over the globe conducted stud-

ies regarding the effect of noise field. They came to conclusion that noise field signals superimposed on microwave signals mitigate/reduced negative effects of EMR on living cells in human subjects. Eventually, they succeeded in creating a solution. They called it the Noise field technology. Over the years, researches in various Universities have found it to be effective against an entire range of EMR-related symptoms at both the cellular and genetic level.

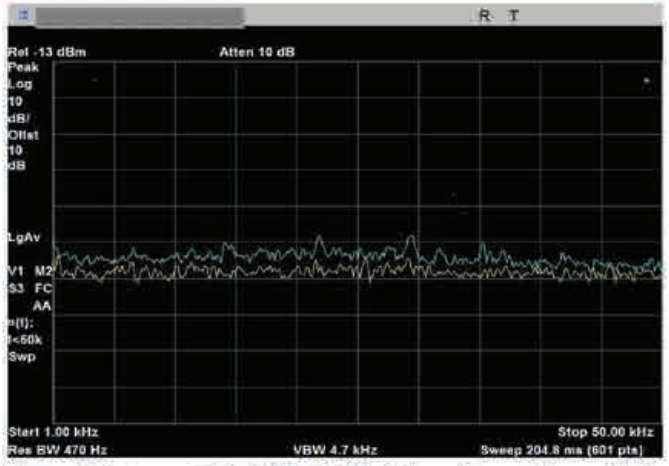


**Figure 3.** Antenna @ 0ft (1 kHz-50 kHz). The plot was taken with the WR OFF (Yellow Trace) and ON (Blue Trace).

## 3. The third experiment

This study was conducted at the laboratory of Dr. Masaru Emoto (Tokyo, Japan). The sample of distill water was placed in close proximity to the operating mobile phone for 2 hours period of time. Then 0.5 mL samples of liquid water from a specific sample have been placed on 100 Petri dishes that were then frozen and stored at a temperature of - 25°C for three hours in a freezer. A sample was removed from the freezer for observation under a microscope with a camera in a room with a constant temperature of -5°C. The sample of crystals was observed and photos were taken (Figure 4 ).

Then experiment was duplicated for another distill water sample, when sample was placed in close proximity to the operating mobile phone (same model) for 2 hours period of time, but at the same time the operating Wave Rider device was placed at the distance of 5 meters from the tested water sample. A sample of frozen water was observed under a microscope and photos were taken (Figure 5).

**Figure 4.** Image of froze water sample after exposure to mobile phone radiation without WR.

**Figure 5.** Image of frozen water sample after exposure to mobile phone radiation with WR.

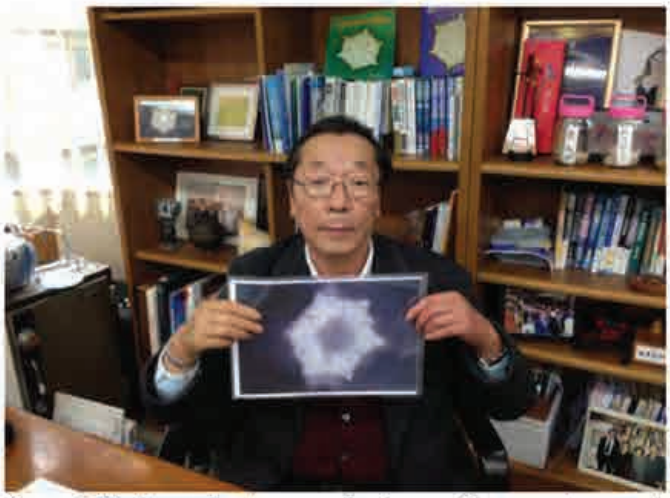

**Figure 6.** Dr. Masaru Emoto presenting image of frozen water sample after exposure to mobile phone radiation with WR (images courtesy of Dr. Emoto).

What is the nature of process in which the snowflake was *created?* At the beginning, it is a small formation. A few atoms formed a small piece of crystal. Such a small piece of crystal almost always has usually some hexagonal symmetry. Then, the water molecules are added to the crystal because it's energetically favored. Nature adds one water molecule at a time. The molecules always try to choose the most energetically favored position on the frozen body. Because these laws of creation of a snowflake are symmetric with respect to the rotational symmetries, it follows that any symmetry that exists at the beginning - a hexagonal symmetry of a small number of molecules in the initial crystal - will be preserved. It's pretty much inevitable that all the arms are growing approximately equally, so the initial symmetry group is preserved and becomes symmetry of a macroscopic object. The whole process of ice crystal formation is governed by the natural stability of water molecular hydrogen bonding [10]. The stable arrangement of hydrogen-bonded water molecules in ice gives rise to the beautiful hexagonal symmetry that reveals itself in every snowflake.

There is a significant deformation of hexagonal symmetry for the frozen water sample pre-exposed to mobile phone radiation (Figure 4). Very likely it is a result of natural hydrogen bonding distortion of water samples exposed to the radiation of mobile phone. On the other hand, we observe restoration of hexagonal symmetry of frozen water samples exposed to mobile phone radiation, when samples were treated with Wave Rider signals (Figure 5) and (Figure 6). It allows concluding that Wave Rider noise field can compensate for the distortion effect of hydrogen bonding of water molecules exposed to microwave radiation. This is an important finding considering that human body on the average basis consists up to 70% of water. It has long been known that the intracellular water very close to any membrane or organelle (sometimes called *vicinal water*) is organized very differently from bulk water, and that this structured water plays a significant role in governing the shape (and thus biological activity) of large folded biopolymers. The biological activity of proteins (of which enzymes are an important subset) is critically dependent not only on their composition but also on the way these huge molecules are folded; this folding involves hydrogen-bonded interactions with water, and also between different parts of the molecule itself. Anything that disrupts these water molecular hydrogen bonds will denature the protein and destroy its biological activity.

4. Another experiment was conducted at Molecular Diagnostic Services Inc., San Diego. Mobile phones model Samsung Gusto™2 was used to administer the irradiation of Astrocyte cells. Wave Rider device was used to test the compensatory effect of amplitude modulated (noise field) signals on Astrocytes exposed to mobile phone irradiation.

- Astrocytes were thawed, plated into poly-lysine coated flasks and cultured for several days prior to seeding into 96 well plates. Cells were seeded in two poly-lysine 96 well plates (25,000 cells/well).
- Plates of astrocytes were treated with or without cell phone radiation daily for 6 hours/day (for a total of 5 days.
- Cell phone radiation was administered by placing the plate directly 1 inch above a Samsung Gusto™2 cell phone at room temperature during which an active call was continuously ongoing for 6 hours. Phones were monitored every 10 minutes to ensure no interruption in the call occurred. The untreated plate was incubated at room temperature in a separate room. Room temperature was monitored throughout the experiment at each plate. Fluctuations in room temperature were minimal and deemed equivalent at each station.
- Three plates were included in the study. Plate one received no cell phone treatment, plate 2 received cell phone treatment alone, plate 3 received cell phone treatment and was placed at 30 feet distance from Wave Rider. A plate 3 was treated in one room while plates 1 and 2 were kept in two separate rooms. Temperature in the rooms were monitored and controlled within 1 degree Celsius. On day 3, random temperature samples were taken on well in each plate and confirmed average temperature variations were a single degree Celsius or less from plate to plate.
- Following treatment, all plates were placed back into the 37°C incubator.
- At days 2, 3, 4 and 5, an MTT-like assay was performed using the Cell Titer 96 Aqueous reagent (Promega) according to the manufacturer's recommendation. MTT was added to wells and the plates were read on a 96 well plate reader (490 nm) (Molecular Devices Vmax kinetic microplate reader, Molecular Devices LLC) at various time-points after addition of the test reagent. Incubation time varied, as the number of cells increased over time. The same plate was used for all assay measurements and only a subset of wells treated with MTT on each assay date. To normalize data to account for the varying cell number and MTT incubation times, background (determined from average optical density value from wells containing media alone) was subtracted from individual data points and an average and standard deviation was calculated for the cell phone or no cell phone treated wells. The percentage of MTT signal in the cell phone treated wells relative to the no cell phone treated wells was calculated using the average and standard deviations from the two sample sets on each day of measurement. This percentage was then plotted as a function of days of treatment.

The results of the MTT-like assay are presented in the section below:

Figure 7 contains a dose response graph of the MTT assay

data for Astrocytes with and without mobile phone irradiation treatment and in the presence of WR. The "no mobile phone" treatment signal on each day of measurement is set at 100% and the percentage of this signal obtained from the mobile phone treated or mobile phone plus WR wells is graphed.

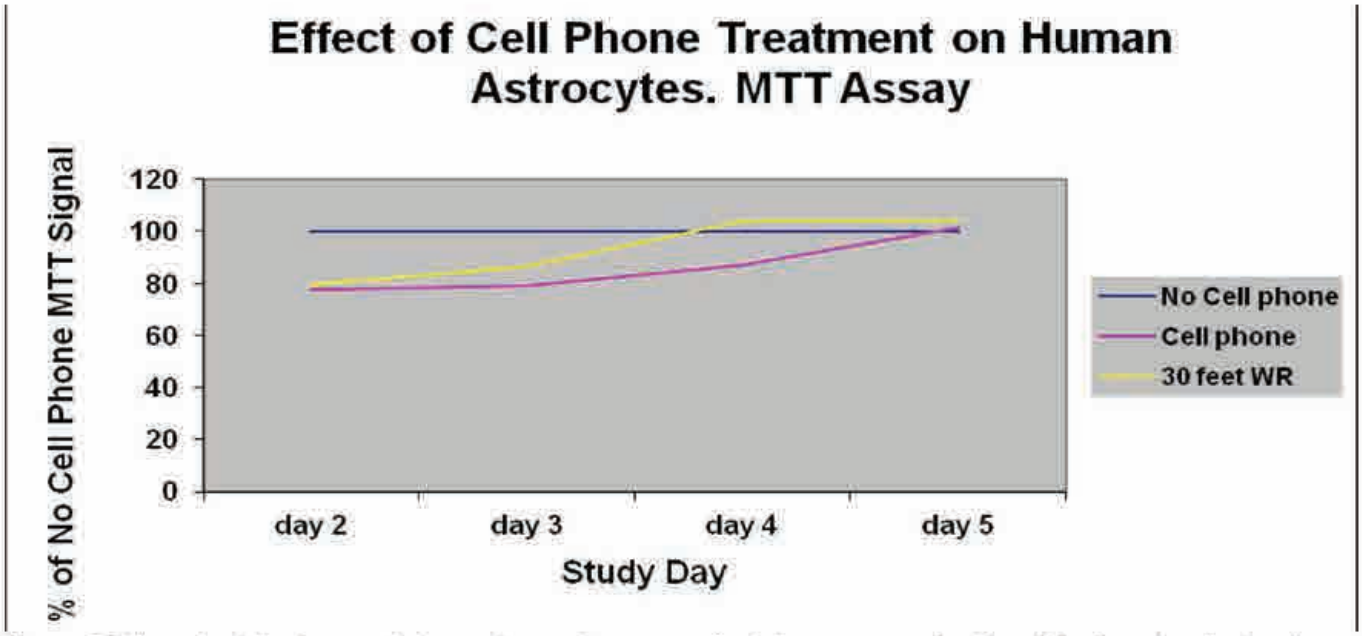


**Figure. 7** Effect of mobile phone radiation on human Astrocyte cells. Cells were treated with mobile phone irradiation plus or minus WR (at the distance of 30 ft away) for 5 consecutive days. On days 2, 3, 4, and 5, an MTT Assay was performed. Data was normalized as indicated in the Work accomplished section above, and the percent signal relative to the "no mobile phone" treated wells was plotted as a function of study day. Data points represent the average values for replicate wells. Error bars represent standard deviations. Standard deviations were calculated using standard methods for the propagation of errors.

| Day 2 | Raw Data | | | |
|---|---|---|---|---|
| position | 30 feet | | Phone only | No phone |
| | 1.366 | | 1.350 | 1.451 |
| | 1.341 | | 1.375 | 1.539 |
| | 1.466 | | 1.387 | 1.626 |
| | 1.403 | | 1.407 | 1.570 |
| | 1.332 | | 1.404 | 1.579 |
| | 1.323 | | 1.324 | 1.491 |
| | Media | | | |
| | 0.608 | | 0.624 | 0.592 |
| | 0.602 | | 0.630 | 0.572 |
| $\mu$ | 0.605 | | 0.627 | 0.582 |

| Minus Background | | | |
|---|---|---|---|
| 30 feet | | Phone only | No phone |
| 0.761 | | 0.723 | 0.869 |
| 0.736 | | 0.748 | 0.957 |
| 0.861 | | 0.760 | 1.044 |
| 0.798 | | 0.780 | 0.988 |
| 0.727 | | 0.777 | 0.997 |
| 0.718 | | 0.697 | 0.909 |

| | | | | |
|---|---|---|---|---|
| $\mu$ | 0.767 | | 0.748 | 0.961 |
| $\sigma$ | 0.054 | | 0.032 | 0.063 |

| | 30 feet | | Phone only | No phone |
|---|---|---|---|---|
| *Average* % of No Cell | 79.8 | | 77.8 | 100.0 |
| $\sigma$ | 9.69 | | 7.89 | 9.33 |

**Table 2.** Effect of mobile phone radiation +/- WR on human Astrocyte cells: Day 2 Data. Raw Data and Analyzed Data are presented for the MTT reading on cells treated with mobile phone radiation for 2 days. Results are from an overnight read of the MTT data. After subtracting the average media alone signal, an average (μ) and standard deviation(σ) were calculated. The percentage of the Non-Cell Phone signal then calculated.

| Day 3 | Raw Data | | | |
|---|---|---|---|---|
| position | 30 feet | | Phone only | No phone |
| | 1.336 | | 1.247 | 1.493 |
| | 1.424 | | 1.249 | 1.509 |
| | 1.326 | | 1.340 | 1.500 |
| | 1.448 | | 1.320 | 1.545 |
| | 1.414 | | 1.333 | 1.519 |
| | 1.366 | | 1.304 | 1.379 |

| Minus Background | | | |
|---|---|---|---|
| 30 feet | | Phone only | No phone |
| 0.729 | | 0.659 | 0.901 |
| 0.817 | | 0.661 | 0.917 |
| 0.719 | | 0.752 | 0.908 |
| 0.841 | | 0.732 | 0.953 |
| 0.807 | | 0.745 | 0.927 |
| 0.759 | | 0.716 | 0.787 |

| | Media | | | |
|---|---|---|---|---|
| | 0.602 | | 0.588 | 0.594 |
| | 0.613 | | 0.588 | 0.591 |
| $\mu$ | 0.608 | | 0.588 | 0.593 |

| | | | | |
|---|---|---|---|---|
| $\mu$ | 0.778 | | 0.711 | 0.898 |
| $\sigma$ | 0.050 | | 0.041 | 0.058 |

| | 30 feet | | Phone only | No phone |
|---|---|---|---|---|
| *Average* % of No Cell | 86.6 | | 79.1 | 100.0 |
| $\sigma$ | 9.10 | | 8.66 | 9.09 |

**Table 3. Effect of cell phone radiation +/- WR on human astrocyte cells: Day 3 Data.** Raw Data and Analyzed Data are presented for the MTT reading on cells treated with mobile phone radiation for 3 days. Results are from an overnight read of the MTT data. After subtracting the average media alone signal, an average(μ) and standard deviation(σ) were calculated. The percentage of the Non-Cell Phone signal then calculated.

| Day 4 | Raw Data | | | |
|---|---|---|---|---|
| position | 30 feet | | Phone only | No phone |
| | 1.728 | | 1.508 | 1.578 |
| | 1.813 | | 1.628 | 1.710 |
| | 1.876 | | 1.618 | 1.770 |
| | 1.792 | | 1.584 | 1.725 |
| | 1.837 | | 1.535 | 1.691 |
| | 1.592 | | 1.419 | 1.479 |

| Minus Background | | | |
|---|---|---|---|
| 30 feet | | Phone only | No phone |
| 1.016 | | 0.850 | 0.940 |
| 1.101 | | 0.970 | 1.072 |
| 1.164 | | 0.960 | 1.132 |
| 1.080 | | 0.926 | 1.087 |
| 1.125 | | 0.877 | 1.053 |
| 0.880 | | 0.761 | 0.841 |

| | Media | | | |
|---|---|---|---|---|
| | 0.728 | | 0.657 | 0.641 |
| | 0.697 | | 0.660 | 0.636 |
| $\mu$ | 0.713 | | 0.659 | 0.639 |

| | | | | |
|---|---|---|---|---|
| $\mu$ | 1.061 | | 0.890 | 1.020 |
| $\sigma$ | 0.101 | | 0.079 | 0.109 |

| | 30 feet | | Phone only | No phone |
|---|---|---|---|---|
| *Average*% of No Cell | 103.9 | | 87.2 | 100.0 |
| $\sigma$ | 14.33 | | 13.86 | 15.09 |

**Table 4.** Effect of cell phone radiation +/- WR on human astrocyte cells: Day 4 Data. Raw Data and Analyzed Data are presented for the MTT reading on cells treated with mobile phone radiation for 4 days. Results are from an overnight read of the MTT data. After subtracting the average media alone signal, an average(μ) and standard deviation(σ) were calculated. The percentage of the Non-Cell Phone signal then calculated.

| Day 5 | Raw Data | | | |
|---|---|---|---|---|
| position | 30 feet | | Phone only | No phone |
| | 1.799 | | 1.851 | 1.668 |
| | 1.924 | | 1.929 | 1.842 |
| | 1.999 | | 2.037 | 2.022 |
| | 1.945 | | 1.780 | 1.990 |
| | 2.036 | | 2.045 | 1.945 |
| | 1.816 | | 1.894 | 1.751 |
| | Media | | | |
| | 0.696 | | 0.717 | 0.691 |
| | 0.702 | | 0.746 | 0.706 |
| $\mu$ | 0.699 | | 0.732 | 0.699 |
| | 30 feet | | Phone only | No phone |
| *Average* % of No Cell | 104.2 | | 101.7 | 100.0 |
| $\sigma$ | 14.34 | | 14.86 | 16.98 |

| Minus Background | | | |
|---|---|---|---|
| 30 feet | | Phone only | No phone |
| 1.100 | | 1.120 | 0.970 |
| 1.225 | | 1.198 | 1.144 |
| 1.300 | | 1.306 | 1.324 |
| 1.246 | | 1.049 | 1.292 |
| 1.337 | | 1.314 | 1.247 |
| 1.117 | | 1.163 | 1.053 |

| | | | | |
|---|---|---|---|---|
| $\mu$ | 1.221 | | 1.191 | 1.171 |
| $\sigma$ | 0.096 | | 0.104 | 0.141 |

**Table 5. Effect of cell phone radiation +/- WR on human astrocyte cells: Day 5 Data.** Raw Data and Analyzed Data are presented for the MTT reading on cells treated with cell phone radiation for 5 days. Results are from an overnight read of the MTT data. After subtracting the average media alone signal, an average(μ) and standard deviation(σ) were calculated. The percentage of the Non-Cell Phone signal then calculated.

For the Astrocytes treated with mobile phone irradiation, a reduction in the MTT signal was observed compared to the untreated cells between days 2 and 4. However, when Astrocytes samples were placed at the distance of 30 feet away from Wave Rider a difference in MTT signal of WR plus mobile phone treated cells was observed. This difference was most dramatic at day 4. By day 5, all treatments resulted in similar MTT signals likely due the fact that cells were beginning to reach confluence in the wells.

Thus, it appears that mobile phone treatment had a negative effect on the Astrocytes growth up until the 5th day of culture. The results for the experiment reveals the following: when normal human brain Astrocyte cells are exposed to mobile phone irradiation cells growth is significantly inhibited within the first 3-4 days. Then Astrocytes metabolic activity begins to increase most likely due to the adaptation effect (cells structure and function are constantly modified in response to changing environmental influences). The negative effect of mobile phone irradiation on Astrocytes growth was partially relieved when Wave Rider was placed at the distance of 30 feet from the treated plates. There was average 7.2% increase of Astrocytes metabolic activity due to WR compensatory effect compared to the treated cell samples without WR influence (see Figure 7). This experiment confirms that Wave Rider device placed at the distance of 30 feet from the treated plates has measurable compensatory effect on the inhibition of normal human brain Astrocyte cells growth when cells are exposed to mobile phone irradiation. It is a significant finding considering that Astrocyte cell projections called trocytic feet (also known as "glia limitans") surround the endothelial cells of the blood - brain barrier (BBB), providing biochemical support to those cells.

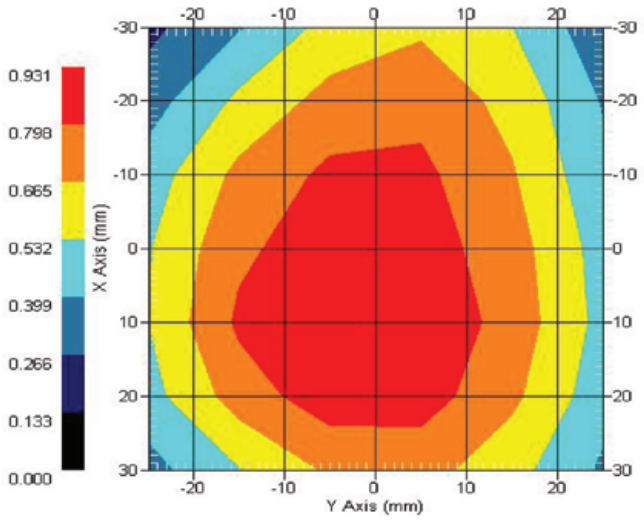


**Figure 8** ."Hot Spots" diagram without Wave Rider effect. SAR Values:
1 gram SAR value: 0.858 W/kg

10 gram SAR value: 0.621 W/kg Area
Scan Peak SAR: 0.928 W/kg Zoom Scan
Peak SAR: 1.061 W/kg

5. The research "R&D Testing SAR Evaluation R&D.20071102" was conducted at FCC certified RF Exposure Laboratory, Escondido, California by the analyst Jay Moulton. Cell phones use for test: Qualcomm Model QCP-2035a S/N B3266834, Kyocera Wireless Model 2325 S/N 457E8CE6 and Samsung Model SCH-A670 S/N298F6709. Frequency range: 824.7 – 848.31 MHz, 1851.25 – 1908.75 MHz. Maximum RF Output: 23 dBm. Conducted signal modulation: CDMA.

Wave Rider device was placed at the distance of 7 feet from the tested "phantom head".

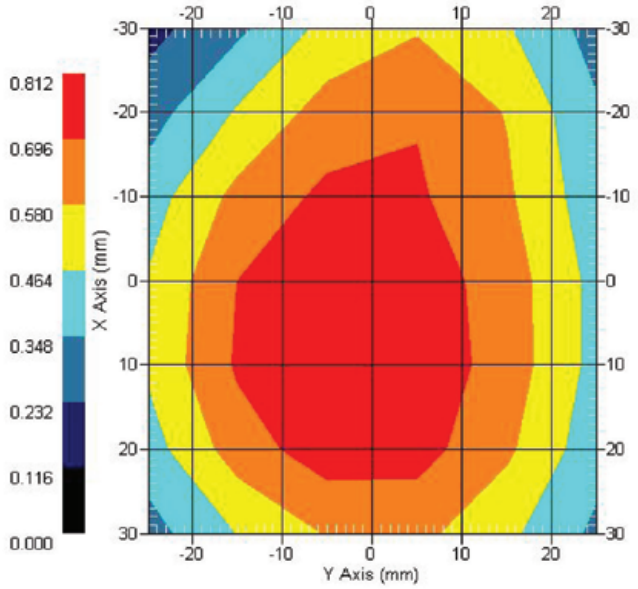


**Figure 9.** "Hot Spots" diagram with Wave Rider effect.

SAR values:
1 gram SAR value: 0.771 W/kg
10 gram SAR value: 0.573 W/kg Area
Scan Peak SAR: 0.811 W/kg Zoom Scan
Peak SAR: 0.980 W/kg

The installation and function of Wave Rider device at the distance of 7 feet from the "phantom head" does not significantly affect the air measurements of the RF phone signals and subsequently does not lead to any significant distortion of transmitted RF signals. In each experiment, SAR values were measured in 242 points around the phone within the "phantom head." The effect of WR on the "phantom head" showed that the "Hot Spots" remained in the same location as without WR and the amplitudes decreased in 80% of the data points. In 65% of the data points there was observed a significant decrease of SAR values in the range of 10% to 40%.

The accepted physical model explains the relationship between the elevation of the body temperature with increased specific absorption rate of electromagnetic radiation (SAR) and increased blood perfusion rate (Green's function) usually following the human body exposure to EMR. The steady-state temperature elevation of the body can be described by the following bio-heat equation:

$$\delta T(r) = \Sigma_i \rho\,(ri)\, SAR\,(ri)\, G(r;ri) \quad (1)$$

where $G$ is Green's function, the dominant parameter influencing this function is related to the blood perfusion rate;

$SAR$ is specific absorption rate of tissue; and $\rho$ is the density of tissue;

Considering that the density of tissue ($p$) is a constant it is possible to conclude that the elevation of the body temperature is directly correlated with increase of specific absorption rate ($SAR$) and the blood perfusion rate ($G$) in the body.

The alternating electric field drives the electrons in the molecules to oscillate and the kinetic energy of the oscillation dissipates into heat and then increases the temperature of the tissue. If that temperature is too high, it would damage the tissue itself. The threshold ΔT of damaging brain/eye tissue is about 4°C (continue for 30 minutes).

Bernadi *et al.* [11]found there is a significant increase of body temperature around a cell phone with 600 mW peak TRP. They detected that the temperature of the ear increases 0.22~0.43°C after a 20-minute continuous using of cell phone, with a 2 W/kg SAR (averaged over 1 g of the tissue); and the temperature of the brain increases 0.09~0.19°C, with a 1 W/kg SAR (averaged over 1 g of the tissue) [11]. On the other hand, V. Anderson *et al.* [12] found the eye temperature increases 0.022°C with an SAR of 0.21 W/kg, also using a 600 mW cell phone [12]. Assuming the temperature increase is proportional to the peak TRP, the temperature increase of human brain would be about 0.5°C if GSM 900 Hz channel is used. In the analysis of heat effects a temperature increase by 0.5°C or more is considered significant. However, an even lower temperature increase by 0.2°C – 0.3°C in the hypothalamus leads to some changes in the thermoregulatory behavior [13].

The observed range of 10% to 40% decrease of SAR values of tested mobile phones when WR device was placed at the distance of 7 feet from "phantom head" allows concluding that WR noise field can mitigate the elevation of human body temperature usually following the subject exposure to EMR.

## Conclusion

The variability of study results presented in this paper allows concluding that Wave Rider device generates low frequency

oscillations that have noise field characteristics. These frequencies have tendency to mitigate and eliminate distortion effect of RF field on hydrogen bonding of water molecular structure and to reduce SAR – absorption rate of RF field by the simulated brain tissue of "phantom head". It is generally known that all metabolic reactions in living organisms take place within colloidal solutions. Disturbances of these colloidal systems, or even worse, their total disruption, are synonymous with degenerative conditions of diseases. There is a relationship between the health of living organisms and the colloidal state of living tissues. The stability of colloidal solutions stands in a direct physical relationship to the stability of hydrogen bonding of water molecules. It is important for the stability of colloidal systems that the structure of water exerts a great degree of organization upon the colloidal particles. Another word the more stable is hydrogen bonding of water molecules the more organized is colloidal system, and as a result the more sustaining is homeostasis of living organisms.

The absorption rate of EMR has a direct correlation with thermal effect of EMR. The bio-heat equation (1) clearly indicates that decrease of SAR value leads to the reduction of temperature elevation of the body tissues when subject is exposed to EMR. Thus, Wave

Rider technology has clear tendency to prevent unwanted biological effects of EMR. It was confirmed by the study *in vitro* on human Astrocytes when brain cells samples were exposed to mobile phone radiation without and with introduction of Wave Rider device. This experiment shows that Wave Rider device placed at the distance of 30 feet from the treated plates has measurable compensatory effect on the inhibition of normal human brain Astrocyte cells growth when cells are exposed to mobile phone irradiation.

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