

Research article

Investigations in Electro-Stress Reduction Devices under Technical Alternating Field Emission Conditions Observing Human Cell Culture Vitalities and Correlating Measurable Marginal Mass Changes

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Abstract

Wireless communication technologies like Mobile phone such as like 4G / 5G (LTE, UMTS, GSM) or DECT wireless home telephones or WI-FI are fully established. These, mobile communication devices have been considered to emit only a radiation with low intensities when they are actively working and are placed near to the head. However, the safety aspects are not completely or clearly evaluated. To address this topic, we have already investigated the cellular effects of DECT base radiation and mobile phones (smartphones) and its vitality effects compensation by: electro-stress reduction systems (ERS). Connective tissue fibroblasts (cell line L-929) were exposed to the radiation of an actively transmitting DECT base radiation and commercially available mobile phone investigating the cell vitality reactions with and without two different ERS systems. Using a similar parallel incubator served a corresponding control of unexposed cell lines. All cell cultures were checked by measurements of the enzymatic activity of mitochondrial dehydrogenases by the color change of the sodium salt 2,3-bis[2-methoxy-4-nitro-5-sulfo-phenyl]-2H-tetrazolium-5-carboxyanilide (XTT) in respect to the interesting cell vitality. The results from 2016 to 2018 clearly demonstrate that exposure to named radiating sources caused significantly reduced cell vitality by more than 50 % for non-thermal radiation first; secondly using ERS the cell vitality went back up to around 95 % an optimized ERS use related to the alternating field emitters and / or cell cultures. In 2015 to 2016 parallelly were made additional investigations to observe probable marginal variance by mass / weight changes with a measuring accuracy of $\pm 0.1 \mu\text{g}$ ($= \pm 0.0001 \text{ mg}$) using ERS offered surprising results: Approx. $6 \mu\text{g}$ mass / weight change repeatedly measured were registered bearing vertically this ERS to a so called “roller detector” and without them (no active radiation nearby). This results gave another proof method to define evidences on standard physics measurement methods, that and how (the modality) ERS device are able to minimize an “impact effect” of artificial man-made radiations; not only by for instance human cell line tests. Hence the measured $6 \mu\text{g}$ mass change caused a calculable “equivalent energy” using the well-known EINSTEIN formula $E = m \cdot C^2$ ($5,4 \cdot 10^8 \text{ Joule}$), extracted to 1-meter distance related to 1 KG weight this could be $5,4 \cdot 10^8 \text{ Watt seconds}$ equivalent energy (alternating fields interacting by ERS use for instance energy absorptions or else). These calculations lead to correlations between this “equivalent energy” and formula findings like the induction law LENZ’s rule plus so-called LORENZ F_L or COULOMB F_C forces too. Besides 90° vertical to radiation sources placement of ERS elements gets its maximum “beneficial” effect on man-made electro-magnetic field sources (hint: compare this with inducti on law, LENZ’s rule). In other words: The observed mass changes using an “beneficial” ERS but having no electromagnetic field changes seems to be highly bio research relevant; specially in relations to humans or human cell vitality effects as well as a suggested living things health impact correlator (like a scale or threshold level). Thus, therefore it can be assumed that there could be a transmission wave or transmission medium that probably exists alongside or connected to electromagnetic HERTZ waves (no measurable effects) having the observed cell vitality or mass change findings. In order to investigate these relationships in more detail, it is proposed that the development of future integrated circuits should always be compared in an immersive manner just making parallel checks of their effect on bio-living systems or (like humans or animals) cell cultures as well.

Keywords: electromagnetic radiation, wireless radiation impact detection, health effects, cell vitality, $\mu\text{-gram}$ mass changes

Introduction

Wireless communication technologies as mobile phones, wi-fi (routers), Bluetooth, digitally enhanced cordless telecommunication (DECT) phones and so on include something like a non-evolutionary adapted daily radiation form for living things. This isn't based on signal variation factors like frequency, time, intensity or as well regarding added modulated transmission standards like 4G / 5G, UMTS, GSM, DECT, Wi-Fi and so on. In major scientific publication forums as [1]. It is not excluded that this upper named artificial radiation forms can result in possible health damage, since this completely contradicts the well-known and adapted stochastic natural atmospheric radiation forms, which are existing millions of years in the aforementioned time-frequency-intensity variation more or less chaotically and not periodically manmade (one major signal description).

Because of these contradictions several investigations were made again

1. upper named man-made modulated radiation form influences on cells [2, 3] and
2. on the other hand, it is to point out the influencing sense of additionally emitted nature copied stochastic alternating fields as atmospheric / sferics mainly "fair weather fields" [4,5].

Exactly this combination of natural and artificial fields uses as an additional or parallel emitted or used field element for earth living things or upper indicated tests by human cell culture research results [2, 3] raises the extraordinary question due to a basic or principle impact cause: How it is possible to derive the impact (near to a cell impingement neutralization) of existing constant technical (artificial) electro-magnetic field influences on exposed (human) cell cultures by an optimized placement of ERS on radiation expose sources having no measurable electro-magnetic field difference? There should be a standard physics related explanation how this (ERS) works or effects. Or in other words should exist a theoretical influence modality description of this interacting ERS on human cultivated cell lines or humans.

To find answers along this question should have a highly appreciated relevance because of a permanently increment of wireless interacting devices or telecommunication sources which have caused a correlated increase in environmental levels of artificial electromagnetic radiations [6,7]. This technical electro-magnetic field sources emit radiations with different (modulation) characteristics in a wide spectrum of frequencies ranging until 5 GHz and in the future (see 5G) until some 100 GHz carrier frequencies. As well the atmospheric and especially biological energy impact of this type of un-natural radiation equipment is quite weak: Research studies have provided strong evidence that electromagnetic radiation influences on humans wellbeing and health by affecting biological and biochemical processes [8-14]. Regarding its world-wide importance with more than 5 billion products end users [15], the technology has been extensively investigated for its health effects at the cellular, experimental animal, and epidemiological level. Epidemiological and experimental investigations on radiation device exposure which might be also potentially harmful to millions of people has become very extended as shown by > 2200 peer-reviewed papers about electromagnetic fields published in scientific journals from 1979 through January 2020 [1]. Besides, the use of the world-

wide upcoming technology around 5G will substantially increase the exposure to radiofrequency electromagnetic fields on top of the 2G (GSM), 3G (UMTS), 4G (LTE), Wi-Fi, Smart Meter, etc. for wireless technical communications already in place [16].

Thus the inherent objective study results of [1, 2] around the immersive use of ERS like a newly constructed and even more effective new resonance devices (nRD) instead of the standard resonance devices (sRD; see Figure. 1) just to neutralize for instance the impact of mobile phone radiations, allows interdisciplinary discussion's around parallelly given investigation results due to measurable marginal variance by mass / weight changes by using ERS too [17]. This extraordinary searched out correlation between chapter (I.) cell vitality differences [2,3] and chapter (II.) measurable marginal mass changes should be discussed at a modelling manner herewith. It needs to be introduced first both investigation setups by the following two chapters as summary of the two independent measurement methods:

Cell Culture Measurements

Experimental design basics

The background of the two earlier presented studies [2,3] was based on cultured connective tissue fibroblasts (cell line L-929; Leibniz-Institut, Deutsche Sammlung für Mikroorganismen und Zellkulturen, Braunschweig, Germany) as a standard cell line for toxicological studies were taken at passages 62 to 80 over a total experimental period of approximately 3 months. The used cells were routinely cultivated in the moist atmosphere of an incubator at 37 °C and gassed with 5 % CO₂ and 95 % air to yield a constant pH value of 7.4. Additionally, the used culture medium was RPMI 1640 with 10 % growth mixture and standard amounts of gentamycin. Hence, each used cell culture reagents were from Capricorn Scientific, 35085 Ebsdorfergrund, Germany.

For the earlier designated tests, cells were seeded from 80 to 90 % confluent mass cultures at a density of 20,000 cells/well into (14 to mainly) 24 wells in the middle part of a 96 well-plate. The time management was that after 24 hours to ensure cell attachment and metabolization, culture medium was exchanged to Leibowitz L-15 medium containing 10 % growth mixture and standard amounts of gentamycin. The explained culture medium guaranteed a pH value at 7.4 at normal atmospheric conditions. Each used plate was delivered to an external mini incubator and cultivated further at 37 ± 1 °C without CO₂ gassing.

Near to this mini incubator were placed commercial-radiation sources inside like a mobile phone or DECT standard wireless home telephone apparatus (DECT standard) basic station having a continuous operation mode (Hint: Added electro-magnetic field exposure conditions of cells). The observation or control of the radiation intensities were measured at the level of the cells at the same conditions used for the assays with a measuring device "Spectran HF-4060" (company Aaronia) with a calibrated area antenna of 1 cm². An intensity of 1.8 W/m² was measured for instance regarding the actively transmitting mobile phone at the level of the cells without an corrugated cardboard and 1.25 W/m² when the same corrugated cardboard as used for previous cell experiments [2,3,18] was placed between the mobile phone and the cells in order to avoid any thermal

influence by microwave radiation. Herby, when the corrugated cardboard was used, a value of 37.5 to 38 °C at the cover lid of the multiwell plates was measured. In conclusion it is to point out, that the experimental design omitted local thermal effects. The incubators temperature was kept constantly at 37 ± 1 °C. Every cell test was conducted with unexposed control cells at the same cultivation conditions, but approximately 5 meters distance from the exposed cell by an active mobile phone or DECT phone. The main investigative ffactor, cell vitality, was checked by morphological observation of the cell cultures and by enzymatic activity. Regarding the second method, each cell culture medium was removed and replaced by fresh culture medium containing 10 % of 2,3-bis[2-methoxy-4-nitro-5-sulfo-phenyl]-2H-tetrazolium-5-carboxyanilide (XTT; Xenometrix AG, Allschwil, Switzerland) and additionally incubated for 120 minutes in the incubator at 37 °C. Beside, Yellowish XTT is cleaved to an orange formazan by a complex cellular mechanism which interacted in viable cells only. Furthermore, this related to NAD(P)H production by glycolysis. Accordingly, the amount of formazan dye formed directly correlated to the number of metabolically active cells in the culture [19,20].

At least after two hours, the optical density was measured as a differential measurement ΔOD = 450 – 690 nm after a 4 seconds shaking interval using an ELISA reader (BioTek Slx808 with software Gen5 version 3.0; Bad Friedrichshall; Germany). The whole test procedure and statistical analysis of all test assays was done by [2,3] using the two-tailed Wilcoxon-Mann-Whitney test.

Regarding two presented studies [2,3], were used different ERS: Mainly sRD and nRD were directed crosswise to the cell samples (distance between tube end and cell layer was 100 mm) during mobile phone or DECT phone exposure situations completely independent as experimental setup routines within several months and more. The observed cell vitality values were tabulated and calculated for each experimental ERS use as a comparison test design with / without radiation and with / without ERS use [2,3].

ERS devices

Fundamentally, a first generation of RD (sRD) consisted of passive elements or compartments with a length of around 35 cm and a tube diameter of 5 cm without any electronic parts. The RD described previously [2, 3] was filled with layers of material of iron, zinc, copper, magnetized metal parts, cardboard, carbon or carbon related granulate materials and varying quartz (SiO₂) granulates. The utilization of these so-called hollow conductor elements (ERS) was adopted from the usual high frequency electromagnetic signal transmission [1-3]. On the other hand, a second generation and novel nRD construction also consisted of a tube filled with different layers or sheeting materials like sRD (standard RD; used cardboard, iron/zinc, copper magnetized metal parts, quartz, carbon as granulate, capsuled H₂O; Figure 1 [2,3]).

These geometric elements, primarily layered in the form of a copper tube, are filled with various metal plates as well as silicon oxide (semiconductors, solar cells) and carbon- / carbon-containing materials based on, among other things to a so-called “wave swamp” ([21] more details can see later). Central

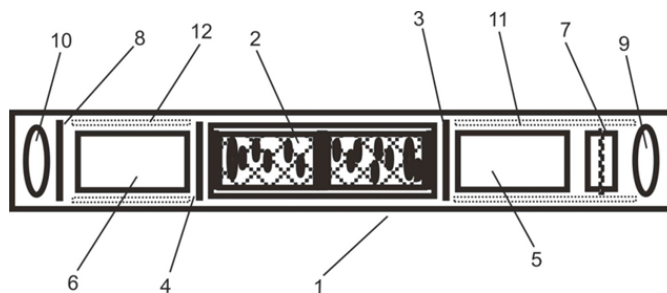


Figure 1. Schematic presentation of a standard resonance device consisting of a housing (1), a copper hollow conductor filled up with varying quartz granulates (2), carbon and zined iron sheet (3), copper sheet (4), tube elements filled with quartz (5,6), magnet element (7), zined iron sheet (8), rose quartz pieces (9,10) and some cardboard anti-shake elements (11,12). Hint for a so-called SHLS: It consists of two additional AC power supply wires inside from right (input) to left (output) crossing the element number (2) as a copper/iron hollow conductor plus its wire surrounding elements (7,10). The novel resonance device has a water filled tube near to the rose quartz element (10) at the opposite side of the magnetized tube end.

power supply points (cf. house three-phase lines, meters, fuse boxes, cell phone masts) are hereby applied vertically (nRD place focusing at 90 ° angle the power supply cable; Figure 2). Remember the coupling principle and a maximum in-coupling effect having a vertical positioning or bearing on a radiation source of the pipe formed ERS related to the induction law and electro technics so-called “LENZ’s rule”; maximum induction at 90 ° vertical coil position to the field lines!



Figure 2. Shown is an nRD pointing perpendicular to a 50 Hz domestic three-phase cable power line.

Short overview of given cell test results using ERS

As already published in the previous studies [2, 3] for the exposure period of 2 h followed by a 22 h period of normal incubation, only 45.3 ± 5.3 % (mean value ± standard deviation; n=13) of the cells survived for non-thermal radiation with an intensity of 1.25 W / m² at the level of the cells. The first and most effective double use ERS setup (two piece of the type sRD) offered representative research series results [2] as summarized herewith: It was pointed out a most potential neutralization was increased to 95 % by additionally using two crossed resonance

devices type RD-B with their plus ends directed towards the cells plus power supply via SHLS, is currently unknown. Entire experimental data of each single experiment with connective tissue fibroblasts exposed to DECT base radiation and ERS are illustrated in [2]. Besides, cell vitality of control cells was / is set as 100 % and each data number of independent experiments were / are accompanied with standard error calculation of the mean.

Additionally, was made a comparison test using sRD and the most actual nRD. Summarized the previous sRD was able to compensate non-thermal radiation of an actively transmitting mobile phone in the test series by 20.17 to 23.70 % (hint: differential % value between this two neutralizing devices) just to inhibit reduction of cell vitality (mean value \pm 2.2 % standard deviation). This value represents a significant compensation of non-thermal radiation by the actively transmitting mobile phone ($p < 0.01$; Wilcoxon-Mann-Whitney test [2, 3, 18]).

The novel nRD was even more effective and was able to inhibit reduction of cell vitality to 11.68 to 14.31 % (mean; around \pm 1.9 % standard deviation). This value of the nRD differs significantly from the value obtained for the sRD ($p < 0.01$; Wilcoxon-Mann-Whitney test). The new nRD are even more effective than the previous sRD.

Present results clearly show that non-thermal radiation is able to affect cell vitality even at relatively low intensities. This correlates to previous publications demonstrating that non-thermal effects also occur in biological systems and cause several alterations on the cellular level [22-26]. They found for instance a marked emphasis in the activation of key pathways generating reactive oxygen species, peroxidation and oxidative damage of DNA and changes in the activity of antioxidant enzymes suggesting a wide pathogenic potential of the induced reactive oxygen species and their involvement in cell signaling pathways. In addition, the review of [27], exposure to electromagnetic fields has been reflected to a variety of adverse health effects that might have significant public health consequences. From this point of view, the use of ERS devices to compensate at least a part of the non-thermal radiation effects could be very reasonable.

In addition, a kind of “threshold level” was identified, which has not yet been reproducibly proven, but which could underline a certain importance of safety radiation intensity limit values, from which level strengths of alternating fields increasingly effect on vitality conditions of human fibroblasts or cell cultures [2] or the discussion of a probable health impact on human / urban living habitats and a daily permitted “dose” of mobile phone signal emissions too [14,16]. For illustration purposes, the measurement results have been converted into a simple graphics in Figure 3, 4, 5. The level difference here is 14 dB between the left graphic optical density value part (hint: cell vitality equivalent) and the right rising edge of the graphics, which should be verified again. The relative radiation energy value was around 1,9 GHz with -46.5 dBm. At least summarized further investigation results first, the presented in Figure 3 didn’t extract any positive effects on the cell vitality by an additional reinforcement of acoustic signals (see relevance of so-called scalar waves [28]. Secondly in Figure 4 could recognize additional effects of SFERICS alternating fields on the cell vitality results, but they have no essential effect relevance related to the control results (Figure 5).

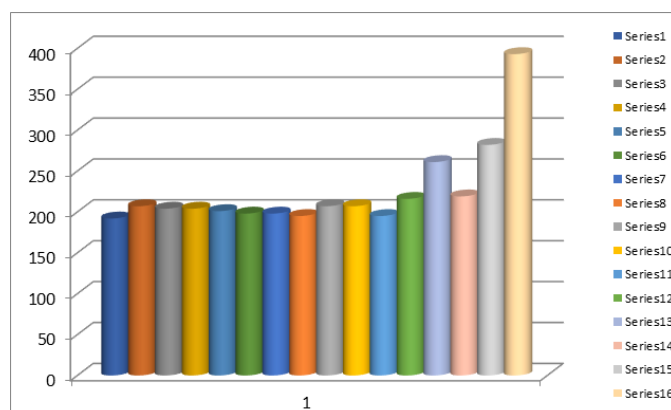


Figure 3. Measurement results of the optical density in mOD with alternating field exposure of a DECT telephone plus acoustic stochastic noise stimulus on connective tissue fibroblasts over 24 hours; see reduced cell vitality around 60 % (mean) in comparison to the control (Fig. 4). In the case of the right-hand measurement samples and bars, an alternating field level up to 14 dB lower than on the left-hand side has been registered in the graphic points; relative measured value at about 1,9 GHz with -46.5 dBm (see emitting DECT station antenna at the left side). Ordinate = Optical density in mOD {values 0 to 400}, Abscise = Cell test sample number 1 to 16 (see “Datenreihen” 1 to 16). Each data point given in the diagrams represents the cell vitality in one single well of the appropriate 96-well plate.

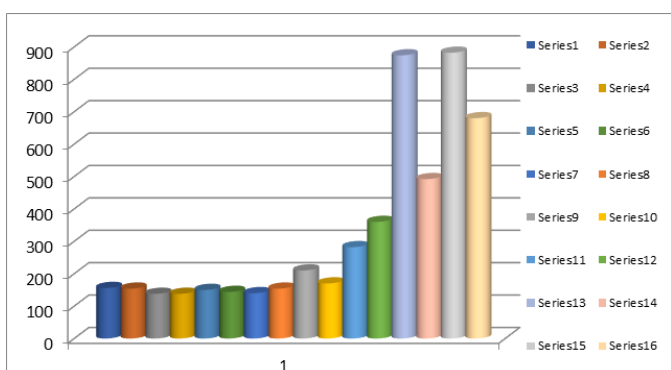


Figure 4. Measurement results of the optical density in mOD with alternating field exposure of a DECT telephone plus an additional SFERICS [4, 5] alternating field exposed by a 30-winding coil {broadband mean value of the magnetic flux = 500 nano Tesla} on connective tissue fibroblasts over 24 hours; see reduced cell vitality > 70 % (mean) in comparison to the control (Figure. 4). In the case of the right-hand measurement samples and bars, an alternating field level up to 14 dB lower than on the left-hand side has been registered in the graphic points; relative measured value at about 1,9 GHz with -46.5 dBm. Ordinate = Optical density in mOD {values 0 to 860}, Abscise = Cell test sample number 1 to 16 (see “Datenreihen” 1 to 16). Each data point given in the diagrams represents the cell vitality in one single well of the appropriate 96-well plate.

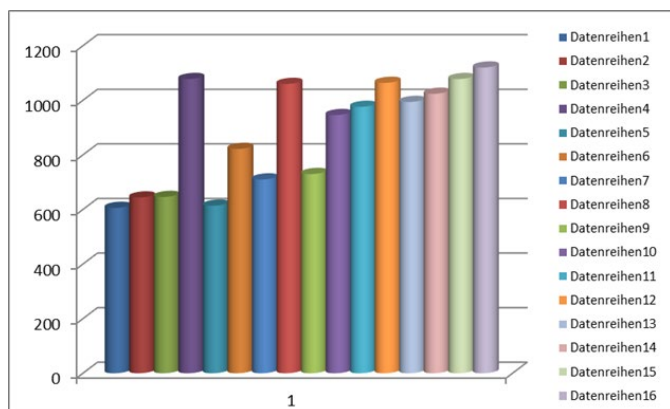


Figure 5. One example of the control measurement results of the optical density in mOD (without any additional alternating field exposure) based on running connective tissue fibroblasts over 24 hours. In this case the right-hand shown received cell vitality is probably enhanced and not position-related equalized temperature levels, i.e. stronger heating influences right side of the mini incubator. Ordinate = Optical density in mOD {values 0 to 1080}, Abscise = Cell test sample number 1 to 16 (see "Datenreihen" 1 to 16). Each data point given in the diagrams represents the cell vitality in one single well of the appropriate 96-well plate.

Exceptional coherence phenomena's by ERS uses

On the other hand, ERS principle working background to effect on electromagnetic radiations isn't clear by electro-physics modelling until now, because there exists something like an unreal circumstance regarding a control cell vitality of 100 % (without radiation impact): In the case of field expositions on cell cultures exists a reduced mean repeatable (stabile) cell vitality reduction around 45 %. Having additionally in-coupling ERS to artificial radiation emitting devices (see mobile phones, DECT telephones), the cell vitality value goes up to a good 95%, but the measured radiation form (in time, intensity, frequency relations) remains scientifically repeatable at different experimental locations [2, 3] untouched! And in addition to this research results is to cite an unusual single investigation result artefact based on this test design: The typical electromagnetic impact radiation source (DECT phone) without any used ERS for it, but an additional normally cells neutral LED light (spot) as second radiation source was applied by an SHLS induced power supply (230 Volt / 50 Hz). Thus, the named cultured connective tissue fibroblasts (cells) were under a sum radiation exposure of DECT phone electro-magnetic fields plus a SHLS related LED light. The belonging experimental number # 1022 (dated 28.12.2015; published at the tables of [2]) indicated by 14 cell samples near to 17 % cell vitality reduction (mean 83 %) in comparison to the control = 100 %. It was expected, that the dominant impact generating DECT phone radiation should force again a cell vitality decline around 45 % and not this value around 17 %.

This context moments share something like "quasi paranormal borderline scientific results" which must have a rational explanation – in other word an electro-physics standard theoretical wave coherence in superposition of all alternating and affecting fields on cells. Consequently, the LED spot interferes by his light emission a reaction mechanism of the SHLS on top

the DECT phone radiation probably bi-directionally working; this is not investigated (repeated) proven, but a theory or modelling how it could correlate seeing the received enhanced only 17 % cell vitality decrease instead of "normal" 45 % should allow the next paragraph content due to the ERS.

The ERS extraordinary construction

With respect for these given cell test results [2,3] is to point out the major content how ERS are assembled including a well-known micro wave electronic circuit phenomena: The ERS implementation of a modified or expanded "wave swamp" [21] as it is common for high frequency circuit corner (antenna) element purposes. The "wave swamp" is a broadband conductor connection against "standing waves" or reflections in the high-frequency signal transmission (see wireless data and communication technologies area from some 100 MHz beginning until X GHz and its antenna buildings), which is used in an annular geometric configuration for something like mobile phone / wi-fi antenna designs ordinarily. WALTER JANSSEN [21] underlined the author 1992 by personal information's, that this "wave swamp" produces a leak in the "energy conservation law" (also among his research colleagues) because only around 80 % of the wave energy feed in can be extracted as useful signal energy; 20 % are heat related and wave technical not measurable! Could this be a kind of overlooked waveform, as MAXELL already postulated theoretically as this wave part parallelly to the electrical and magnetic wave near 200 years ago? Perhaps and as well, NICOLA TESLA used it practically, or [28] and [29] describe this wave type as scalar waves or hypersonic could really exist? Could this be a part of those explained expanded from two to three wave elements as a trigger for bio-systems on our planet; only speculations? But is there any further method to measure something behind such a theoretical HERTZ wave presumption with today's electrophysical measuring methods too?

By chance, suitable extraordinary measurements were carried out with the ERS in 2015 to 2016, the relevance of which will be explained in more detail in the following chapter.

1. Weighing tests with a "roller detector" and a two-pan scale with a resolution of $\pm 0.1 \mu\text{g}$.
2. Measuring method (direct content transfer from [17]).

To introduce the measurement method, the experiments in 2015 to 2016 [17] is to summarize the following content. There were used two ERS devices and they were subjected to very fine / sensitive comparison weighing tests or measurement descriptions: On one weighing arm one firmly on a stable wall mounted and built in a wooden weighing house protected against external influences with a measuring accuracy of $\pm 0.1 \mu\text{g}$ ($= \pm 0.0001 \text{ mg}$; [g] = gram) and a total load a field roller detector was mounted per arm of 23 g, its weight due to a field inactive reference sample on the other weighing arm was balanced. Previous attempts with this roller detector (see the literature reference) had repeatedly and reproducibly shown that on the detector after long undisturbed hanging on the scale long-range, non-electromagnetic subtle fields with weighable real mass content absorb. Furthermore, previous experiments had shown that the non-contact and interference-free approach of a test sample, which is also such a subtle one Field carries, at a distance of about 30 cm to the roller detector at the in Operating scale leads

to an immediate overlay of the two fields, what immediately after approaching or at distance to measurable changes in weight of the detector on the scales. This measurement method allows to check whether a test body, such as the two ERS, a subtle field (or several field influences combined. The weight changes of the detector can be used in such experiments the existence of non-electromagnetic subtle fields and radiation, that are bound to or sent from the samples to be examined recognize and thus directly prove their existence.

3. Measuring results (directly extracted from [17]). Figure 6 shows the weight changes of the roller detector hanging on the scales in the case of the trouble-free horizontal bring one or both ERS to the roller detector on a wooden frame at a distance of approx. 30 cm, the lamp positions being held for 3 minutes each were. The overlaid mass drift of the detector resulted from the effects of external factors uncontrollable

Strahler von Florian König mit Rolle
Versuche vom 04.04.2016

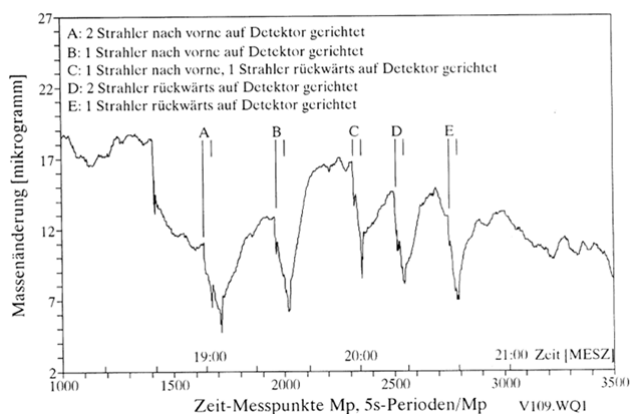


Figure 6. Protocolled mass / weight changes of the so called “roller detector after the ERS test samples were brought horizontally to a distance of approx. 30 cm from the roller detector in the test on 04/04/2016. The superimposed mass drift of the detector resulted from the action of external, and thus uncontrollably variable local and / or global and / or lunar and / or solar and / or universal field influences on the roller detector field (see [6, 8]). Graphics abscissa: “Masseänderung” = change in mikro gram = μg ; ordinate: “Zeit-Messpunkte Mp, 5s-Perioden/Mp” = time axis for the done measurements (dated 04.04.2016 by [7]) given oversampling intervals = 5 second over four hours.

In total, the two ERS were given in five different positioning test setups on the roller detector brought up without mechanical or electromagnetic interference, as in Figure 6 is noted: A: Two ERS were used. The longitudinal axes of the two ERS formed an angle of approximately 90° to each other and their imaginary extensions met (each under an angle of 45° to the detector axis) at an intersection, which is approximately in the center of the roll detector on the scales with a length of about 18 cm and 3 cm in diameter. The arrow marks (negative ERS end) on both ERS pointed to the roll / cavity detector. B: Only one radiator was used instead of A, hence without a second ERS. So one ERS pointed to the center of the roll detector. C: Two spotlights were used. The longitudinal axes of the two ERS again formed

an angle of approx. 90° and their imaginary extensions met (each under one angle of 45° to the roll detector axis) at an intersection, which is again approximately in the center of the roll detector on the scales. The arrow marks (negative ERS end) on the first spotlight indicated the detector, while the arrow marking of the second ERS went away from the detector into the opposite direction. D: Two ERS were used. The longitudinal axes of the two ERS again formed an angle of approx. 90° and their imaginary extensions met (each under one angle of 45° to the detector axis) at an intersection, which is again approximately in the center of the roll detector on the scales. But the arrow marks (positive ERS end) on both ERS pointed away from the detector in opposite directions; hint: Both positive ends of the ERS focused the center of the roll detector. E: Only one ERS was used, as with A, but without the second spotlight. The arrow marks of the ERS pointed away from the detector; so the ERS was used 180° rotated to B. In all five cases, there were highly significant measurement effects in the form of a respective one abrupt deviation of the roll mass from the mass drift of the detector of approx. $6 \mu\text{g}$. This indicates that the ERS creates or generates or interacts with something like a subtle non-electromagnetic field form including a real macroscopic mass content effects in all directions radiated a long their cylinder axes. The observed measurement effects may seem slight. But it is on the one hand keep in mind that the distance between the roll detector and the ERS is approx. 30 cm each and in other test cases only measurable when approaching a few millimeters weight changes occurred. On the other hand, a change in mass corresponds to $|-6| \mu\text{g}$ one real energy content E, according to the well-known EINSTEIN formula $E = m \cdot C^2$, of $E = 6 \cdot 10^{-9} \cdot C^2 = 6 \cdot 10^{-9} \cdot (2.998 \cdot 10^8)^2 = 5.4 \cdot 10^8$ Joule, 540 Mega Watt Seconds (MWs) or 150 Kilo Watt Hours (KWh) (original citation form [17]); Hint: A Joule (1 J) is the work that is done when the force [F] is one Newton (1 N) along a path of one meter (1 m): $1 \text{ J} = 1 \text{ N} \cdot 1 \text{ m} = 1 \text{ Nm} = 1 \text{ kg} \cdot \text{m}^2 / \text{s}^2$. Additionally, 1 watt corresponds to one joule per second. One kilowatt (kW) corresponds to 1 kJ per second or 3600 kJ = 3.6 MJ = 1 kWh per hour. This physics basics are important for the next following paragraph 4.

Furthermore, result explanations: The results in Figure 6 clearly show that ERS seem to influence subtle non-electromagnetic fields with macroscopic mass and energy content wear and transmit along their 30 centimeters cylinder axes into the spatial environment

These fields / radiations can extend to other devices surrounding them or living beings. Because the non-electromagnetic subtle field matter / radiation shows a very weak electromagnetic interaction, the subtle non-electromagnetic fields / radiation emitted by the emitters thus also affect electromagnetic processes and, for example, real energy as well transmit subtle and bioactive informations; upper results content as original citations from [17].

4. In the following chapter are discussed correlations between cell test vitality effects and observed mass change as calculable “electromagnetic field force or gravitational force in NEWTON” or else by used ERS

Immersive discussions and open causal questions

Starting by questions: additional exist another “forgot-

ten” or not parallelly observed additional mechanical field force or accompanying field element like something as “scalar waves” [6,7] caused by (all daily given) electrotechnical artificial and not natural field emitter devices parallel to so called electro-magnetic HERTZ wave form (in electro-physics principle)? Regarding [2,3] given immersive investigation results it is allowed the following question: How it is possible to influence human cell culture vitality / activities having “whatever as reaction cause” parallel to a constant measurable artificial electromagnetic field impact (no differences) seeing addable or additionally used ERS (RD’s / sRD’s and nRD’s from [2, 3])?

Exactly this question creates for instance a “third wave hypothesis” (parallel to first electrical and second magnetic fields) or was the motivation to combine and use an atypical appearing experimental proof setup methods to pick up “where ever existing measurable deviations” during research projects with / without this RD’s / sRD’s and nRD’s; see the marginal variance by mass / weight changes.

Herewith are shown and explained the first time some probable bi-directionally (health) influence patterns, which can be extracted as correlations with electro-physics formulas too. Additionally: Is there given something like a threshold level, which could be interesting for discussion around maximum field exposition levels using this upper named telecommunication technologies?

In other words: Does the mentioned ERS really interfere to standard physics or radiation forms or levels?

At this content ending moments are allowed some opening these around the exciting functional proof of the ERS: Henceforth it is to imagine a test setup to make a proof of extraordinary devices like ERS having a detection of mass changes, which records very fine weight changes in a μ -gram range [17]. Therefore a use of ERS (repeatedly) point out, a so-called “neg-entropic effect” (quote from the protocol) which occurs approx. 6 μ g mass or weight change repeatedly visible in Figure 6. These changes in mass could be triggered by something like a field or force. Remember the above vertical (focusing ERS on field sources), function-relevant ERS direction findings include the induction law or LENZ’s rule plus so-called LORENZ F_L or COULOMB F_C force. The “magnetic force component = F_m ” mentioned in the previous context section e.g. the current-carrying cables and fields of wireless communication technologies with their so-called “real and imaginary parts” exist as useful signals; and a “third radiation form”, which may be neglected, which researchers named MAXELL and NICOLA TESLA or [28,29] etc. postulated or even applied them practically. Speculation or not - the effect of the ERS is existing without apparently directly scratching the Hertzian wave! Do you research a movie yourself about a strange radiation shape: Perhaps the so-called gravitational force, which has become known from the USA and is known as gravity, which can be seen as a movie from “NASA semiconductor” [30] could correlate by ERS use too?

Now some theoretical connecting aspects into physics: In fact, a formula correlation between F_m and the force F_L or the force F_C (field of the electron; [31]) and the weight changes via $F_G = m \cdot a$ (m = Mass, a = acceleration or instead of a then g = gravitation) is allowed. This means it is allowed at first “by equal sign {“=”}” a formula correlation between F_m or F_G based on the

EINSTEIN formula $E = m \cdot C^2$ in respect to the other formula elements around F_L and F_C . Secondly it is allowed to use of the approx. 6 μ g mass / weight change in ERS-targeted measurement samples from [17] or conductors with electrons (50 Hz network) through which current flows, which ERS directional action via (electrical and) magnetic field components and the measured changes in weight. Continuing this facts in form of a question by some extractions to standard electro-technical correlation formulas now:

How much electrons are needed (in / with an ERS with a copper tube core) to have generated the approximately 6 μ g mass / weight change recorded in the protocol [17] at VOLKAMER’s mass / weight measuring reactor? No answer can be given at this point, because with the above comparison of the forces F_m , F_G , F_C sufficient statements in theoretical physics proof by the alternating HERTZ field or forces existence. Additionally to this, if a simply charged particle such as an electron or a proton is accelerated in a vacuum in an electric field, its kinetic energy changes by exactly one electron volt when the acceleration voltage is 1 volt.

Inset: The kinetic energy (from Greek kinesis = movement) or also kinetic energy or rarely speed energy is the energy that an object contains due to its movement [32]:

1 eV = one electron volt >>> The value is exact because the elementary charge was assigned a fixed value of 1.602 176 634 $\cdot 10^{-19}$ J (Joule) for the definition of the SI units (including voltage in {V} and power in {W}).

Conclusion

It was shown that possible health hazards from man-made forms of radiation with non-thermal effects could correlate or can be demonstrated with results from human cell line tests. A conductor or electron interfere along a path or inside a 35 cm tube device named ERS (inside a layered filled copper tube) as a so called “wave swamp”. The main and important question is: What kind of wave type or transport medium (of information’s) is influenced, because the electro-magnetic wave (EMW) isn’t manipulated by used ERS. Thus, have been measured no EMW changes! But there were measured enhanced (“beneficial”) cell vitality values using ERS and as well 6 μ -gram mass / weight change correlating to calculable “equivalent energy E” using for instance the well-known EINSTEIN formula $E = m \cdot C^2$ (see 5,4 $\cdot 10^8$ Joule). In addition are allowed theoretical excursions to use the generated forces based on the ERS use according to LORENZ / LENZ (see induction) / COULOMB and gravitation laws. This context raises the question: Could this ERS be something like a wave converter from electro-magnetic to for instance so called scalar wave types based on transfer graphics illustrated by [28]?

In conclusion, this induces a hypothesis, whether for these bio-cellular and physically measurable “beneficial” cell vitality and mass changes (having possibly correlating to human health impact) a causal background in the used daily circuit electronics: Could this not have a reason health concerns? So far until now, related research and electrical engineering developments have been based purely on performance-optimized wireless communication path optimizations (see increasing an even broader data transmission rate). Isn’t it possible to postulate that

circuits may be developed in the future with the premise, just to make comparison tests parallelly of the SMD / PCB version A (without) and B having in favor its optimized bio-relevance realization? This means that the assumed influence of circuit board properties (see form-geometric micro wave related PCB's) on earth organisms or living things in near-field emission conditions in the given procedure of signal transformations (to be realized from electrical line signals to air wave transmission <> transmitter / receiver) must be checked comprehensively since it cannot be ruled out that an unknown waveform or information transport medium (next / connected to the electromagnetic wave) emitted into the environment. Otherwise there wouldn't exist the upper explained measurement results on cell vitality and mass change (including no electromagnetic alternating field changes in time / frequency and intensity). A requirement of this publication is therefore the sustainable research on circuits or (low / high frequency) circuit electronics for their bio-relevant impact behavior, which would create a so-called better or beneficial "bio-compliant" electrical engineering for the future.

And lastly, a note is allowed to take up those rising tactile rice sensations of electrosensitive persons with / without influences of electromagnetic alternating fields (see for instance [33]): For example, without given alternating fields (compared to active fields), these type of persons feel a reduced pressure on the chest, breathing more freely or easily, slightly cooler air on the surface of the skin etc. (without measurable change in temperature). This also applies to similar tactile sensation differences with ERS or without [17]. If such marginally measurable changes in weight or mass did not offer an analogy or coupling approach, it was precisely to make such tactile-subjective stimuli describable by test subjects or even to describe them to detect correspondingly?

Abbreviations

ERS: electro-stress reduction systems; RD: resonance device(s); sRD: standard resonance device(s); nRD: newly constructed resonance device(s); layer waveguide system (SHLS)

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