IIREC

International Institute for Research on
Electromagnetic Compatibility

Biophysical testing of the effect of the product «Harmonizer Car» – including stress resistance – in disturbed magnetic fields of a passenger car

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Annex	7 illustrations

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The scope of this report is exclusively the documentation and evaluation of effects that were assessed by objective physical measurement. Neither the investigation of manufacturing nor of mode of operation of the product was contracted. It is up to the manufacturer to care for constant product quality.

1. Subject of Investigation

The international institute IIREC was mandated by Symbioceuticals – Harmonizer GmbH to test the effect of the product «Harmonizer Car» by objective measurements (with physical meters, independent of the subjective sensitivity of humans).

According to experience by IIREC the procedure of grid measurement of the vertical component of magnetic flux density, or induction, in the static (DC) and extremely low frequency (ELF) magnetic field (± 3 dB range up to 18 Hz) including the evaluation of the divergence of the magnetic field gradient ist appropriate to give evidence if a product of this kind is able to **smoothen magnetic field gradients** («**magnetic field equalizing effect**»).

In the study documented here **questions** relevant to the user were examined by measurements of the impact of the product on technogenic magnetic field disturbances in a passenger car, such as:

- Will the product unfold its effect reliably, and
- will this be impaired by disturbing influences?

A satisfying answer to these question is a precondition for awarding the biophysical test seal by IIREC.

The **test sample** was handed over to IIREC by the manufacturer. For testing, it was attached to the battery of the test car.

The **test field** was the disturbed magnetic field on the driver seat of the car. The measuring field was set up as shown in fig. 1 (annex) by a wooden measuring board with 11 x 11 measuring points stenced into it.

The electromagnetic technologies in a passenger car (electric installation with DC or low frequency AC from the battery and the dynamo machine, resp., ignition sparks, radio control with RF electromagnetic waves, magnetization of vehicle body and steel tyres etc.) operate in various ranges of frequency and emit several types of fields.

Note that the measurements and effects reported here are restricted to the DC and ELF field in the denoted frequency range. Neither radio frequency (RF) electromagnetic fields nor DC and LF electric fields were comprised by the measurements, but DC magnetic fields and their modulations in the ELF range.

2. Testing of Effects in the Magnetic Field

The magnetic field has particular biological relevance because it permeates the body, it is not easily shielded, it influences all life processes and exerts an immediate impact on the ions, the electrically charged particles in the body (e.g. sodium, potassium, calcium, magnesium, zinc and many others in our cells, iron in hemoglobine etc.). Signals imprinted to cell water and body water are magnetic in nature.

Testing in the magnetic field, therefore, is the first choice when examining the coherent effect of resonance products. (In physics, coherence is defined as a constant phase correlation between oscillations of single elements. Coherence is the principle that maximises the impact of subtle microscopic effects, e.g. it converts normal light to laser light.)

2.1 Method of measurement and evaluation

Test measurements were conducted according to the **grid measurement procedure** of IIREC in the DC and ELF magnetic field. The magnitude measured was the **vertical magnetic induction** in microtesla (μT). At the measuring site (the driver seat in a passenger car) a test field of 0.5 by 0.5 m was measured. In this measuring field there were 11 x 11 = 121 measuring points at a distance of 5 cm.

As a **meter** for measuring the magnetic flux density, or induction (± 3 dB range up to 18 Hz) the digital precision teslameter 05/40 by Projekt Elektronik (Berlin) was applied. A VC-960 multimeter by Voltcraft served as a data logger. The most significant particulars of the measuring system were compiled in **table 1**.

The measurement board representing the measuring field with stenced measuring points is equipped with a holder for the probe gliding on a cursor. This measurement **setting** makes it possible to move the probe to any measuring point avoiding deviations by inclination or torsion. Thus an optimal precision of measurement is guaranteed.

Teslameter	05/40
Measurement range	± 100 μT
Digital resolution	0,1 μT (with data logger 0,01 μT)
Measurement deviation	± 0,5 % of measured value @ 40 μT
Frequency range (±3 dB)	up to 18 Hz
Sensor system	fluxgate, sensitive to direction

Table 1: Significant technical data of teslameter

The **evaluation and mapping of measured data** was performed by the **data analysis software Surfer** by Golden Software. The values measured at single measuring points were interpolated by the software and mapped for the measurement area of 0.5 by 0.5 m. Contour lines were drawn along points of equal magnetic induction. The coordinate axes were labeled with lengths in m.

In the **diagrams** of the annex the areas between contour lines are colored. The respective value ranges of the vertical magnetic induction in μT can be read from the color scale. For a maximum of color differentiation a rainbow spectrum was applied in these diagrams.

The contour lines can be read in the same manner as the well-known lines of equal height in geographical maps. Lines lying close to each other indicate a strong gradient. Larger distances between the lines indicate a region with low gradients. A transition from a low gradient to a strong one or vice versa causes a disruption that will exert a biological irritation characteristic for geopathogenic zones. A smooth or "equalized" field is characterised by balanced gradients.

Additionally, a curvature of the contour lines indicates an irregularity of the gradient, contour lines of (approximately) parallel course indicate even gradients (if the distances between the lines are approximately even).

The effect of the product in the field can be seen when contrasting the situations without and with the impact of the product.

For an immediate assessment of the biological effect **another type of diagrams** was generated. It maps the degree of biological disturbance for each measuring point. From the view of mathematical physics, this is calculated as the divergence of the field gradient (**field gradient divergence FGD**). More details are found in the comments to the diagrams in the annex, and in the following sections, as well.

2.2 Detailed Investigations and Results

2.2.1 Test in a passenger car

The first measurement recorded the measuring field (driver seat) in "engine idle" mode of the test car of type Ford Fiesta (v. fig. 2). In order to activate the dynamo machine, the light was turned on.

In the second measurement run (fig. 3) under the same conditions the effect of the Harmonizer Car was tested that was before attached to the battery of the car. The cathode was chosen as point of attachment because it is the source of electrons. (Electrons are the carrier of the effective "field-shaping" information and are the principal causative factors of electric and magnetic effects during the measurement.)

Comparing the measurement results of the original field (fig. 2) and the same field under the impact of the Harmonizer Car (fig. 3), the effect of the harmonizer in the field would be missed unless a closer look were given to the diagram (cf. notes to fig. 3). The immediate mapping of the degree of biological disturbance at the single measuring points underlines the improvement by the Harmonizer Car more clearly (fig. 6 compared to fig. 5, cf. explanatory notes to the diagrams).

2.2.2 Stress test in an extremely inhomogeneous magnetic field

The last measurement repeated the measurement of the test field with the Harmonizer, but before the Harmonizer Car had undergone a stress test in an extremely inhomogeneous magnetic field Die letzte Messung war eine Wiederholung der Vermessung des Testfeldes, nachdem der Harmonizer Car einem Härtetest im extrem inhomogenen Magnetfeld unterzogen worden war (fig. 4).

As a matter of experience, products well suitable to perform an effective balance of magnetic field disturbances may lose or even revert this effect when exposed to a strong inhomogeneity of the magnetic field. Therefore, this type of stress test forms a standard element in the testing routines of IIREC.

The stress test was conducted by exposition of the test sample of the Harmonizer Car during a period of 72 hours to a magnetic field that was generated by two permanent magnets of an induction of 7 mT each in an orthogonal configuration. After this period the test sample was taken back to the battery of the car. The results of the following measurement of the test field are displayed in fig. 4. The mapping of the interpolated measurement results shows approximately the same effect as found before the stress test. From this we conclude that the exposition to the stressing magnetic field did not result in an impairment of the efficacy of the product. The more explicit evaluation of degrees of biological disturbance at the measuring points reveals that in a wide area of the field the field gradients were even balanced more smoothly after putting the Harmonizer to the stress test (fig. 7).

3. Expert's Opinion

3.1 Metrological significance of results

The **effects found in the measurements** – on one hand the disturbing effects of the construction of the car and the operation of the engine in idle mode as recorded in the test field (driver seat), and on the other hand the alterations after bringing in the Harmonizer Car – have an order of magnitude that is distinctly above the measurement uncertainty, so they are clearly classified as **significant**.

The reading of DC values on the precision teslameter 05/40 (including the ELF contribution) exhibits variations of 0,05 μT. Measured values, therefore, are certain if exceeding 0,1 μT. For effects evaluated as differences (between a "disturbed" field and a "balanced" one) according to laws of metrology, the threshold of certainty is computed at 0,14 μT (= 0,1 μT times square root of 2). Accordingly, DC effects from 0,15 μT upward are classified as certain.

The ranges of values are extremely wide, so the evaluation was restricted to a range from -30 μT to +20 μT. As can be seen from figures 2 to 4, shifts of 1 μT and more are easily discerned. *The effects found exceed distinctly the measurement uncertainty and thus are metrologically significant.*

Moreover the results that were outlined in detail in section 2.2 and in the illustrations in the annex give the following answers to the themes of investigation presented in the introduction:

- The **Harmonizer Car**, if **attached to the battery**, **balances the disturbed magnetic field in the cabin of a passenger car** (at the driver seat).
- The efficacy of the product is not lost after a 72 hours' **exposition to a strong and extremely inhomogeneous magnetic field.**

3.1 Biological relevance of results

The human body, as a "receiving antenna", is able to adapt to a wide variety of magnetic field situations, such as prevailing in different regions of the world. But during a stay in one place, the human body expects a balanced magnetic field situation, i.e. an even course of magnetic field gradients.

To be sure in this point, the degree of biological disturbance, or irritation, was evaluated for the measuring points in the test field (**field gradient divergence FGD**, figures 5 to 7). The mapping of results of this data analysis reveals the improvement brought about by impact of the Harmonizer Car.

The degrees of biological disturbance, or irritation, are quite high in the technogenic magnetic field on the driver seat of a passenger car, as we found here. Values exceeding 10,000 microtesla/m/m (i.e. 10 mT/m/m) are classified, according to the experience of IIREC, as an extreme irritation, that reported as unpleasant by nearly all test persons (disregarding individual sensitivity).

Magnetic disturbances of this amplitude imponder extraordinarily for car drivers and passengers – because they do not variate their position during a ride. **This may impair the well-being of the passengers and the attention of the driver. Frequent drivers are even put to an elevated risk of serious long-term diseases.**

The evaluation of the measurements conducted under the impact of the Harmonizer Car revealed that in a wide area of the seat of the driver the Harmonizer reduced the degrees of irritation below 1-2 mT/m/m. These low degrees of irritation are biologically well tolerable. The **effects of the Harmonizer Car that were evidenced here (balance of technogenic disturbances in the cabin,** and **resistance against strong magnetic field disruptions**) confirm, on the whole, a remarkable **reliability** of the product. The effect of the Harmonizer **contributes to the prevention of possible health hazards thru magnetic field disruptions**.

3.2 Awarding of test seal

Thus, by **objective physical measurements** with meters sensitive to **magnetic induction** the reliability and stress resistance of the biologically beneficial effect of the Harmonizer Car, namely its balancing of magnetic field gradients, was proven.

With this being evidenced, the conditions for awarding the test seal of IIREC to the product are fulfilled. The manufacturer/contractee is entitled – under the additional terms and premises quoted below – to declare the product «Harmonizer Car» as »tested by IIREC« and to attach the following test seal to the product:

Terms:

(1) The validity of the test seal shall be prolongued in due time before expiration.

(2) IIREC shall be informed immediately of any alteration of the terms of manufacturing or of the effect of the product.

(3) The test seal shall not be applied any longer, should future testing by IIREC find a decline of product quality, or one of the terms of application not to be met any more.

Premises:

(1) The consumers of the product shall be notably informed on the proper application of the product, and that a combination with a different product might be counterproductive and should be avoided.

Important notes:

(1) The test seal may be applied with the product, the product documents, or the product wrapping, wherever a seal is attached by the manufacturer.

(2) IIREC will offer to the contractee in due time, before expiration of the validity of the test seal, a periodic audit and prolongue, in case of a positive result, the validity of the test seal.

(3) If desired, IIREC will elaborate suggestions for an extended quality assurance of the product.

(4) It is up to the manufacturer to care for constant product quality.

By his signature the expert confirms that the measurements and evaluations were conducted under his supervision, and the results being correct within the precision limits of measurement and evaluation.

Walter Hannes Medinger, MSc, PhD

Generally Sworn and Certified Expert at Court
Scientific Head of IIREC
International Institute for *EMC* Research
Electro***M***agnetic ***C***ompatibility on a biophysical foundation

Annex:

7 illustrations

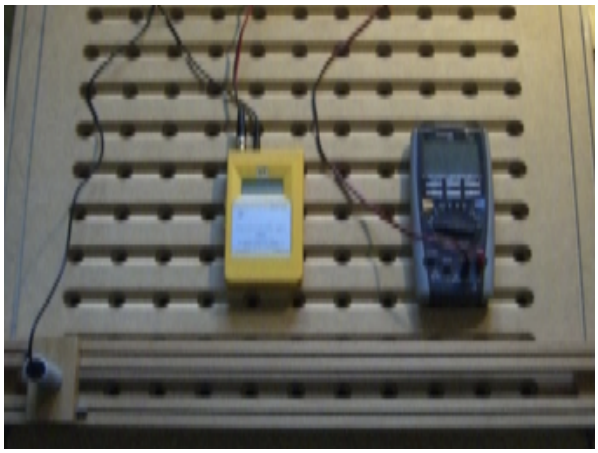

Fig. 1: Measurement setting

For each measuring procedure the measuring apparatus was set up on the driver seat of the test car. It is made up of a wooden measuring board with holes arranged in a regular grid representing the measuring points. A cursor – to which the probe (black) is fixed in a holder (white) – can be moved to any measuring point. The teslameter (yellow) as the registration unit proper is connected to the data logger (grey).

The diagrams to follow show interpolations of values that were measured. The diagrams were generated by the data analysis software Surfer by Golden Software. The following diagrams are maps of the vertical magnetic flux density in microtesla (μT) as indicated by the color scale and the contour lines. The values displayed at the measuring points match exactly the measured values. Values in between were interpolated by the software. Lengths along the coordinate axes are labeled in Meters (m).

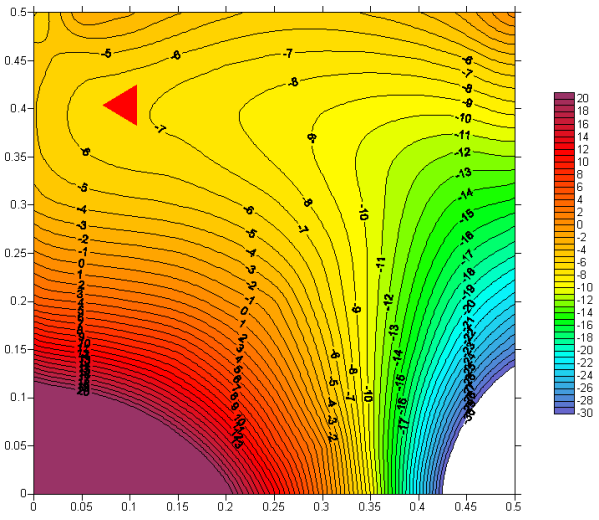

Fig. 2: Basis measurement – Passenger car, engine idle, without Harmonizer Car

These values were measured on the driver seat before application of the Harmonizer Car. In this thoroughly technical ambience values measured variate in a wide range. The scale was truncated at -30 μT (RHS below, corresponding to RHS back on the driver seat) and at+20 μT (LHS below, corresponding to LHS back on the driver seat). Subject of this investigation is the distribution of the magnetic energy over the rest of the field area. It is striking that the contour lines of -5 μT and less join from above and from below (red arrow).

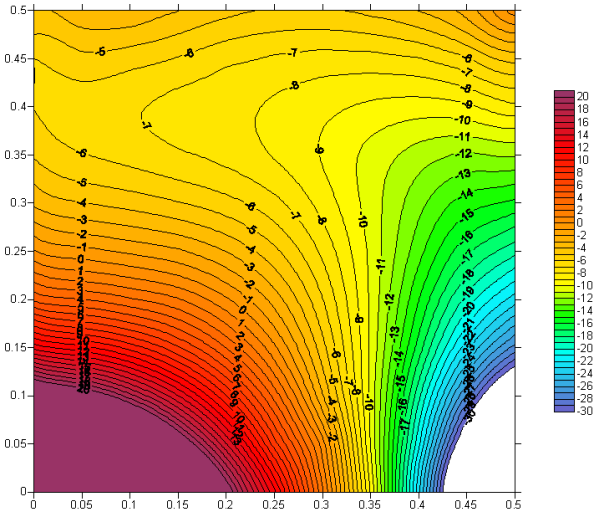

Fig. 3: Measurement of the same field under identical conditions, but with Harmonizer Car

Analogously to fig. 2, this diagram maps the values in the field, but this time 24 hours after attaching the Harmonizer Car at the car battery.

Compared to fig. 2 it can be recognized that the contour lines of values > -7 μT do no longer join from above and from below. This indicates a more regular course of contour lines (more even gradients) and a decrease of biological irritation.

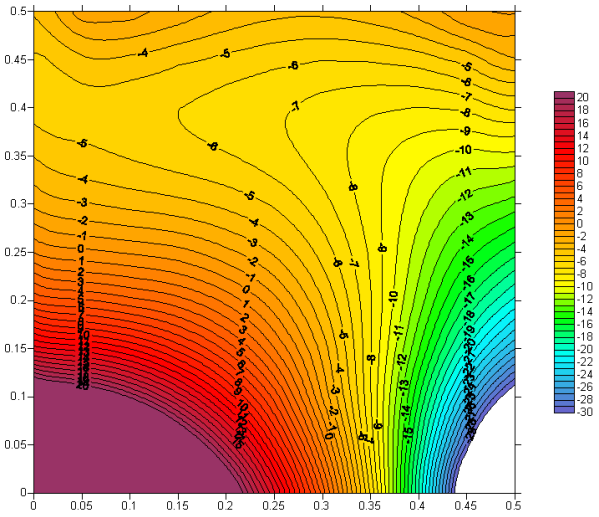

Fig. 4: Measurement with Harmonizer Car following stress test

This map shows the field values in the test field (driver seat) with Harmonizer Car at the battery, measured after the Harmonizer was put to a 72 hours' stress test in an extremely inhomogeneous magnetic field.

The alterations against the original condition that were displayed in fig. 3 are recognized here once more. The course of the contour lines, again, is more even than in the measurement without an harmonizer. Thus, the effet of the Harmonizer Car remained unimpaired thru the stress test.

In the series of illustrations to follow, for each measuring point the field gradient divergence (FGD) is mapped as a **measure of the degree of biological disturbance** in the magnetic field. The unit of the values indicated here is microtesla/m/m.

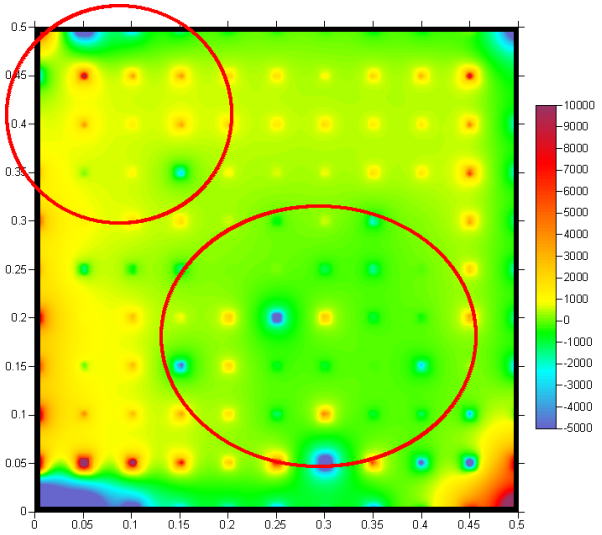

Fig. 5: Degree of disturbance at the measuring points of the background field (cf. fig. 2)

This diagram represents an evaluation of the data mapped in fig. 2 for each measuring point.

The degree of biological disturbance can be read from the intensity of color and the diameter of color circles at the single measuring points. Red and blue points mark the strongest disruptions.

Note particularly the disturbances in the areas within the red circles.

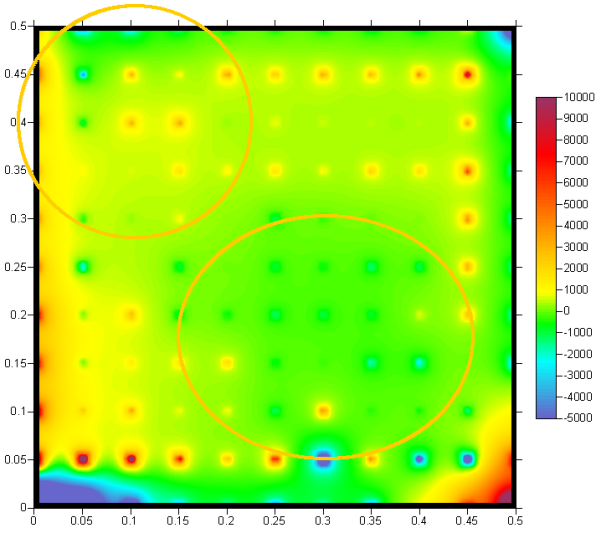

Fig. 6: Reduced degree of disturbance with Harmonizer Car (cf. fig. 3)

Compared to fig. 5 the disturbances of biological relevance are evidently reduced.

This evaluation reveals once more, that the extreme disruptions to the left and to the right of the car seats (in the diagram below, that is on the back side of the seats in reality) being due to the construction cannot be balanced by the Harmonizer. But the crucial improvement occurs in the area where the driver is seated. The green and yellow colors indicate a normal (natural) degree of variation.

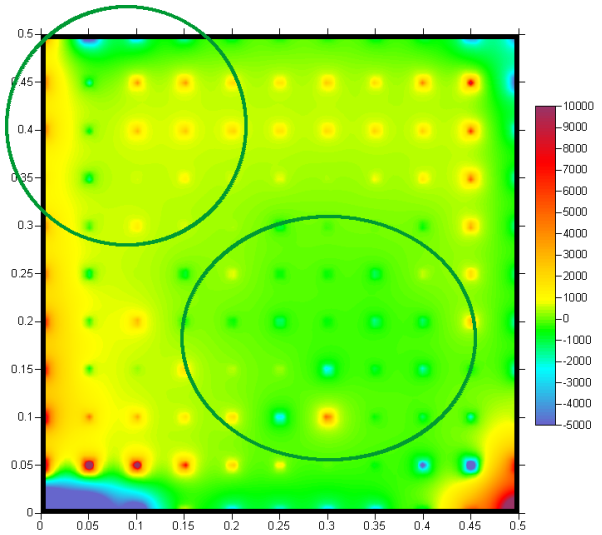

Fig. 7: Further reduced degree of disturbance with Harmonizer Car following stress test (cf. fig. 4)

Against the measurement with the non-stressed Harmonizer (fig. 6) the degrees of disturbance were reduced once more.

This further improvement can be seen very distinctly in the areas within the green circles. Either the exposition to the extremely inhomogeneous magnetic field has enforced the effect of the Harmonizer Car, or the effect found in the foregoing measurement has lasted on and increased by repeated application of the Harmonizer.