# EVALUATION OF THE EFFECTIVENESS OF USING AIRES SHIELD ELECTRONIC ANOMALY NEUTRALIZERS TO REDUCE THE NEGATIVE INFLUENCE OF A CELLULAR PHONE'S ELECTROMAGNETIC FIELD

*I. Serov, Professor V. Sysoev*

**Abstract**

**Research was conducted to evaluate the effectiveness of using Aires Shield electromagnetic anomaly neutralizers to reduce the negative influence of the electromagnetic field caused by the operation of a cellular phone, on the brain's bioelectrical activity. 11 human subjects were tested, each of which participated in two experiments: a baseline study (using a mobile phone without an Aires Shield) and the main study (using a mobile phone with an Aires Shield). A mobile phone operating on the GSM-900 standard was used. In order to record the brain's bioelectric activity, a 19-channel computerized electroencephalogram machine using 16 monopole electrodes in accordance with the internationally-recognized 10-20 system. The behavior of the relative strength of the rhythms of the brain's bioelectric activity with and without an Aires Shield was compared. The research has demonstrated that the elevation of the relative strength of theta and alpha rhythms, which are manifest when using a mobile phone on the side exposed to the mobile phone, without using an Aires Shield are virtually absent when it is used. Therefore, using an Aires Shield when working with mobile phones operating on the GSM-900 standard inhibits electromagnetic radiation from interacting with the brain's own bioelectric activity on the frequencies of the alpha- and delta rhythms, which may be regarded as a protective effect.**

---

**Introduction.** In Europe and the United States, the adopted standards for determining SAR (Specific Absorption Rate) levels from cellular phone radiation are based solely on the thermal effect, which is only associated with the heating of the tissues of the human body. However, a number of works have discussed the presence of an informational effect [1, 2, 4]. The GSM-900 mobile phone standard transmits information using impulses that are joined into blocks. The duration of a single block is 4.616 ms, which establishes the frequency of the mobile phone's impulses at approximately 217 Hz (1/4.616). Blocks of impulses between a mobile phone and a base station are grouped into multiblocks, consisting of 26 repetitions. Thus, the second frequency emitted by a mobile phone is 8.35 Hz (217/62). Certain types of cellular phones operating in an energy-conserving mode may also generate a third frequency: 2 Hz [3, 5].

The danger of such an informational effect from mobile phones is that the frequencies mentioned above can interact with the brain's own electroencephalographic activity. The frequency 217 Hz may resonate with the brain's gamma rhythm, the frequency 8.35 Hz - with the alpha rhythm, and 2 Hz - with the delta rhythm. Thus, when using a mobile phone, signals are transmitted into the human brain, which are capable of interacting with the brain's own bioelectric activity, thereby disrupting its function. This makes it important to protect the human brain when using a mobile phone.

Aires Shield electromagnetic anomaly neutralizers may be considered one form of protection. They are a universal three-dimensional Fourier filter. As a result of an electromagnetic field interacting with the Aires Shield, the field undergoes a structural

transformation that may cancel out the influence of the frequencies that resonate with the human brain (217 Hz, 8.35 Hz, and 2 Hz), which occur when using a cellular phone.

**Research objective**. To evaluate the effectiveness of using Aires Shield electromagnetic anomaly neutralizers to reduce the negative influence of the electromagnetic field caused by the operation of a cellular phone, on the brain's bioelectrical activity.

**Methodology.** 11 men (ages 18 to 22 years) participated in the study. Each subject participated in two experiments: a baseline study (using a mobile phone without an Aires Shield) and the main study (using a mobile phone with an Aires Shield).

The research was conducted in the morning in a room with an air temperature of 20°C. The recording procedure was an uninterrupted 40 minutes long and included the following stages:

1. Recording a baseline EEG at rest (a state of calm wakefulness).

2. Recording an EEG with a mobile phone in standby mode held next to the ear (3 minutes).

3. Recording an EEG with a mobile phone in call mode held next to the ear (no audio, 3 minutes).

4. Recording an EEG with a mobile phone in talk mode held next to the ear (no audio, 5 minutes).

5. Recording an EEG 3, 5, and 10 minutes after turning off the phone.

The subjects were sitting in a darkened, soundproof room while the EEGs were recorded.

A mobile phone operating on the GSM-900 standard was used.

When performing the electrophysiological exam, the brain's bioelectric activity was recorded by a 19-channel computerized electroencephalogram machine using 16 monopole electrodes in accordance with the internationally-recognized 10-20 system in the 0-70 Hz transmission band with 250 Hz frequency discretization. Unpolarized silver chloride electrodes were placed symmetrically in the areas of the prefrontal (Fp1, Fp2), postfrontal (F3, F4), inferior (F7, F8), central (C3, C4), middle temporal (T3, T4), posttemporal (T5, T6), parietal (P3, P4), and occipital (O1, O2), areas, with joined reference electrodes being placed on the earlobes. The electrodes were fastened under the bands of a special headpiece. To improve their impedance, the electrodes were soaked in a saline solution and the attachment sites were treated with alcohol. A 50 Hz band-stop filter with a 0.1 Hz stop band was used during the processing of the recordings.

The software program Win EEG was used to analyze the artifact-free portions of the EEGs. The multi-channel EEG pattern was analyzed using rhythm topography (color mapping), the numeric values of which were determined using a table of indices (the indices of the EEG's

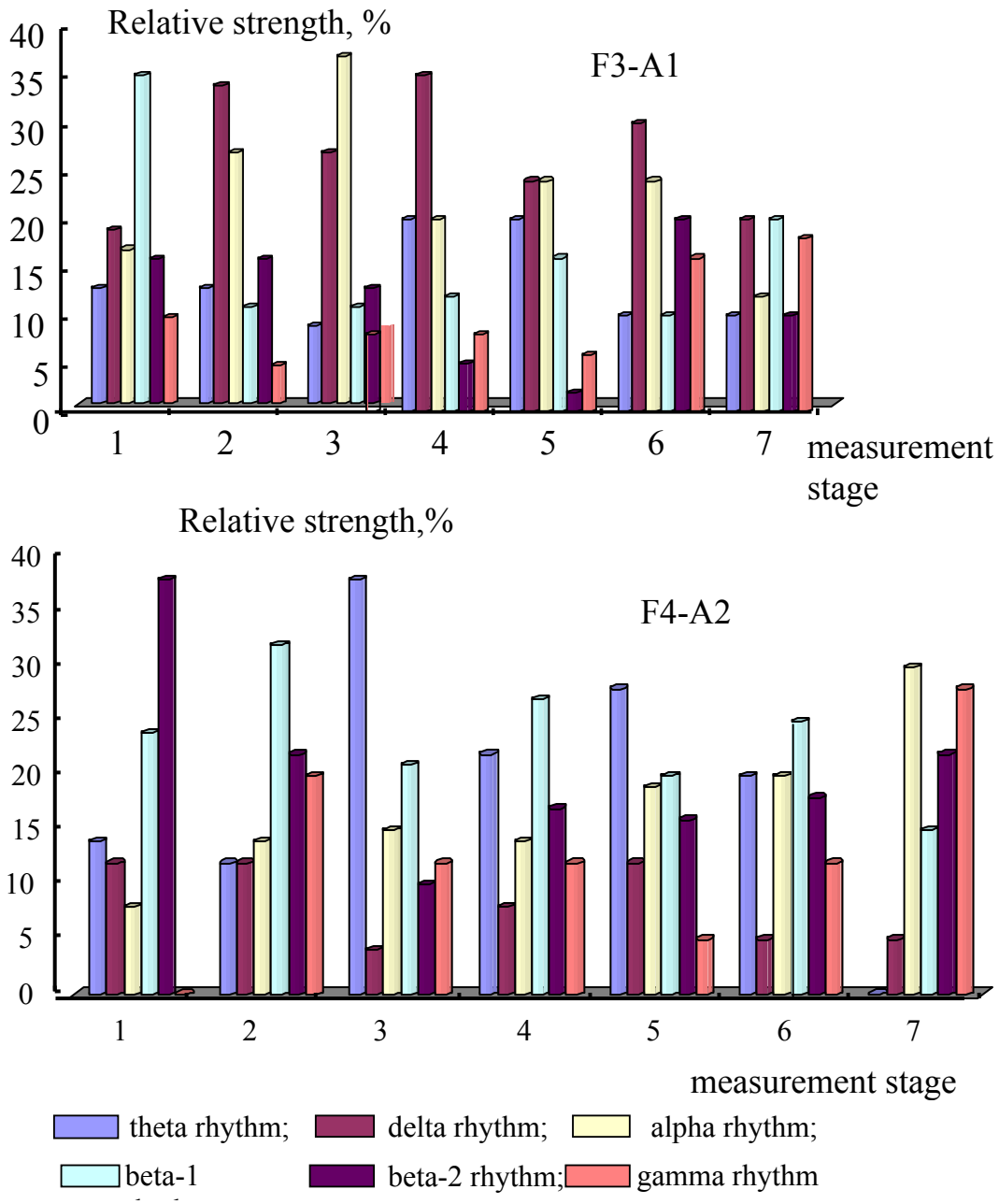
main rhythms were determined as the ratio of the time a particular rhythm was present to the entire EEG recording time, expressed as a percentage) and the top frequency in each of the main EEG ranges across the 16 leads. The following frequency ranges were examined: the delta rhythm (0.5-3 Hz), Θ (4-7 Hz), α (8-13 Hz), $\beta_1$ (14-25 Hz), $\beta_2$ (26-35 Hz), γ (36-50 Hz).

A qualified visual analysis of the EEG was employed to isolate the analysis period with a duration from 0.2 - 1 second. The periods free from oculogyric and muscular artifacts were sampled at random over the entire duration of the EEG recording.

80 - 100 EEG fragments were analyzed at all of the stages of measurement in each EEG recording.

**Results.** The distribution of the relative strength of the delta, Θ, α, $\beta_1$, $\beta_2$, and γ rhythms was determined for the EEG in the frontal, temporal, central, parietal, and occipital leads.

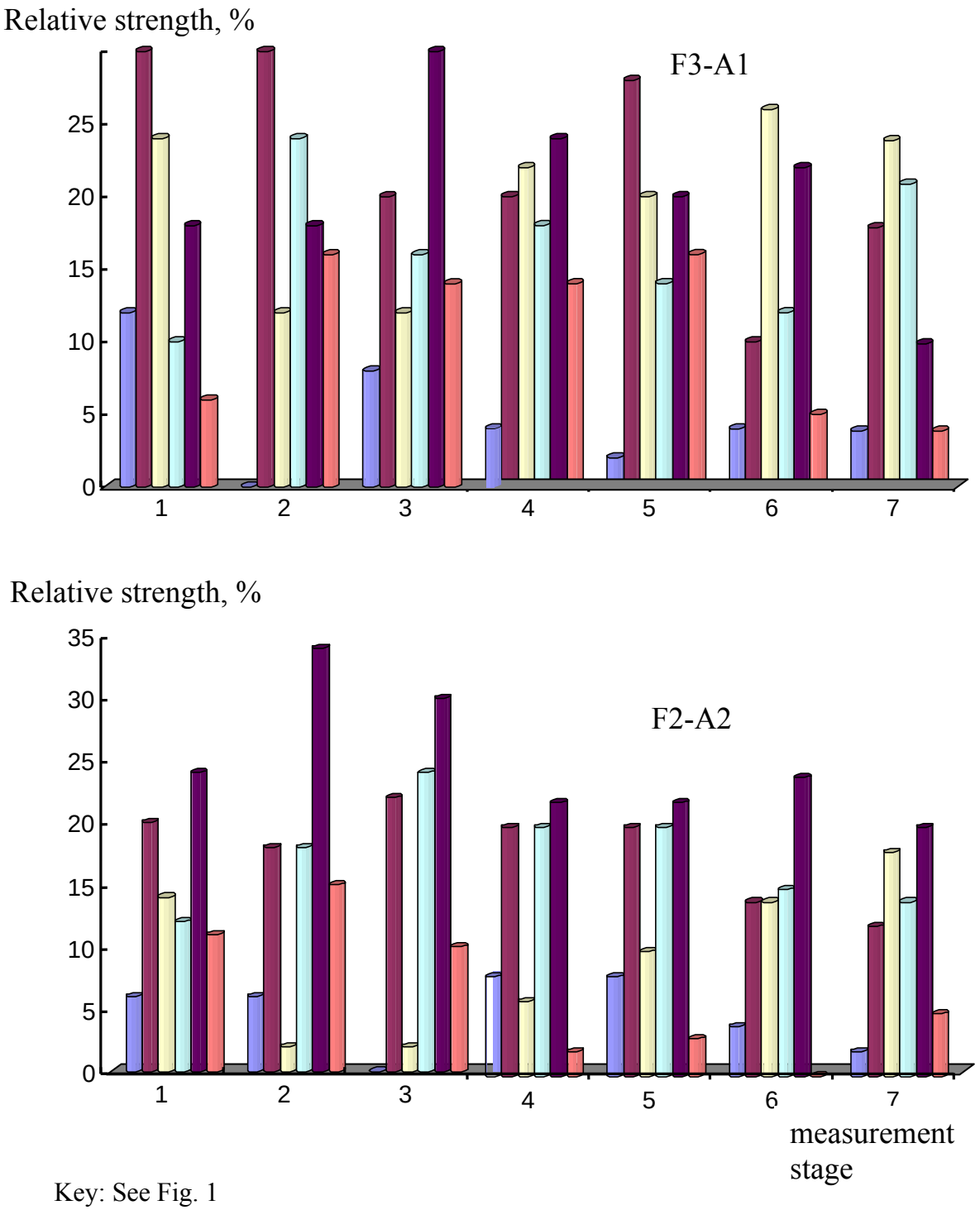
The substantial change of the spectral characteristics of the EEG rhythms is conspicuous under the influence of a mobile phone in virtually all of the left leads examined. The most typical was the increase of the relative strength of the delta and alpha rhythms, especially the increase observed in the third and fourth stages of measurement, which confirms the data obtained by other experiments. When using the electromagnetic anomaly neutralizers, no increase in the relative strength of the rhythms was detected. Figures 1 and 2 illustrate this pattern in the EEG's frontal lead.




Key:

1. Recording of a baseline EEG at rest. 2. Recording an EEG with a mobile phone in standby mode held next to the ear. 3. Recording an EEG with a mobile phone in call mode held next to the ear (no audio). 4. Recording an EEG with a mobile phone in talk mode held next to the ear (no audio). 5. - 7. Recording of an EEG 3, 5, and 10 minutes after turning the phone off.

Figure 1. Relative strength of the EEG rhythms in the frontal leads when under the influence of a mobile phone's electromagnetic field during the stages of measurement.

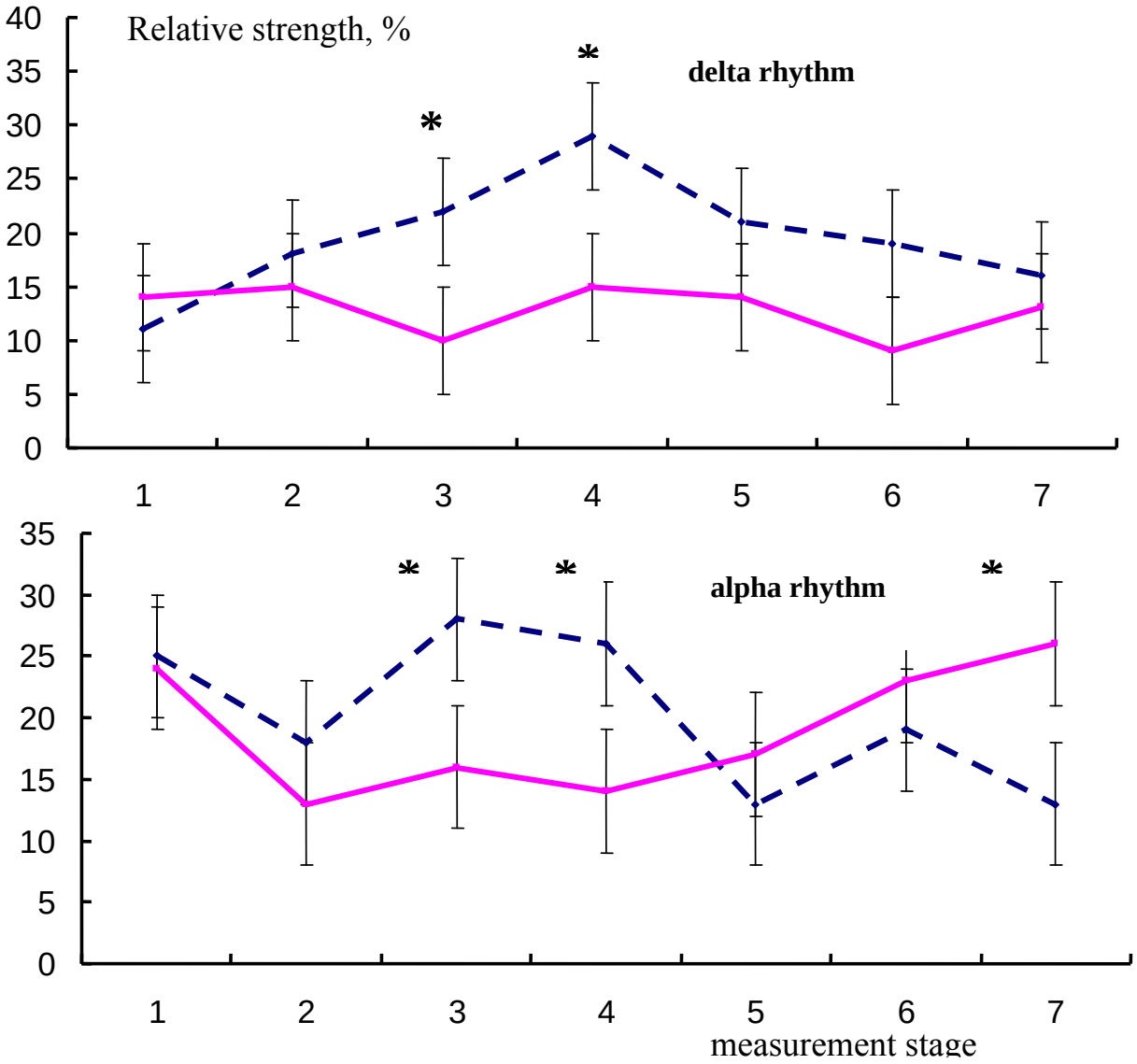



Key: See Fig. 1

Figure 2. Relative strength of the EEG rhythms in the frontal leads when under the influence of a mobile phone's electromagnetic field while using electromagnetic radiation neutralizers during the stages of measurement.

In the leads located on the side of the head opposite the mobile phone, no pattern was identified in the changes of the relative strength of the rhythms.

A comparison of the behavior of the relative strength of the rhythms of the brain's total bioelectric activity with and without an Aires Shield made it possible to detect statistically significant ($p < 0.5$) differences in its properties. Figure 3 shows the behavior of the relative strength of the delta and alpha rhythms of the EEG during all stages of measurement. It has been established that the elevation of the relative strength of these rhythms, which are manifest when using a mobile phone on the side exposed to the mobile phone, without using an Aires Shield, are virtually absent when it is used.




Key:

control measurements;

main series of measurements (using the Aires Shield).

* Statistically significant change ($p < 0.05$).

Figure 3. The comparative behavior of the relative strength of the EEG's rhythms under the influence of a mobile phone's electromagnetic field during the stages of the research in the main and control measurements (on the side of the head exposed to the field).

**Conclusion.** Using an Aires Shield electromagnetic oscillation neutralizer when working with mobile phones operating on the GSM-900 standard inhibits electromagnetic radiation from interacting with the brain's own bioelectric activity on the frequencies of the alpha- and delta rhythms, which may be regarded as a protective effect.

Bibliography.

1. A.I. Zubrilkin. Biotropism of the Parameters of Active Radiation from Mobile Phones / A.I. Zubrilkin, A.V. Ponomarev, S.V. Pobachenko // Journal of Higher Learning Institutions. Physics. – 2012. – Vol. 55. – No. 8/3. – pp. 157 – 158.

2. L.D. Usanova. Effects of the Influence of Electromagnetic Radiation at 1800 mHz on Living Objects: dissertation abstract, 2011. – p. 18.

3. Brenner, R.P. Computerized EEG spectral analysis in elderly, normal, demented and depressed subjects / R.P. Brenner [et. al.] // Electroencephalography Clinical Neuropsychology. – 1986. – Vol. 64. – pp. 483 – 492.

4. Croft, R.J. Effect of 2G and 3G mobile phones on human alpha rhythms: Resting EEG in adolescent, young, adults, and the elderly / R.G. Croft [et. al.] // Bioelectromagnetics. – 2010. – Vol. 31 (b). – pp. 434-444.

5. Hyland, G. J. Physics and biology of mobile telephony / G. J. Hyland // The Lancet. – 2000. – Vol. 356 (25). – pp. 1833-1836.