REPORT on 報告

Special Aspects of Cerebral Bioelectrical Activity Changes Upon Exposure of Brain to Electromagnetic Radiation, Emitted by Mobile Phone, and Possible Correction Thereof by Combination of AIRES SHIELD Pro and Mobile Phone Pilot Studies

以行動電話發射之電磁輻射暴露大腦時腦部生物電活動變化之特殊面向，以及透過 AIRES SHIELD Pro 與行動電話結合進行之可能修正 — 先導研究

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SUMMARY 摘要

Study subjects are 21-year old male volunteers. The set of methods is comprised of physiological and statistical study methods. The purpose of the work is to assess aspects of cerebral bioelectrical activity upon brain exposure to electromagnetic radiation, emitted by the modern mobile phone in the conversation mode, and possible compensation of emerging negative physiological effects by means of the AIRES SHIELD Pro corrective device. Feasibility and efficiency of the AIRES SHIELD Pro corrective device use to mitigate negative impact of electromagnetic radiation, emitted by the mobile phone, has been justified. Selection of physiological parameters, sensitive to impact of electromagnetic radiation, emitted by the mobile phone, has also been justified.

研究對象為 21 歲男性志願者。所採用的方法組合包括生理學與統計學研究方法。此研究目的在於評估現代行動電話於通話模式下發射之電磁輻射暴露大腦時，腦部生物電活動的相關面向，及透過 AIRES SHIELD Pro 糾正裝置對所產生之負面生理效應進行可能的補償。研究證明了使用 AIRES SHIELD Pro 糾正裝置以減輕行動電話所發射之電磁輻射之負面影響的可行性與效能。亦證明了在生理參數的選擇上，可辨識出對行動電話所發射之電磁輻射敏感的指標。

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INTRODUCTION 引言

Studies of impact, produced by electromagnetic field (EMF) and radiation (EMR), emitted by mobile phones (MP), on biological organisms have actively been conducted over the last two decades. However, the literature showed no clear correlation of negative impact with radiation, emitted by MP, at least until 2000. In order to clarify this issue, the WHO established the INTERPHONE project. Studies were conducted in 13 countries. 12,800 people participated in the studies. 20 mln pounds were spent. The findings of the studies made it possible for the WHO specialists to confirm connection between MP use and brain tumors, manifestation of Alzheimer and Parkinson diseases, epileptic seizures provocation. Preliminary findings were published in The Daily Telegraph in 2009. The mobile phone is a source of complex-modulated electromagnetic radiation of SHF (centimeter) band. Depth of MP SHF EMR with frequency up to 1000 MHz penetration into the brain makes up to 1.93 cm (6). Thus, it is possible that MP EMR directly impacts not only the cells of closely adjacent areas, but also on the whole brain, including liquid media thereof. This changes functional state of the central nervous system (CNS), which is reflected in the bioelectrical activity pattern (BEA) of the brain (1, 3, 4, 7, 8, 10, 13, 14, 16, 17). However, not all researches support the idea of weak EMR, emitted by mobile phones, negatively impacting the brain (14). The opinion is favored by the researchers, focusing their attention on exposure to energy of radiation, emitted by mobile phones, which is measured by SAR (Specific Absorption Rate). Modern phones, generally, have SAR below the acceptable standards. Moreover, manufacturers state that receiver sensitivity is better in expensive phones and smartphones, which enables to increase communication distance and also to use less powerful transmission unit of the basic station. From their vantage point, this suggests that modern mobile communication is harmless.

在過去二十年中，針對行動電話（MP）所發射之電磁場（EMF）與電磁輻射（EMR）對生物體影響的研究已被積極展開。然而，文獻顯示，至少在 2000 年前，尚未有明確證據將行動電話所發射的輻射與負面影響相關聯。為釐清此一問題，世界衛生組織（WHO）成立了 INTERPHONE 計畫。該研究在 13 個國家進行，共有 12,800 人參與，耗資 2,000 萬英鎊。研究結果使 WHO 的專家能夠確認行動電話使用與腦瘤、阿茲海默症與帕金森氏症的出現，以及癲癇發作的誘發之間存在關聯。初步結果於 2009 年刊登在《每日電訊報》。行動電話為一種在超高頻（SHF，公分波段）所發射之複雜調變電磁輻射源。頻率高達 1000 MHz 的行動電話 SHF 電磁輻射在腦部的穿透深度可達 1.93 公分（6）。因此，行動電話電磁輻射不僅可能直接影響鄰近區域的細胞，亦可能影響整個大腦，包括其中的液態介質。 這會改變中樞神經系統（CNS）的功能狀態，並反映在腦部的生物電活動模式（BEA）（1, 3, 4, 7, 8, 10, 13, 14, 16, 17）。然而，並非所有研究都支持手機所發出的低強度電磁輻射（EMR）會對大腦造成負面影響的觀點（14）。傾向此看法的研究者將注意力集中在由手機發出的輻射能量暴露上，該能量以 SAR（比吸收率，Specific Absorption Rate）來測量。一般來說，現代手機的 SAR 值低於可接受標準。此外，製造商聲稱昂貴的手機與智慧型手機接收靈敏度較佳，這使得通訊距離可以增加，同時也能讓基站使用較低功率的傳輸單元。從這個角度來看，這暗示現代行動通訊是無害的。

The purpose of this paper is to assess aspects of cerebral BEA upon exposure to EMR of the modern phone in the conversation mode and possible compensation of emerging negative physiological effects, using the AIRES SGIELD Pro corrective device.

本研究旨在評估在通話模式下，現代手機所產生之電磁輻射（EMR）對腦部生物電活動（BEA）的影響面向，並探討使用 AIRES SGIELD Pro 矯正裝置對可能產生之負面生理效應的補償作用。

STUDY POPULATION, SCOPE AND METHODS

研究對象、範圍與方法

We used Prestigio modern smartphone in this study. 13 apparently healthy 21year old male volunteers participated in the study. The tests conformed to ethical principles of the Declaration of Helsinki of the World Health Organization 2000 and were performed by double-blind method with the informed consent from the volunteers. The statistical group included 6 persons. The entry condition was stability of the functional state of the body (according to EEG and ECG values) during one-two weeks of the study (April 5, 2019 - April 18, 2019).

本研究使用 Prestigio 現代智慧型手機。共有 13 名外觀健康的 21 歲男性志願者參與研究。測試遵循世界衛生組織 2000 年《赫爾辛基宣言》的倫理原則，並在志願者知情同意下以雙盲法進行。統計組包含 6 人。納入條件為在研究期間（2019 年 4 月 5 日至 2019 年 4 月 18 日）經一至兩週監測後，個體功能狀態（依 EEG 與 ECG 值）穩定。

EEG and ECG values were recorded, using Etsefalan 13103 software solution with integrated EEG and ECG recording and analysis programs. Cerebral BEA (EEG) was recorded, using 16 monopolar leads according to the international 10-20 system of electrode placement in the $0 - 70$ Hz bandwidth with 250 Hz sampling frequency. The electrodes were placed symmetrically in the prefrontal (Fp1, Fp2), postfrontal (F3, F4), frontotemporal (F7, F8), central (C3, C4), midtemporal (T3, T4), posttemporal (T5, T6), bregmatic (P3, P4) and occipital (O1, O2) regions, while integrated reference electrodes were placed on ear lobes. The even electrodes were placed on the right side.

使用整合了腦電圖與心電圖記錄和分析程式的 Etsefalan 13103 軟體方案記錄了 EEG 與 ECG 值。腦部生物電活動（EEG）以國際 10-20 電極放置系統的 16 支單極導聯在 $0 - 70$ Hz 頻段、250 Hz 取樣頻率下記錄。電極對稱放置於前額（Fp1、Fp2）、前額後側（F3、F4）、額顳（F7、F8）、中央（C3、C4）、中顳（T3、T4）、後顳（T5、T6）、頂裂（P3、P4）與枕部（O1、O2）區域，整合參考電極置於耳垂。偶數編號電極置於右側。

The scenarios for the study:

研究情境：

EEG and ECG recording and analysis according to the requirements and criteria of functional diagnostics (visual analysis) and selection of subjects in to the statistical group. 13 subjects.

依功能診斷（目視分析）的要求與標準進行 EEG 與 ECG 的記錄與分析，並將受試者納入統計群組的篩選。13 名受試者。

Recording I - background EEG (2min); eyes opening and closing test; II background with eyes closed (audio frequency oscillator - 2 min); III - EEG recording with the mobile phone On (MP ON - muted conversation mode), in the fronto-temporal region on the right side (5 min); IV - recording after MP is off (MT after test -2min). 6 selected subjects.

記錄 I - 背景腦電圖 (2 分鐘)；睜眼與閉眼測試；II 背景於閉眼狀態（音頻振盪器 - 2 分鐘）；III - 在額顳區右側進行的手機開啟時之腦電圖紀錄（MP ON - 靜音通話模式，5 分鐘）；IV - 手機關閉後之紀錄（MT 測試後 - 2 分鐘）。6 位受試者。

Recording I - background EEG (2min); eyes opening and closing test; recording II - background with eyes closed (audio frequency oscillator - 2 min); III - EEG recording with the mobile phone On + AIRES SHIELD (MP+ - muted conversation mode), in the fronto-temporal region on the right side (5 min); IV EEG recording after MP+ is off and after test (2min). 6 selected subjects.

記錄 I - 背景腦電圖 (2 分鐘)；睜眼與閉眼測試；記錄 II - 背景於閉眼狀態（音頻振盪器 - 2 分鐘）；III - 在額顳區右側進行的手機開啟並搭配 AIRES SHIELD 之腦電圖紀錄（MP+ - 靜音通話模式，5 分鐘）；IV - MP+ 關閉及測試結束後之腦電圖紀錄（2 分鐘）。6 位受試者。

The subjects did not know if scenario II or III was used during the study.

受試者並不知道研究期間使用的是情境二或情境三。

Five random 5 -second segments were studied in each scenario sample. Power spectrum, amplitude, EEG bands index, asymmetry of the dominant rhythm, correlation analysis were evaluated. As the sample was small (6 subjects), integrity of the findings was assessed, using non-parametric sign test.

在每個情境樣本中隨機選取五段 5 秒的片段進行研究。評估了功率譜、振幅、腦波頻帶指標、占主導節律的非對稱性以及相關分析。由於樣本數較少（6 名受試者），使用非參數符號檢定評估結果的一致性。

FINDINGS AND DISCUSSION OF IN-HOUSE STUDIES

室內研究的發現與討論

Five subjects of the statistical group had stable EEG patterns of the same type. Alpha activity prevailed in the EEG of the above-mentioned subjects while waves were distributed by the amplitude with decrement from the back of the head to the forehead. Frequency: 9.8 ± 0.2 oscillations per second. Amplitude: $80.0 \pm 7.0\mu$ V. Index: $85 \pm 17\%$. No significant variations of the average alpha activity frequency and the average amplitude were seen in the subjects during the background recording from one study to another.

統計組中有五名受試者呈現相同類型的穩定腦電圖模式。上述受試者的腦電圖以α節律為主，波振幅自後腦向額部遞減。頻率： 9.8 ± 0.2 次振盪 / 秒。振幅： $80.0 \pm 7.0\mu$ V 。指數： $85 \pm 17\%$ 。在各次背景記錄中，受試者的平均α節律頻率及平均振幅未見顯著變化。

The sixth subject was specifically included into the statistical group for comparison. This subject had an unstable EEG pattern not only during the three studies, but also during the first background study, scattering of low-amplitude beta rhythm, diffused vascular pulsations were observed in the subject as well. Nevertheless, values of basic rhythms, their distribution and correlation were within the limits.

第六位受試者被特別納入統計組以作比較。該受試者在三次測試期間以及第一次背景測試時都顯示出不穩定的腦電圖模式，還觀察到低幅度β節律散佈及彌漫性血管搏動。然而，基本節律的數值、其分佈與相關性仍在範圍內。

Hyperventilation (HV) is a functional test, adopted in the clinical electroencephalography. This test causes development of hypoxia and hypercapnia forced physiologically substantiated change of the functional state of the CNS. Generally, aftereffects of the HV include development of slow wave activity, while, in pathological cases it provokes development paroxysmal activity. When the test is over, BEA shift towards slow wave activity prevalence continues no more than 5-15s.

過度換氣（HV）是臨床腦電圖檢查中使用的一項功能性測試。該測試會引起低氧與高碳酸血症，從而在生理上促使中樞神經系統功能狀態發生改變。一般而言，HV 的後效應包括緩波活動的出現；而在病理情況下，它會誘發陣發性活動的發生。當測試結束後，腦電生物電活動向緩波活動佔優勢的轉變持續時間不超過 5 至 15 秒。

In all subjects of the statistical group, including the sixth subject, HV aftereffects stayed within the above-mentioned limits of BEA changes, no paroxysmal activity was detected. Development of spectral power density in the slow wave area of EEG band and in the alpha band, enhancement of coherence in all bands, increase of the correlation coefficient in the temporal leads (to a lesser extent in the sixth subject, B-v) were observed. The ATTACHMENT hereto includes examples of encephalic asymmetry visualization based on reciprocal functions: cross-spectrum (CS), coherency (COH), cross-correlation (CC) after the HV in the patient with a stable BEA pattern (Fig. $2\ \mathrm{A1}-\mathrm{A3}^{1}$) and in the sixth subject (Fig. $3\ \mathrm{A1}-\mathrm{A3}^{1}$)

在統計組的所有受試者中，包括第六位受試者，HV 事後效應均維持在上述 BEA 變化範圍內，未檢出陣發性活動。觀察到腦電圖慢波區與 α 波段的頻譜功率密度發展、所有頻段相干性的增強、顳葉導聯的相關係數上升（在第六位受試者即 B-v 中程度較輕）。隨附文件中包括基於互反函數顯示腦不對稱性的範例：交叉頻譜（CS）、相干度 (COH) 、以及在具有穩定 BEA 模式的患者（圖 $2\ \mathrm{A1}-\mathrm{A3}^{1}$ ）與第六位受試者（圖 $3\ \mathrm{A1}-\mathrm{A3}^{1}$ ）中 HV 之後的互相關（CC）。

The main differences between the subjects of the statistical group and the sixth subject were evident upon exposure to the MP and MP+, i.e. in the presence of the AIRES SHIELD. As for the statistical group, $7-13$ seconds after the MP was turned on,

統計組受試者與第六位受試者之間的主要差異在於暴露於行動電話（MP）與行動電話加上 AIRES SHIELD（MP+）時顯現。就統計組而言，在行動電話開啟後 $7-13$ 秒，

EEG pattern changed gradually. The pattern with a prevailing alpha activity (Fig. 1A) was replaced by the pattern with a prevailing slow wave activity (Fig. 1B), dominance of delta waves with an emphasis on the MP side ($p \leq 0.01$) was observed, thus reflecting change of the functional state of the brain. The BEA pattern was similar upon exposure to the MP and during the MP aftereffect as well as after the HV. However, while after the HV EEG promptly went back to the background values, even 2 minutes after the MP was turned off, EEG slow wave activity still prevailed. Positron-emission tomography (J.am.Med. Association, 2010) showed that brain cells absorb glucose with 2.4 speed in the areas where the MP is applied (orbitofrontal cortex and the front part of the temporal cortex), indicating hyperactivation of these areas upon exposure to EMR, emitted by the MP. It is to be noted that prolonged hyperactivation may cause damage to these parts of the brain, which are responsible for learning, memory, planning and development of motor programs. General BEA pattern upon exposure to EMR, emitted by the MP, and during the MP aftereffect is similar to the BEA pattern in the hypnotic sleep or meditation, i.e. altered state of consciousness. It should be noted that during aftereffect of EMR, emitted by the MP, prevalence of slow wave activity continued for more than $2-3\ \mathrm{min}$. Extension of such a condition is most hazardous for children's mind during the process of formation thereof $(11,12)$.

腦電圖模式逐漸改變。以優勢α波活動為主的模式（圖 1A）被以優勢慢波活動為主的模式（圖 1B）所取代，觀察到以δ波為主且在手機一側（ $p \leq 0.01$ ）更為明顯的優勢，反映出大腦功能狀態的改變。暴露於手機和手機暴露後的餘效以及高壓（HV）後的腦電生物電活動（BEA）模式相似。然而，儘管在高壓處理後腦電圖迅速回復到背景值，即使在手機關閉兩分鐘後，腦電圖的慢波活動仍然佔主導。正子放射斷層攝影（J. am. Med. Association, 2010）顯示，在手機作用區域（眶額皮質與顳葉前部），腦細胞攝取葡萄糖的速率為 2.4 倍，表明在暴露於手機發出的電磁輻射時這些區域呈現過度活化。值得注意的是，長期的過度活化可能會損害這些負責學習、記憶、規劃與運動程式發展的大腦區域。 暴露於手機所發射的電磁輻射（EMR）以及在手機影響後的整體腦生物電活動（BEA）模式，與催眠睡眠或冥想中出現的 BEA 模式相似，也就是意識的改變狀態。值得注意的是，在手機所發射的電磁輻射影響後，慢波活動的優勢持續了超過 $2-3\ \mathrm{min}$ 。此類狀態的延長對正在形成中的兒童心智最為危險 $(11,12)$ 。

As for combination with the AIRES SHIELD, when the MP was turned off, cerebral bioelectrical activity immediately went back to the initial state, similar to aftereffect of the HV (Fig. 1B). Even though there was a visual similarity of the initial EEG pattern (the background prior to turning on of the MP) and the pattern after exposure to the MP in combination with the AIRES SHIELD, statistical analysis showed valid ($\mathrm{P} \leq 0.05$) differences. The differences included increased frequency of alpha rhythm from 9.8 ± 0.2 to11.6 ± 0.3 oscillations per second. Neurophysiologists of the late $20\mathrm{c}-21\mathrm{c}(2,5,9)$ believe that the higher alpha rhythm frequency is, the higher the speed of information perception and processing thereof is. However, this conclusion has to be experimentally tested within the framework of future studies on efficiency of the AIRES SHIELD, used as the device, neutralizing negative impact of exposure to EMR, emitted by the MP. Findings of the comparative BEA encephalic asymmetry (ECA) changes assessment (see ECA visualization patterns and data, provided by G.N. Lukyanov) upon exposure to EMR, emitted by the MP with and without the AIRES SHIELD showed that when the MP was used in combination with the AIRES SHIELD, coherence structure changed, i.e. electrons arrangements, indicating harmonized behavior of oscillation processes and interactions of brain structures and parts. Harmonization is necessary for 'cost-free' optimization of processes in the CNS. In complex systems harmonization is performed not only and not so much through oscillation phases, but also via correlations. Our study also showed change of

至於與 **AIRES SHIELD** 的組合，當手機被關閉時，腦部生物電活動立即回復到初始狀態，類似于高壓後效應（圖 **1B**）。儘管初始腦電圖模式（手機開啟前的背景）與在手機與 **AIRES SHIELD** 組合暴露後的模式在視覺上相似，統計分析顯示存在顯著（$p \leq 0.05$）差異。這些差異包括 **α** 節律頻率從 9.8 ± 0.2 增加到 **11.6** ± 0.3 次振盪每秒。已故的神經生理學家 $20c - 21c(2, 5, 9)$ 認為 **α** 節律頻率越高，信息感知與處理的速度越快。然而，這一結論需要在未來關於 **AIRES SHIELD** 作為中和手機所發電磁輻射負面影響裝置之效能的研究框架內以實驗方式驗證。 对比评估在暴露於由行動電話所發出的電磁輻射（**MP**）的情況下，有無 **AIRES SHIELD** 時腦電生物電活動（**BEA**）腦不對稱性（**ECA**）變化的發現（見由 **G.N. Lukyanov** 提供的 **ECA** 視覺化模式與資料）顯示，當行動電話與 **AIRES SHIELD** 結合使用時，相干結構發生改變，即電子排列改變，顯示腦部結構與部分之間的振盪過程與交互作用呈現出和諧化的行為。和諧化對於中樞神經系統中「無成本」優化過程是必要的。在複雜系統中，和諧化的實現不僅也不主要透過振盪相位，而是通過相關性。我們的研究也顯示出變化之處

correlation links structure between cortical parts of the brain. Comparing different stages of the study, we see that the structure has become more sophisticated: against the background of exposure and after exposure, in particular, in the frontal region, where behavioral programs are developed, and in the right temporal region, where the operating MP is located. As a result, the brain gradually becomes more resilient to negative impact of EMR, emitted by the MP.

皮質各部分之間的相關連結結構。比較研究的不同階段，我們看到該結構變得更加複雜：在暴露期間以及暴露之後，尤其是在發展行為程序的額葉區域，以及放置操作性手機的右側顳葉區域。因此，大腦逐漸對由手機發出的電磁輻射的負面影響變得更有抵抗力。

A different pattern of exposure to the MP was observed in the sixth subject. When the MP was turned on, bursts of alpha activity with 11-13 oscillations per second frequency were recorded against the background of slow wave rhythms. Amplitude of such alpha activity was the greatest before the MP was turned off ($4^{th}, 5^{th}$ minute). It was similar to sleep spindles at the end of exposure to the MP and during aftereffect of the MP in combination with the AIRES SHIELD. In this case, subject to unsteadiness of the initial EEG pattern, tension of cortical vessels was evident, which was manifested by vascular pulsations, sharpness of alpha waves peaks due to high-frequency activity. This BEA pattern is an indicator of shift in the activity - inactivity balance towards slight predominance of activation processes as a result of the brain cortex excitation. Upon exposure to the MP and the MP+ (in combination with the AIRES SHIELD), the brain, first of all, responded to low-frequency modulating signal (2 oscillations per second). Afterwards the brain searched for the optimum way to compensate changes, caused by exposure to the MP: corrective regulatory structures of the diencephalic system were engaged. In the latter case bursts of alpha waves against the background of slow wave activity mostly indicated that the process of the BEA changes correction involved not only regulatory subcortical structures, but also the cardiovascular system, which was manifested by synchronization with ECG (electrode 18, see Fig. 3). As is shown in the diagrams below, benchmarking clearly demonstrated that exposure to the MP disrupts fractional structure of EEG, which is characteristic to background studies (see the first diagram). Such a structure reflects interaction of structures of the central nervous system (see the diagram in the middle). Upon exposure to the MP in the presence of the AIRES SHIELD, destructive influence of the working mobile phone is significantly weakened (see the third diagram). The calculation was specifically performed by electrodes on the left side, including the reference electrode A1 to exclude possible physical artefact from the MP, placed at the right ear.

第六位受試者呈現出不同的手機暴露模式。當手機開啟時，在慢波節律的背景下記錄到每秒 **11–13** 次振盪的阿爾法活動爆發。此類阿爾法活動的振幅在手機關閉前（$4^{th}, 5^{th}$ 分鐘）最大。它在手機暴露結束時及手機與 **AIRES SHIELD** 結合後的餘效期間類似睡眠紡錘波。在此情況下，由於起始腦電圖模式的不穩定，可見皮質血管張力，表現為血管脈動，以及因高頻活動而使阿爾法波峰尖銳。此腦生物電活動模式指示活動—非活動平衡朝向活動過程稍微佔優的轉移，為腦皮質興奮的結果。在暴露於手機及手機+（與 **AIRES SHIELD** 結合）時，腦部首先對低頻調變訊號（每秒 **2** 次振盪）產生反應。 之後，大腦尋求最佳方式來補償由行動電話暴露所引起的變化：間腦系統的修正性調節結構被動員。在後者情況下，在慢波活動背景下出現的α波爆發多半表示腦生物電活動變化的修正過程不僅涉及皮層下的調節結構，還牽涉到心血管系統，這由與心電圖的同步化表現出來（電極 **18**，見圖 **3**）。如下面的圖表所示，基準比較清楚地顯示行動電話暴露擾亂了在背景研究中具有特徵性的腦電圖分段結構（見第一個圖表）。這種結構反映了中樞神經系統各結構之間的相互作用（見中間的圖表）。在有 **AIRES SHIELD** 存在的行動電話暴露下，工作中手機的破壞性影響顯著減弱（見第三個圖表）。計算特別由左側電極執行，包含參考電極 **A1**，以排除可能來自置於右耳之行動電話的物理性干擾。

From the standpoint of modern science, a biological organism is a multiplecomponent, dissipative, fractally organized, non-linear, self-regulating system. The prime objective of a biological system being a single structure is survival in the changing environment. The system has a multi-layer subordinate structure with dynamically arranged hierarchy of self-regulating processes. Resonance response to biologically significant multi-frequency impacts of informational nature is a basic

從現代科學的觀點來看，生物有機體是一個多成分、耗散性、分形組織的非線性自我調節系統。作為一個整體結構，生物系統的主要目標是在變遷的環境中求生。該系統具有多層次的從屬結構，內含動態排列的自我調節過程階層。對於具有資訊性質的、多頻率的生物學上顯著作用，系統的共振反應是基本的

property of biological systems. However, the system is non-linear, therefore, response depends on the initial state and requires non-linear approach to assessment of the state change. Otherwise, analysis of the calculations may be incorrect. Thus, a significant discrepancy may be detected upon visual comparison of EEG pattern and visualized encephalic asymmetry. It is due to the fact that when EEG spectrum is broken down into bands, using the Fourier filters, coherence seemingly enhances over all bands, including alpha and beta ones, nevertheless, the BEA pattern includes virtually no alpha or beta waves. The main conclusions are confirmed by more precise processing of EEG signals, the findings of which are presented by prof. G.N. Lukyanov in the diagrams below.

CONCLUSIONS **結論**

THE PILOT STUDIES HAVE SHOWN SIGNIFICANT CHANGES OF EEG VALUES UPON EXPOSURE TO EMR, EMITTED BY THE MP, INDICATING PROLONGED DECREASED FUNCTIONAL ABILITY OF THE CNS.
COMBINATION OF THE MP AND THE AIRES SHIELD Pro DEVICE NORMALIZES ANALYZED EEG PARAMETERS AND OPTIMIZES THE STRUCTURE OF CORRELATIONS, WHICH MAKES IT POSSIBLE TO STATE NOT ONLY RESTORATION OF THE INITIAL FUNCTIONAL STATE LEVEL, BUT ALSO ENHANCEMENT THEREOF, FOLLOWING EXPOSURE TO EMR, EMITTED BY THE MP.

將手機與 AIRES SHIELD Pro 裝置結合，可使所分析的腦電圖參數恢復正常並優化相關結構，這不僅說明在暴露於手機所發射的電磁輻射後功能狀態已恢復至原始水準，甚至有所提升。

THE FINDINGS INDICATE EFFICIENCY OF THE COMBINATION OF THE MP AND THE AIRES SHIELD Pro, SERVING AS A DEVICE, NEUTRALIZING NEGATIVE IMPACT OF EMR, EMITTED BY THE MP.

研究結果顯示，將手機與 AIRES SHIELD Pro 結合使用是有效的，該裝置能中和由手機發射之電磁輻射的負面影響。

LIST OF REFERENCE: **參考文獻清單：**

Abdulkerimov S.A., Bogdanov V.P., Koyokina O.I. et al. Influence of Complex Polarization Electromagnetic Waves on Brain Activity. New Medical Technologies Bulletin, 2003,
No2, P. 38-39 **No2，頁 38-39**
Bazanova O.M. Modern Interpretation of Electroencephalogram Alpha Activity. Physiological Sciences Advancements, 2009, No3, P.32-53

Bazanova O.M. 現代對腦電圖α波活動的詮釋。《生理科學進展》，2009 年，第 3 期，頁 32-53

Grigoryev O.A. Radiobiological Assessment of Mobile Cellular Communication Electromagnetic Field Influence on Health of Population and Risks Management. Extended Abstract of Doctoral Thesis, 2012, Moscow, 47 p.

Grigoryev O.A. 行動蜂巢通訊電磁場對人口健康影響之放射生物學評估與風險管理。博士論文擴充摘要，2012 年，莫斯科，47 頁。

Zubrilkin A.I., Ponomarev A.V., Pobachenko S.V. Biotropism of Operating Factors of Radiation, Emitted by Mobile Phones. Journal of Higher Educational Institutions. Physics, 2012, V.55, No8/3, P. 157-158

Zubrilkin A.I., Ponomarev A.V., Pobachenko S.V. 行動電話所發射輻射的生物趨向性作用因素。《高等院校學報·物理》，2012 年，卷 55，第 8/3 期，頁 157-158

Iznak A.F., Iznak E.V., Sorokin OS.A. Change of EEG and Response Time in Apathetic Depression Treatment. Neuropathology and Psychiatry Journal, 2011, No 7, P. 49-53
Ismailov E.Sh. Biophysical Effect of Microwave radiation, Moscow, 1987, P. 144.
Kanunnikov I.E. Reflection of Type and Success of Cognitive Activity in EEG: Application of Non-Linear Methods in Psychology. I.M. Sechenov Russian Physiology Journal, 2000, No8, P. 953-960
Lebedeva N.N., Potulova L.N., Marguey R.A. Dynamics of Rhythmic Activity of Brain Cortex upon Exposure to Electromagnetic Field, Emitted by Mobile Phones. Biomedical Electronics, 2010, No10, P. 3-10
Rozhdestvenskaya V.I. Individual Differences of Working Capacity. Psychophysiological Study of Working Capacity during Repetitive Activities, Moscow: Pedagogics, 1980, 158 p.
Serov I.N., Sysoev V.N. Assessment of AIRES SHIELD Neutralizers of Electromagnetic Anomalies Efficiency for Reduction of Adverse Impact of Mobile Electromagnetic Field. International Journal of Applied and Fundamental Studies. 2014, No 8/3, P. 81-85
Suvorov G.A., Paltsev Yu.R. et al. Issues of Biological Impact and Hygienic Limitation of Electromagnetic Fields, Emitted by Mobile Communication Means. Occupational and Industrial Ecology Medicine. 2002, No 9, P. 10-18
Sudakov K.V., Antimony G.D. On Hypnogenic Action of Modulated Electromagnetic Field. Bulletin of experimental Biology and Medicine.1077, No 8. P. 146-149

13.Bak M. Effect of GSM Signals during Exposure to Event Related Potentials (ERPs)/ Occup. Med. Environ. Health. 2010, Vol. 23(2), P. 191-199
14.Besset F., Espa F., Danvilliers J, Billiard M. et al. No effect in Cognitive Function from Daily Mobile Use. Bioelectromagnetics, 2005, Vol. 2, (6), P. 102107
15.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. 3 (6). P.434-444
16.Haarala C., Bjornberg L., Ek U/ et al. Effect of a 902 MGz Electromagnetic Field Emitted by Mobile Phones on Human Cognitive Function: A Replication Study/ Bioelectromagnetics/2003 Vol. 24, No4, P. 283-288

ATTACHMENTS: **附檔：**

List of Abbreviations: **縮寫表：**

BEA - bioelectrical activity

BEA - 生物電活動

WHO - World Health Organization

WHO - 世界衛生組織

HV - hyperventilation **HV - 過度換氣**
MP - mobile phone

MP - 行動電話

MP+ - mobile phone in combination with AIRES SHIELD
AT - after test
SHF - centimeter band electromagnetic radiation
ECA - encephalic asymmetry
CNS - central nervous system
ECG - electrocardiogram **ECG - 心電圖**
EMR - electromagnetic radiation

EMR - 電磁輻射

EMF - electromagnetic field

EMF — 電磁場

EEG - electroencephalogram

EEG — 腦電圖（electroencephalogram）

SAR - Specific Absorption Rate
2. List of Subjects:
I. Development of optimum leads layout, recording scenarios:

O-a G.R. 28.08.1998
R-a E.I. 30.071955
M-a M.G. 15.06.1963
II. Study according to Scenario I - qualification stage:
M-v V.A. 3.02.1998
T-v D.N. 8.06.1997
K-v A.R. 30.03.1997
K-v A.D. 27.12.1997
R-v A.M. 20.11.1997
V-n N.A. 19.12.1997
K-v A.S. 3.06.1997
N-v T.G. 30.07. 1998
A-v A.G. 21.12.1997
B-v R.A. 24.101997
III. Study according to Scenarios II and III:
T-v D.N.
K-v A.D.
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A-v A.G.
B-v R.A.

3. Figures:

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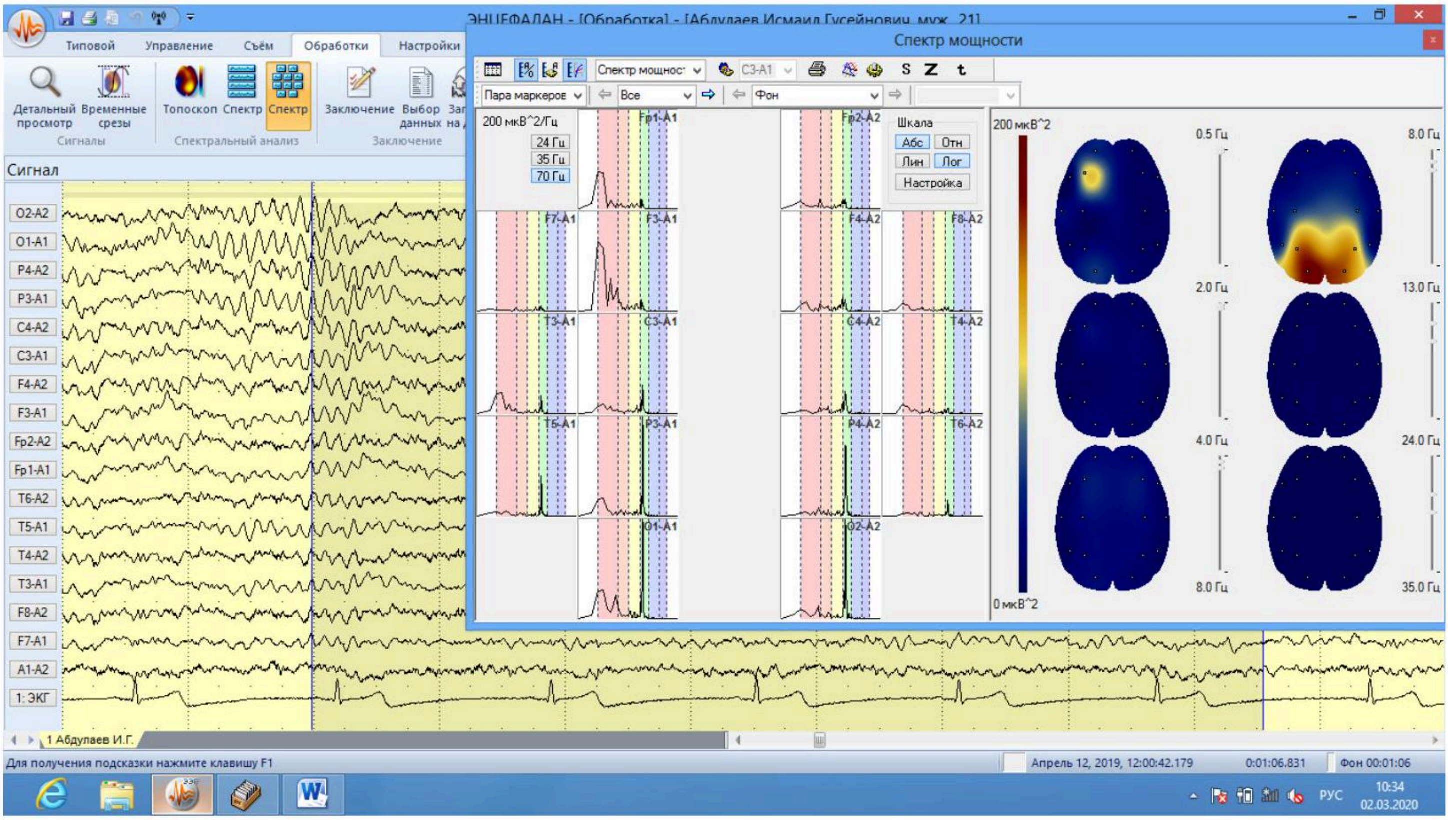

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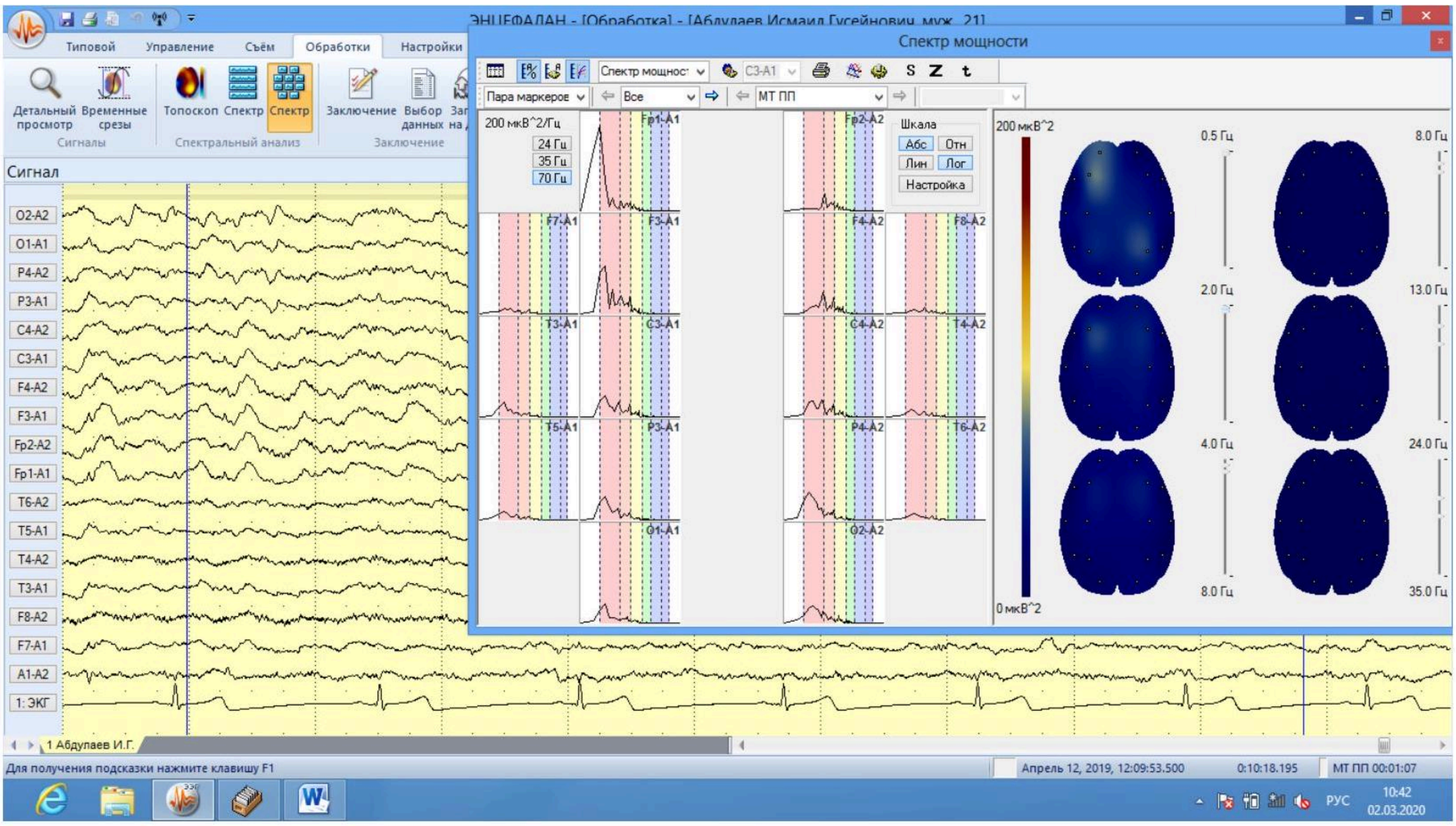

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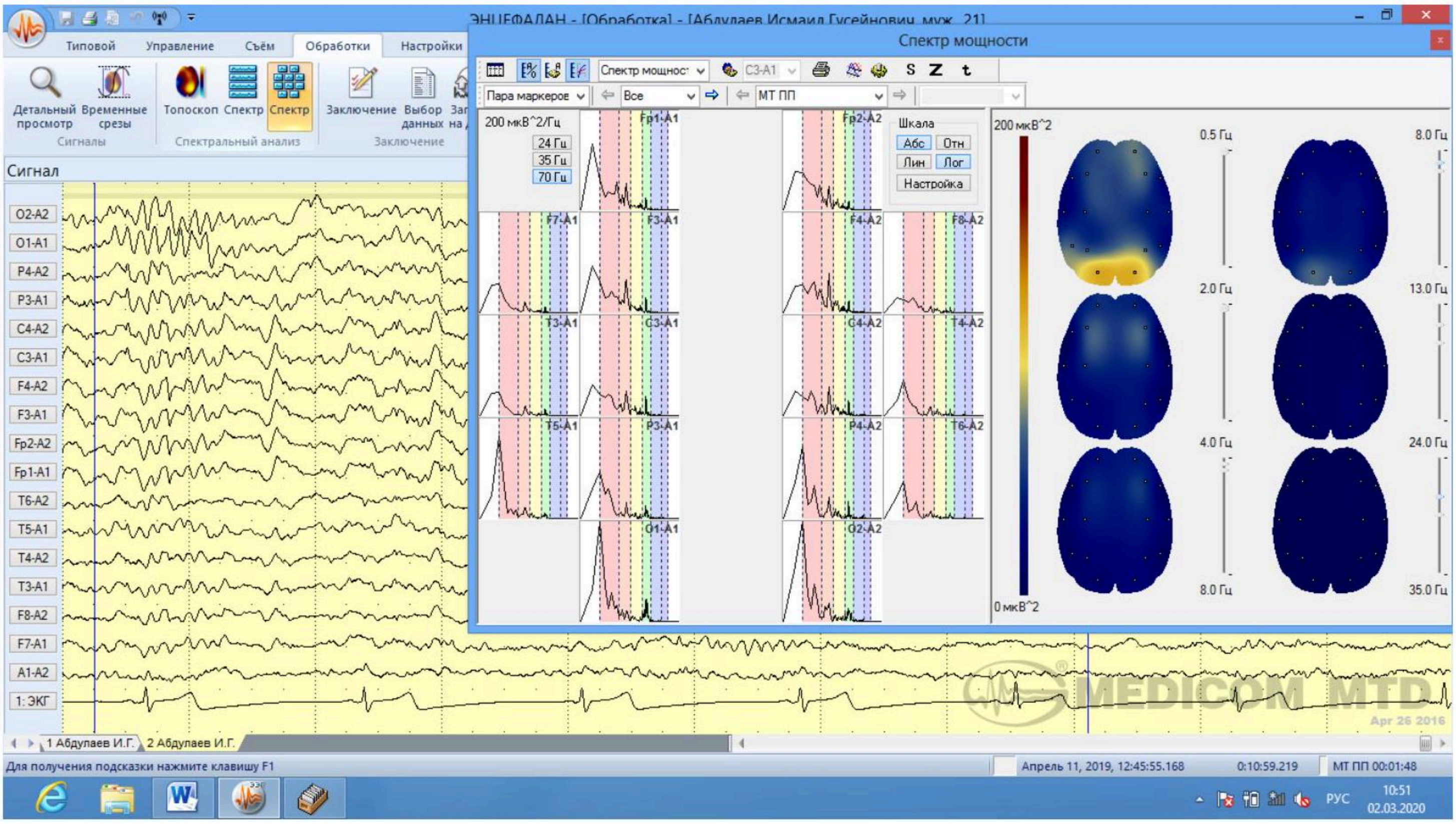
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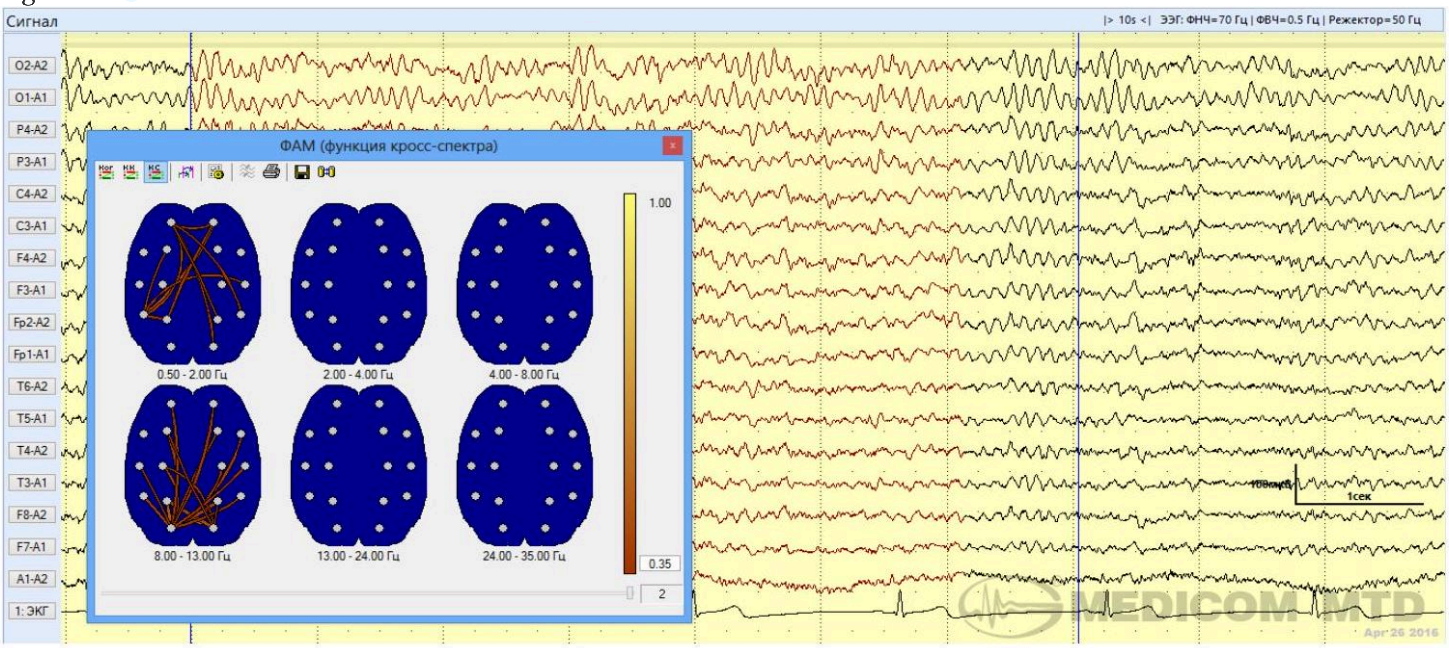
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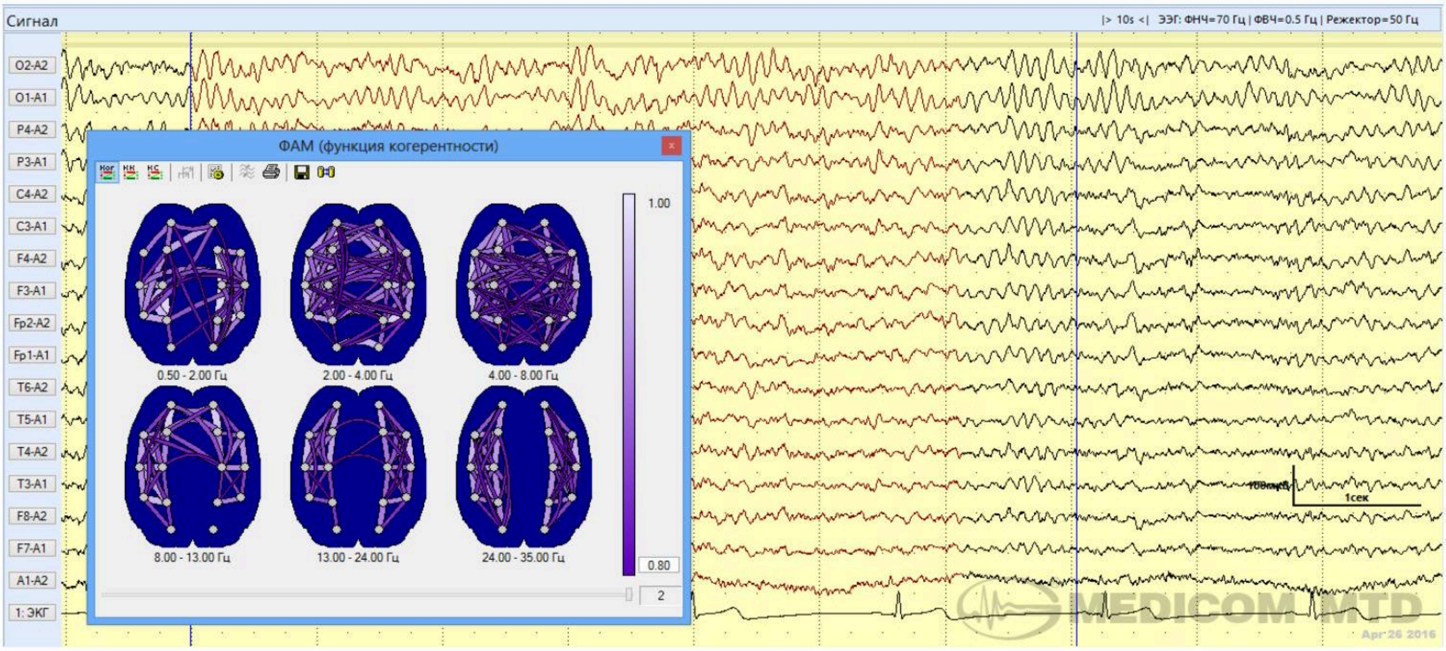
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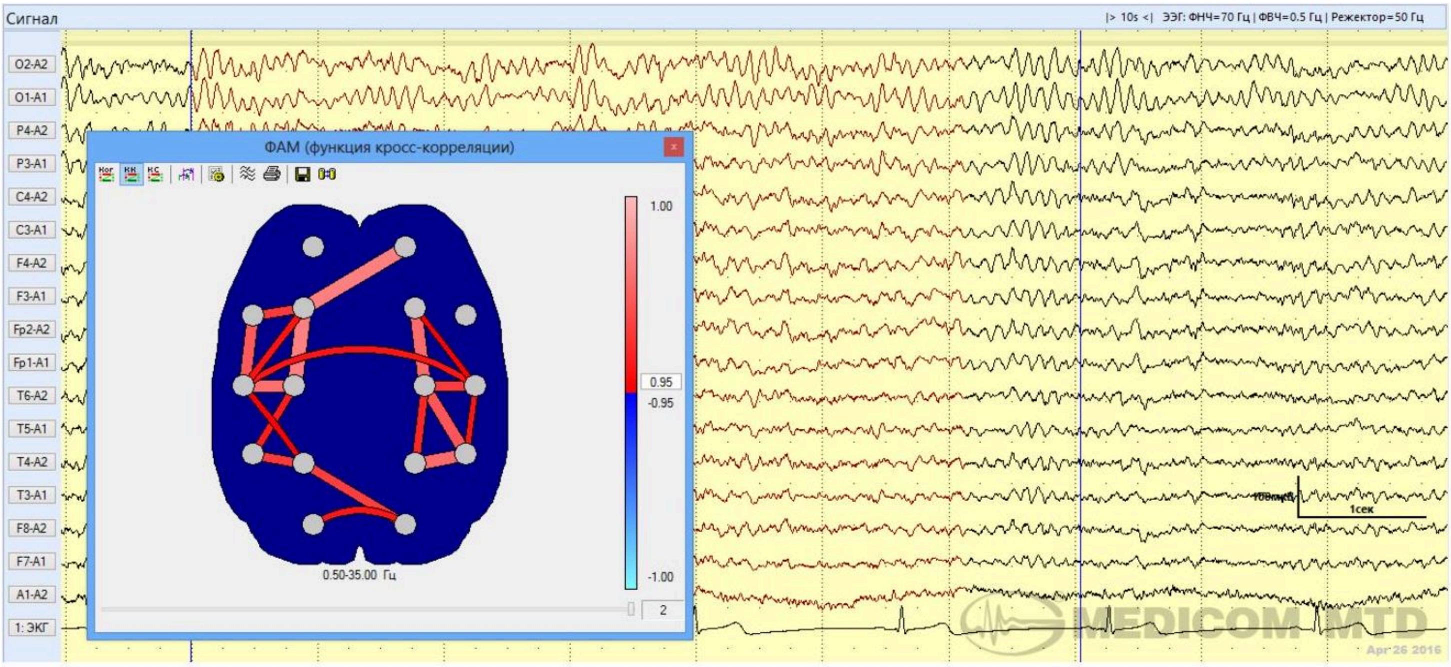
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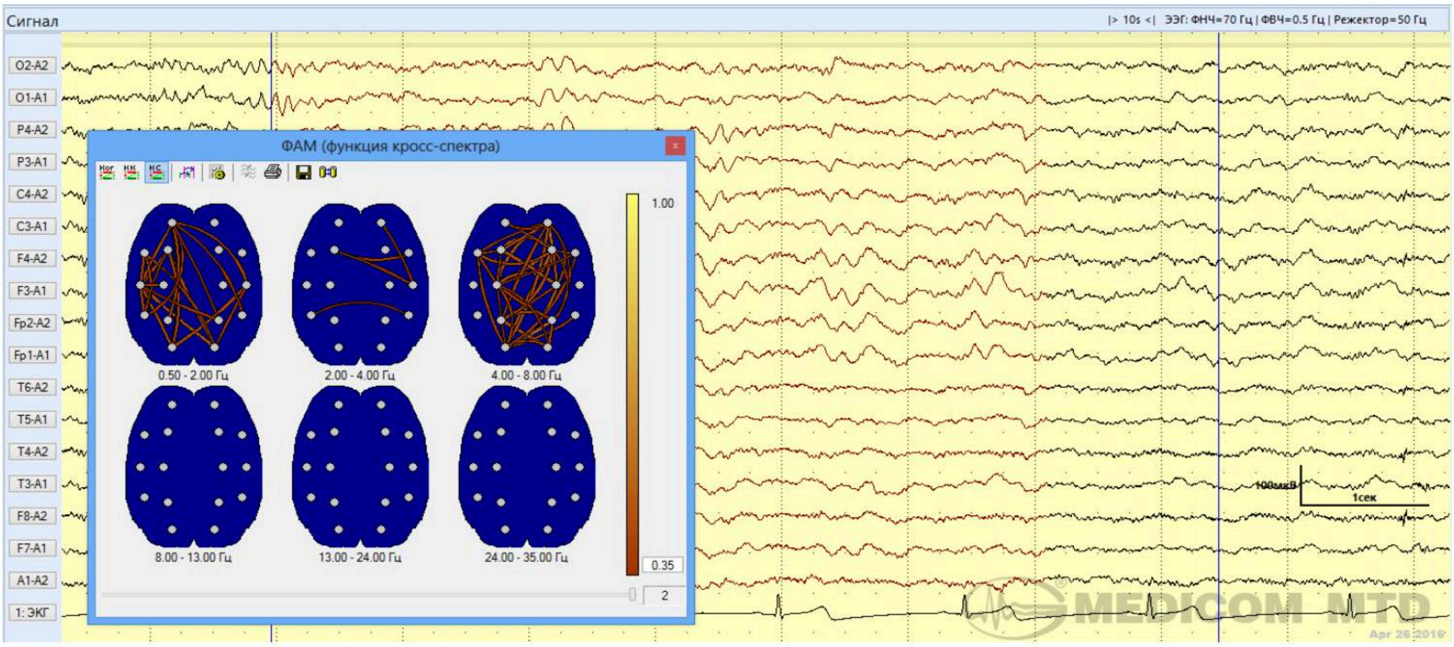
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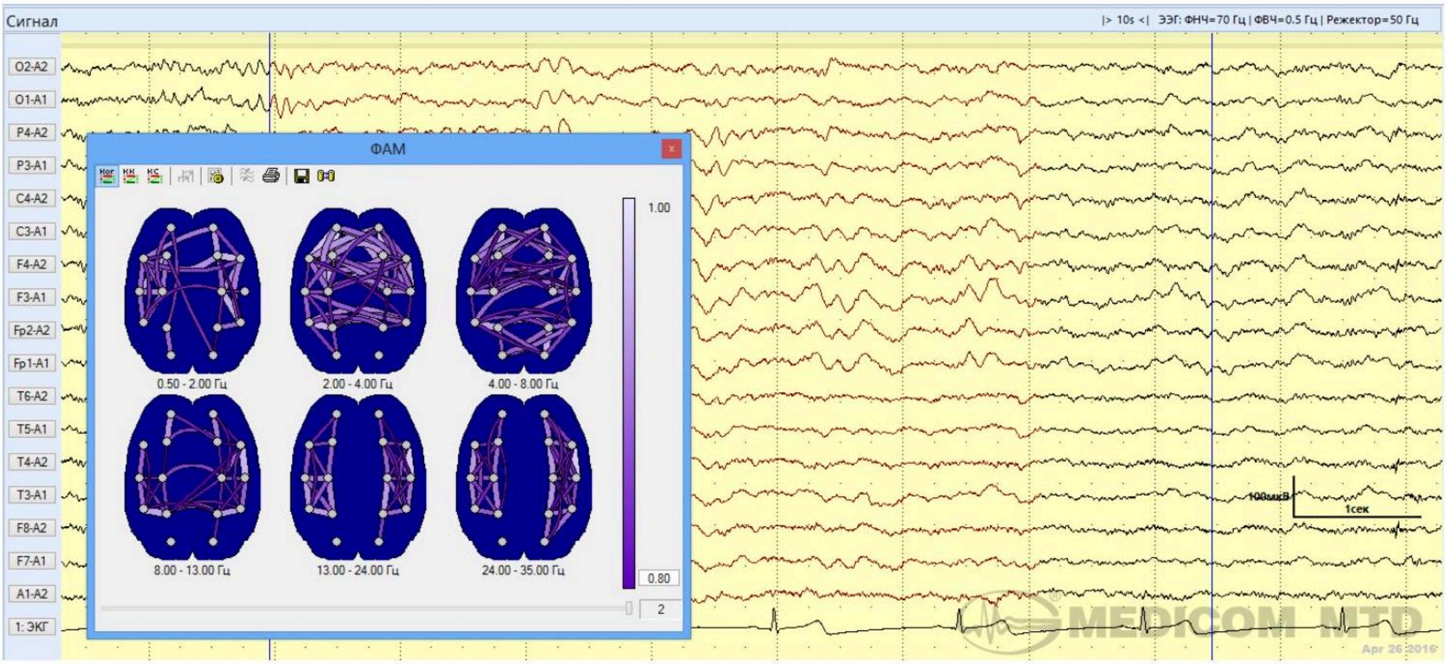
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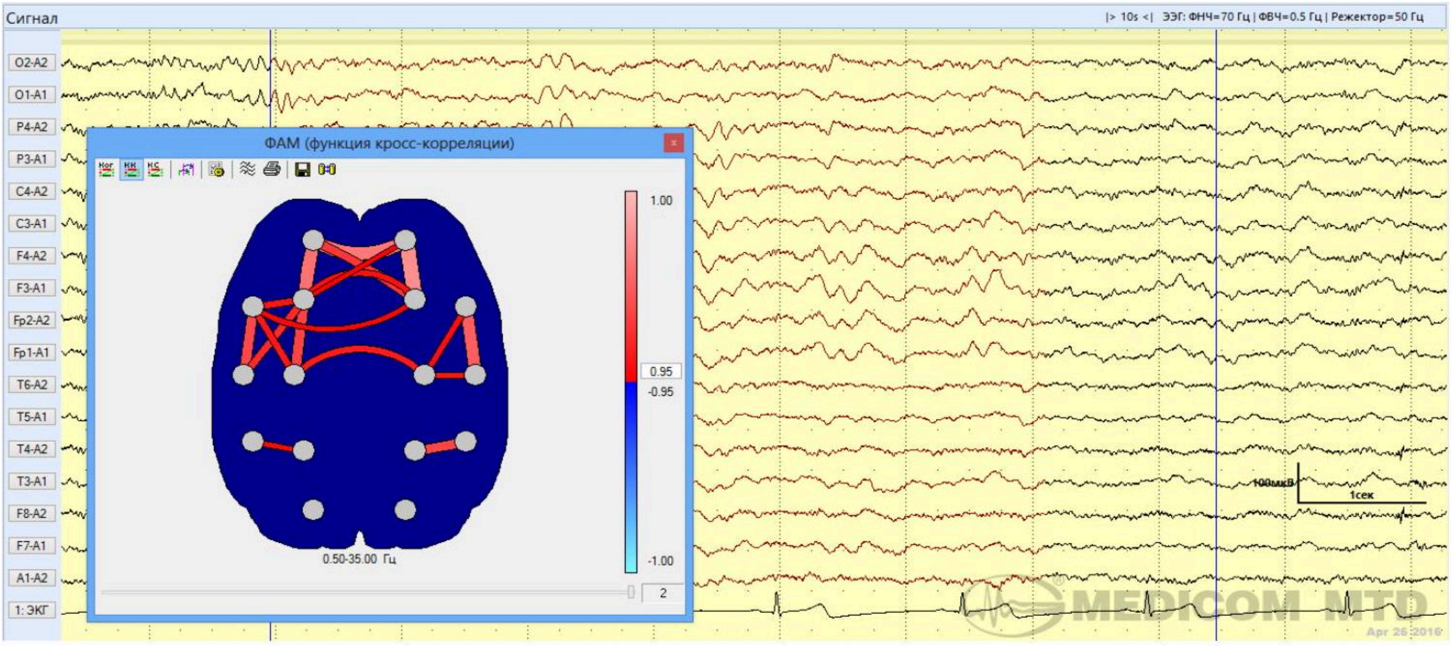
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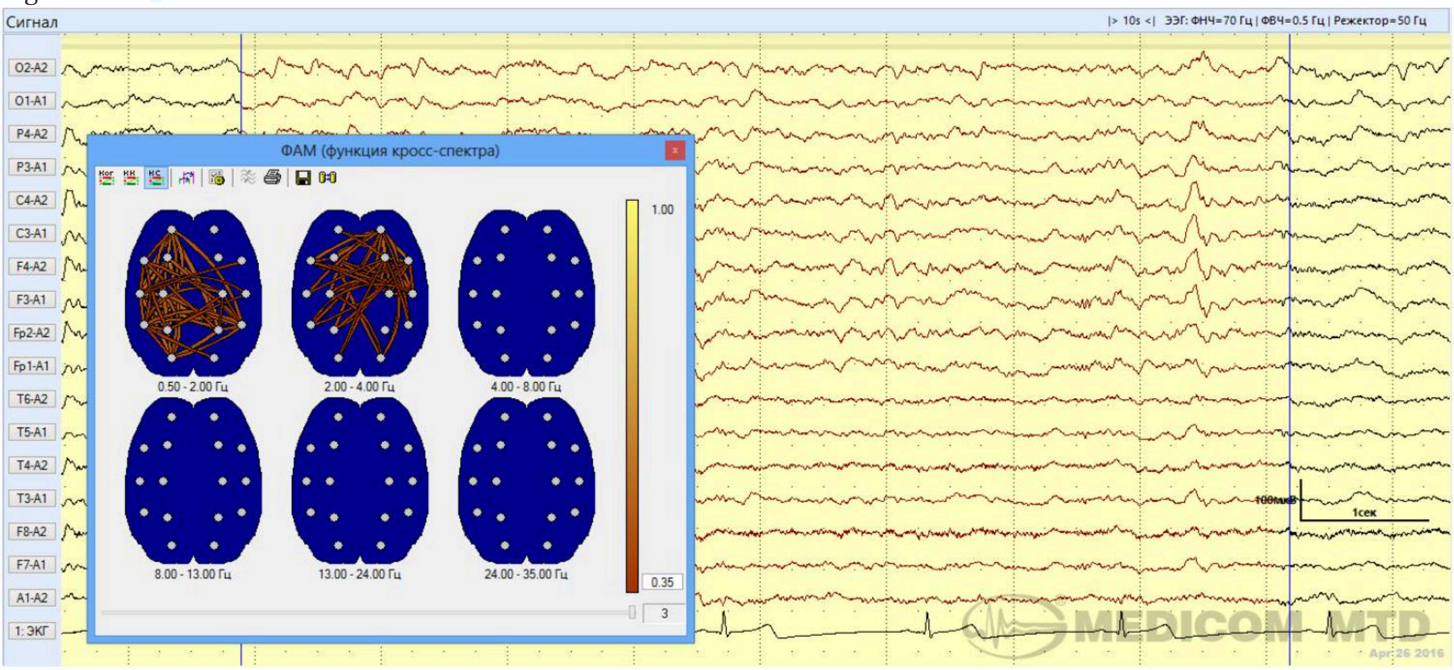
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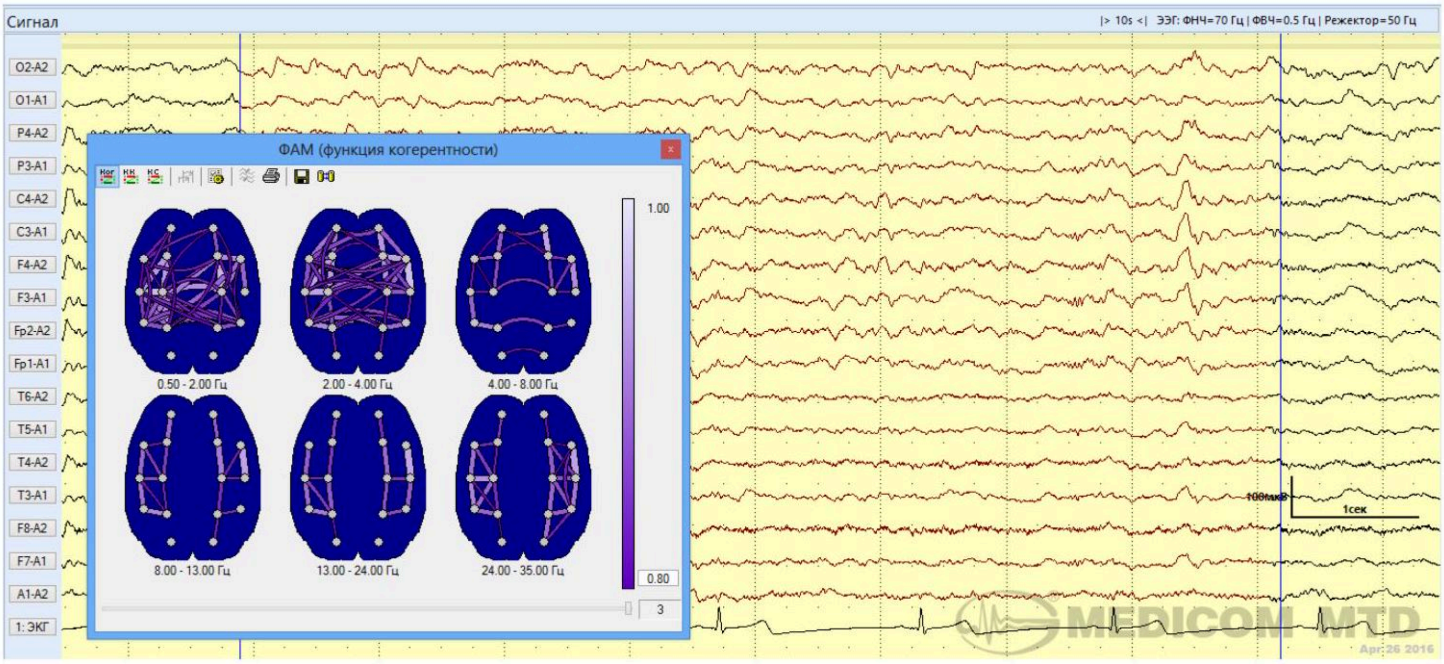
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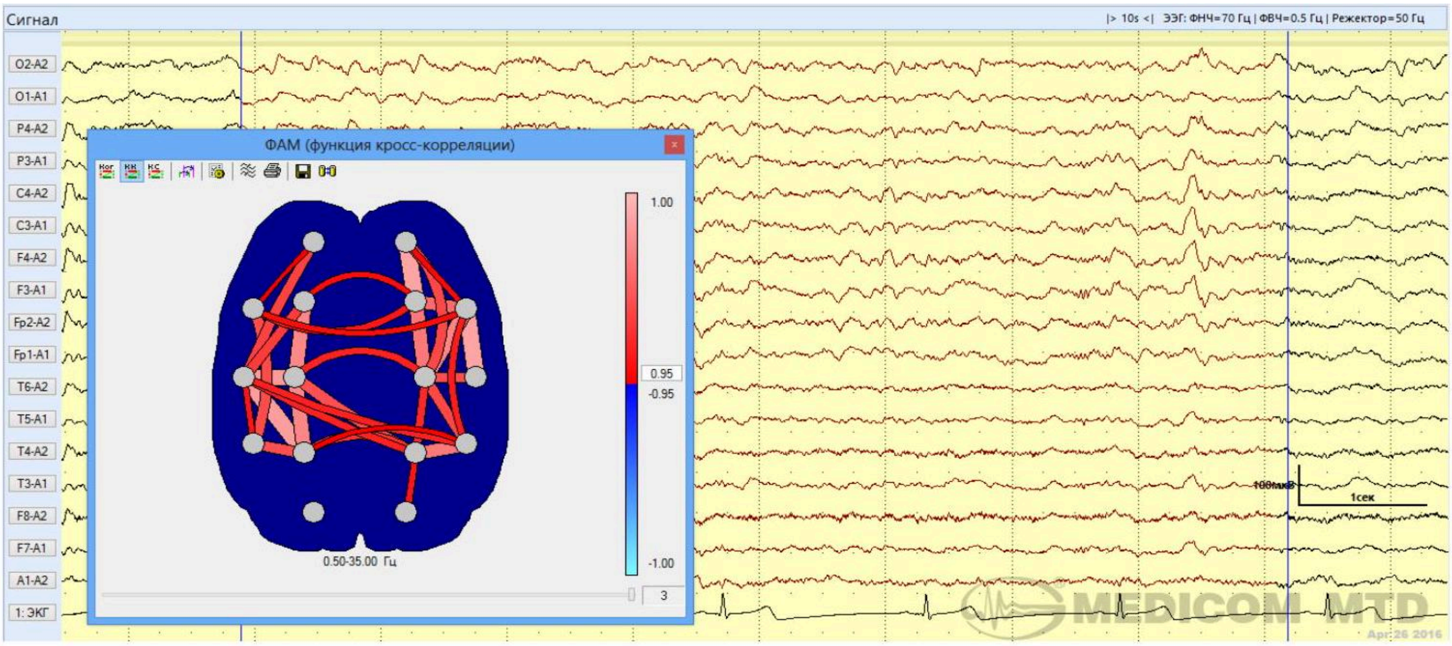
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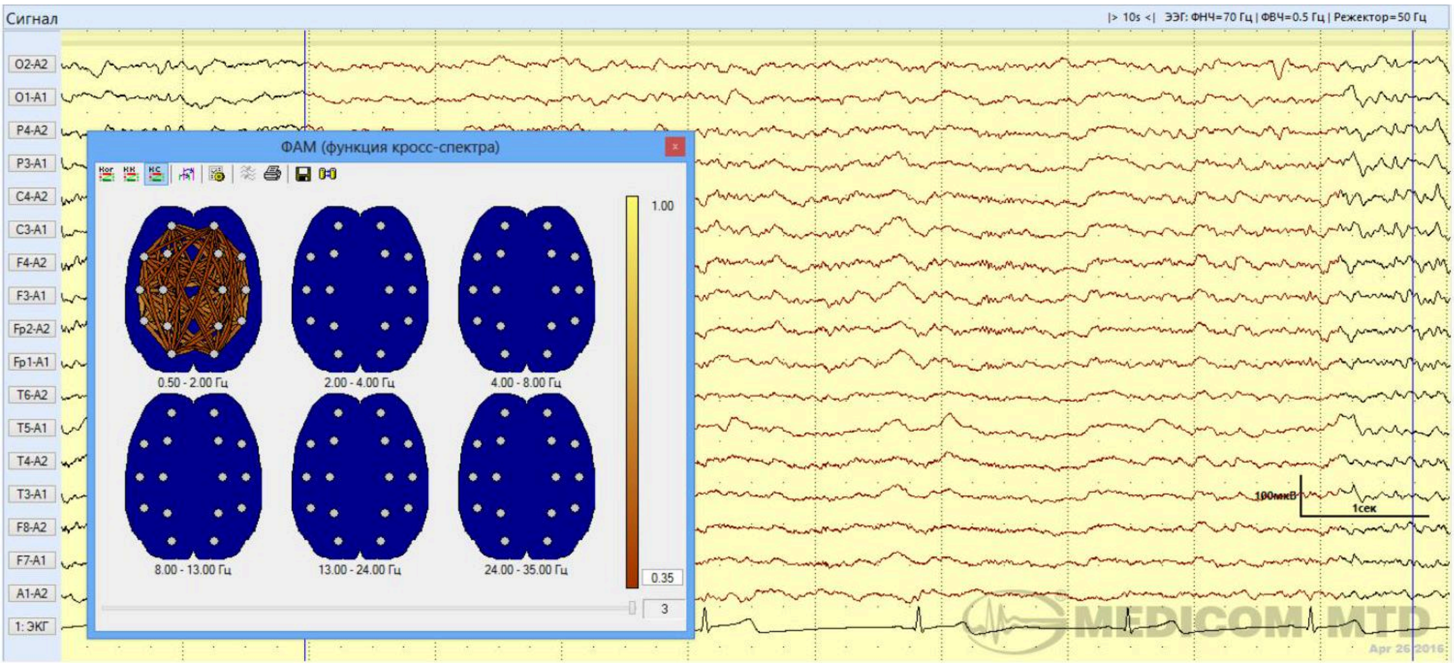
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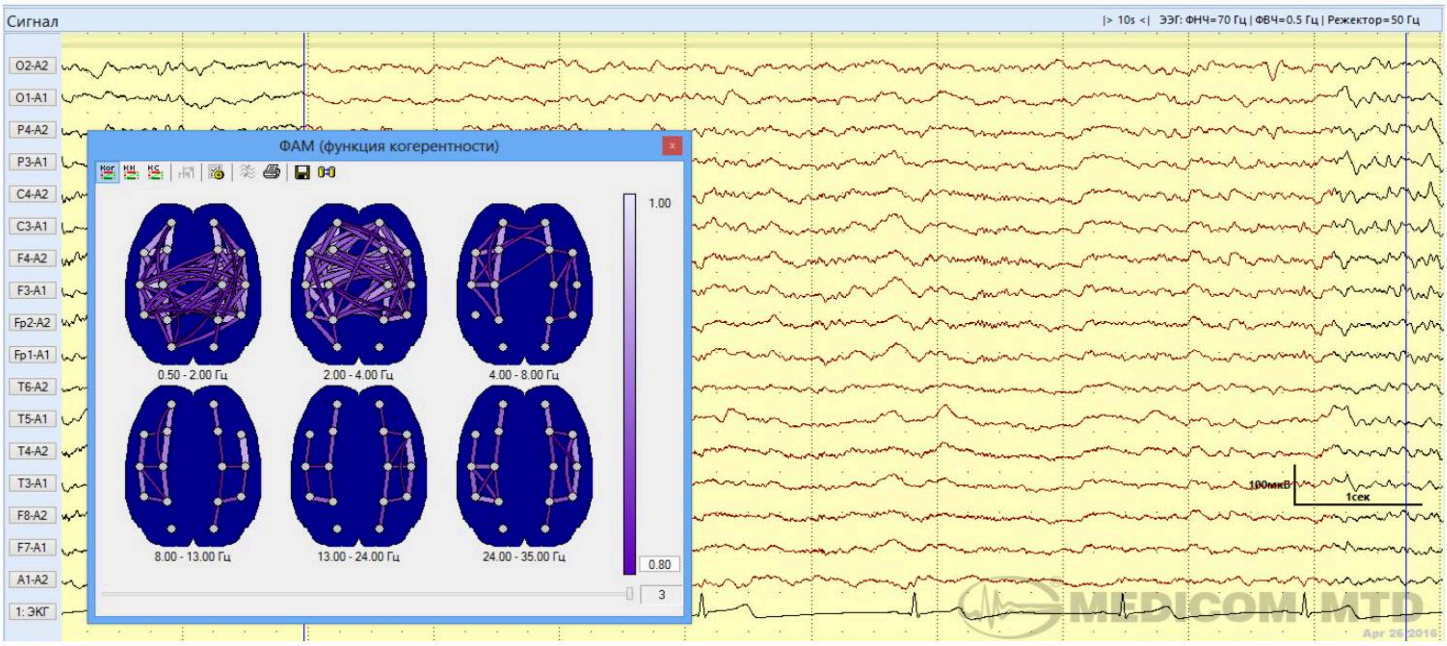
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция кросс-спектра)
1.00
0.35
3
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
100мкВ
1сек

a


Сигнал
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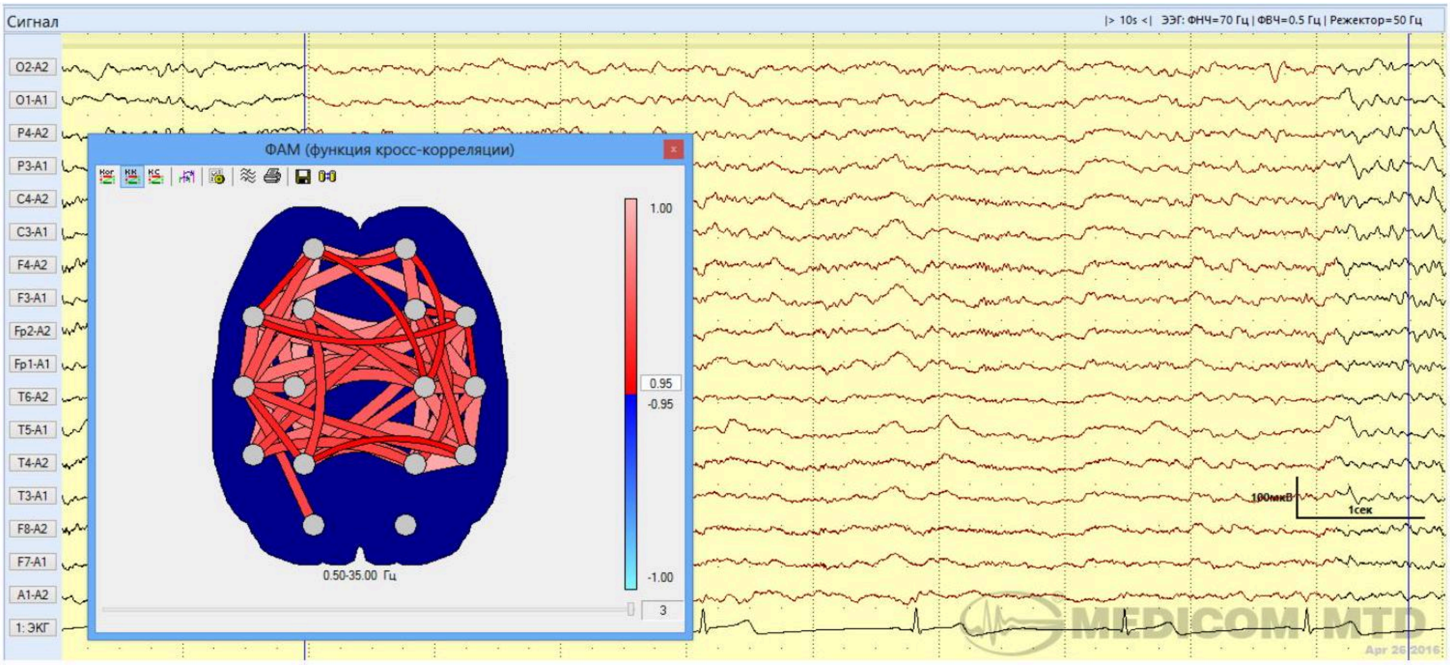
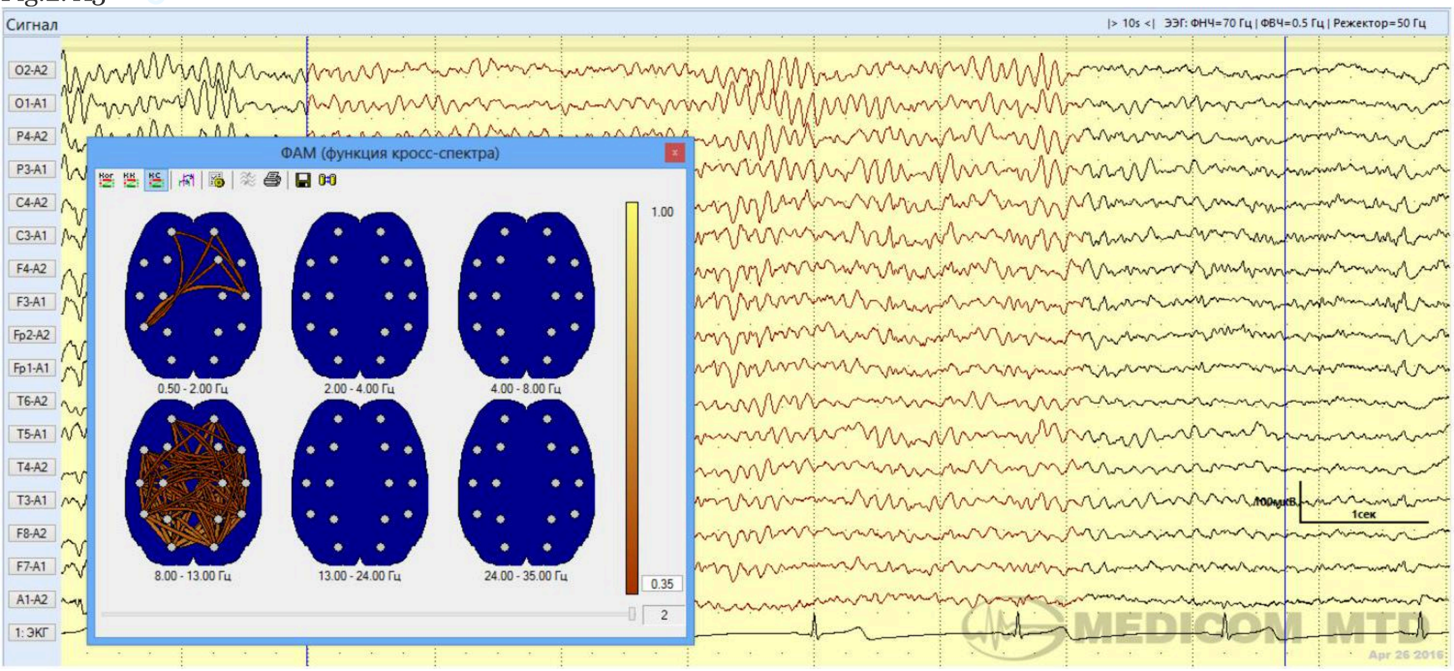
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция когерентности)
1.00
0.80
3
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
100мкВ
1сек

b

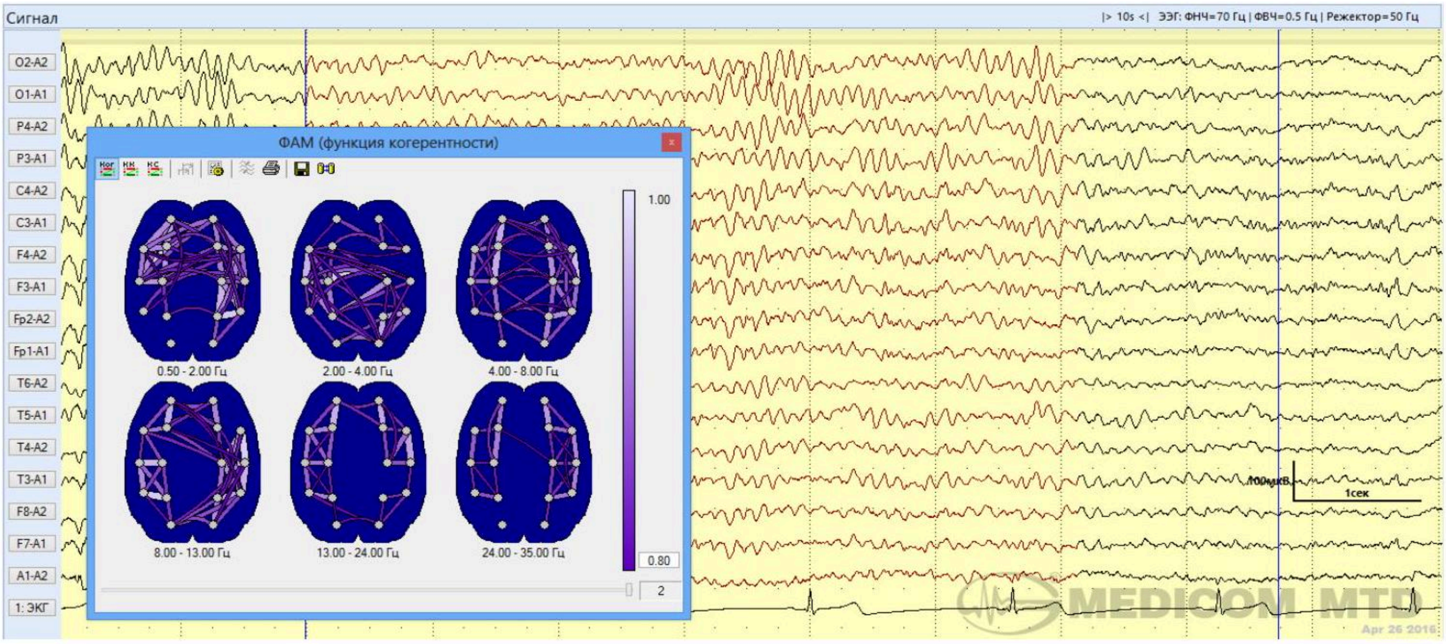

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция кросс-корреляции)
1.00
0.95
-0.95
-1.00
0.50-35.00 Гц
3
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

C

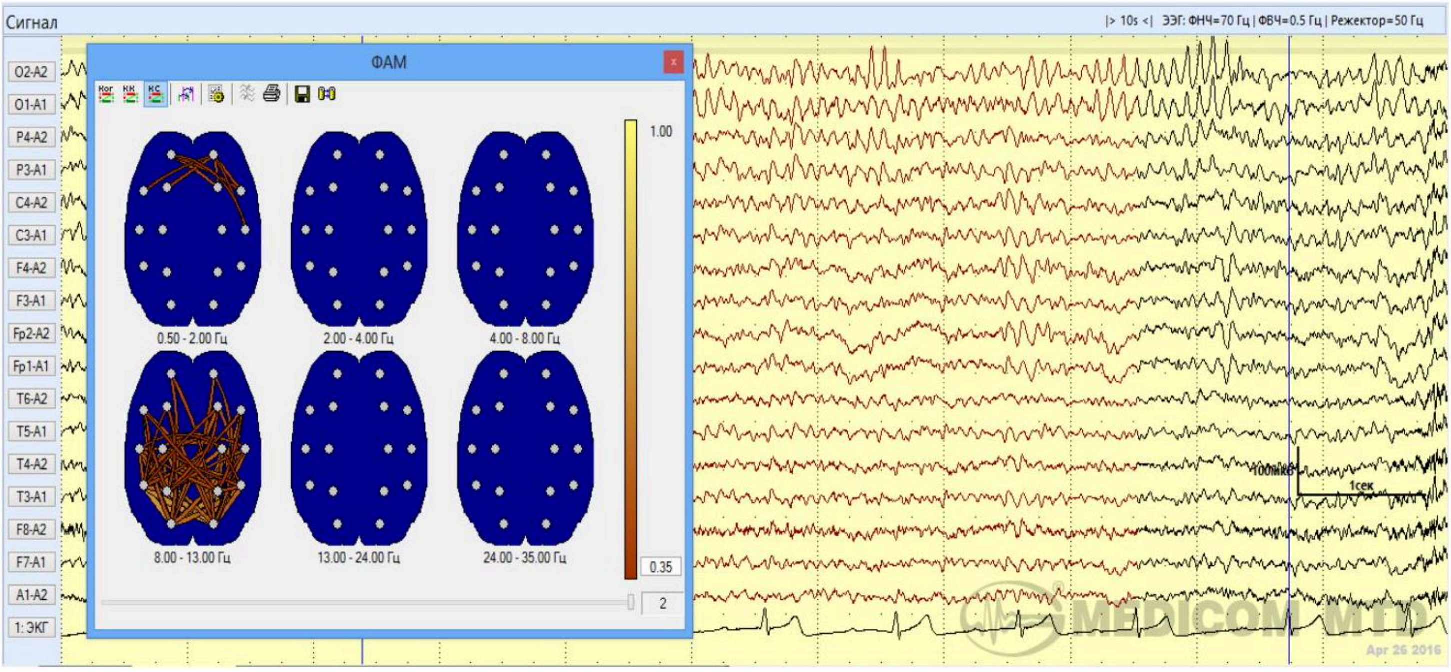
Fig.2. A3 [1]


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция кросс-спектра)
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.35
2
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

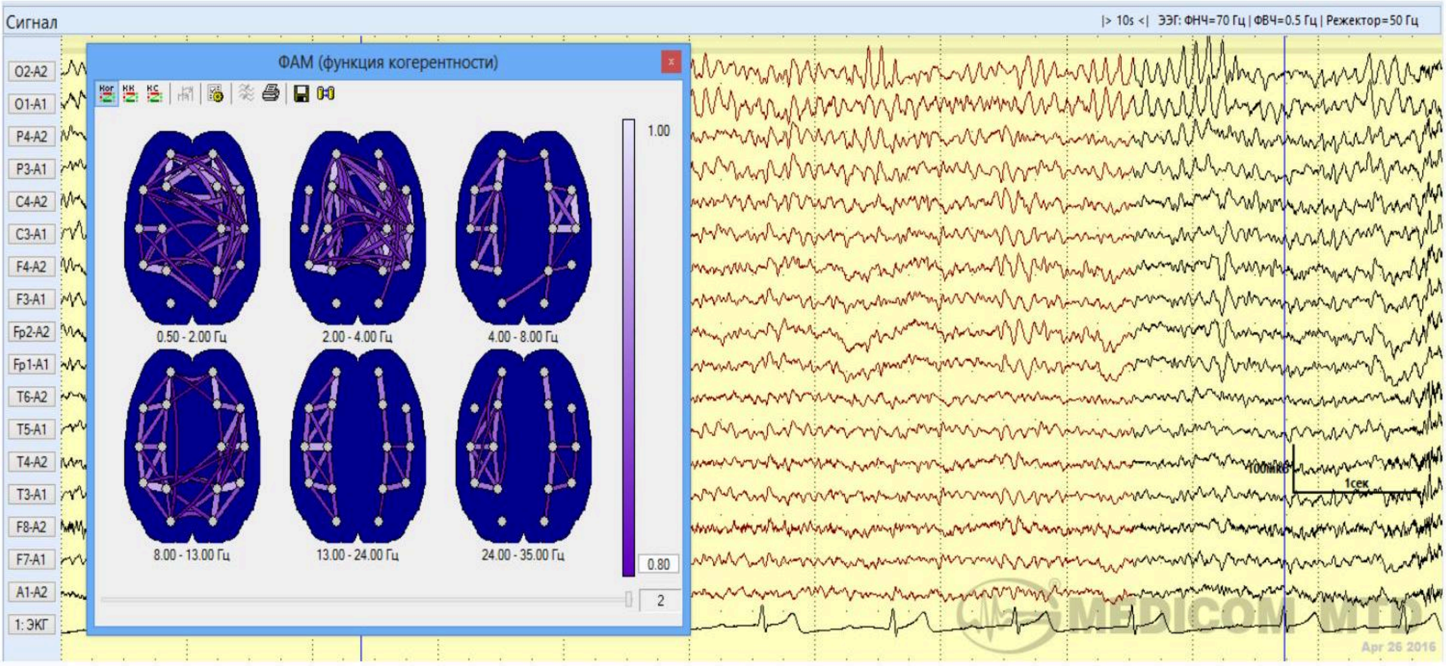
a


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция когерентности)
1.00
0.80
2
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

b
c
Fig.3. A1

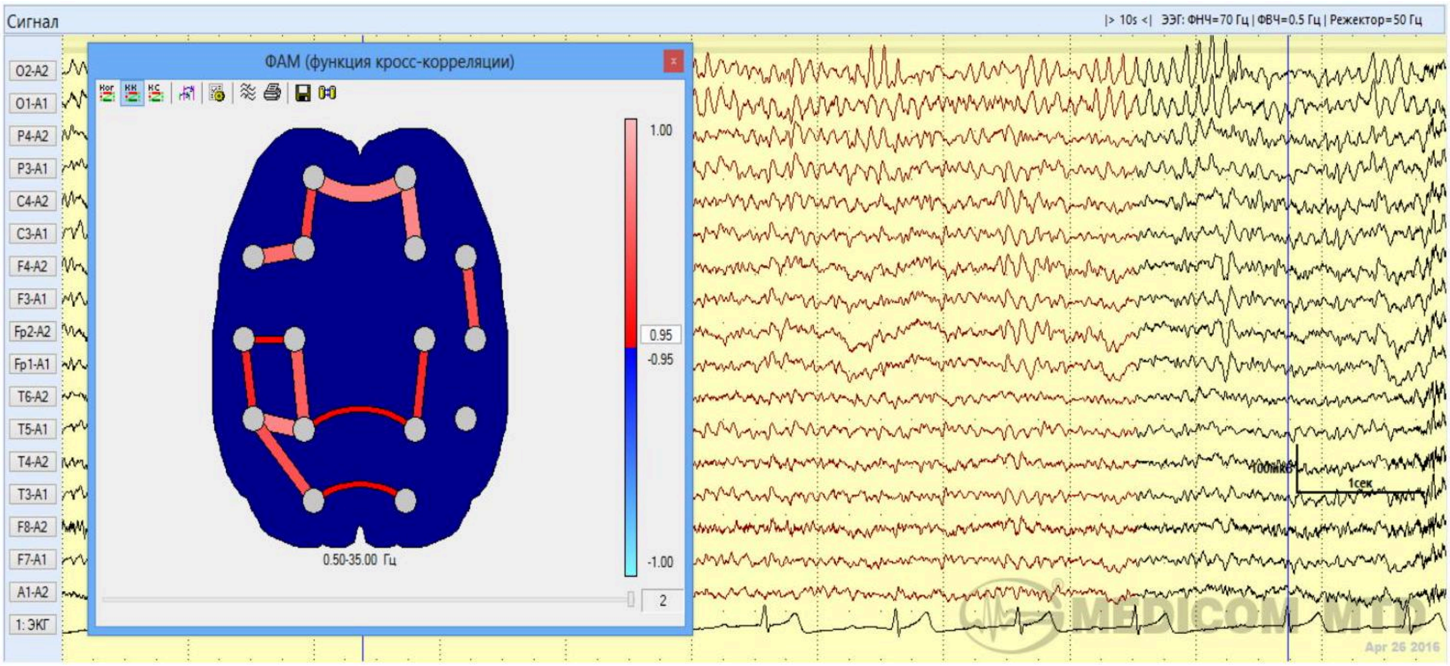

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ
1.00
0.35
2
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

a



Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция когерентности)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.80
2
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

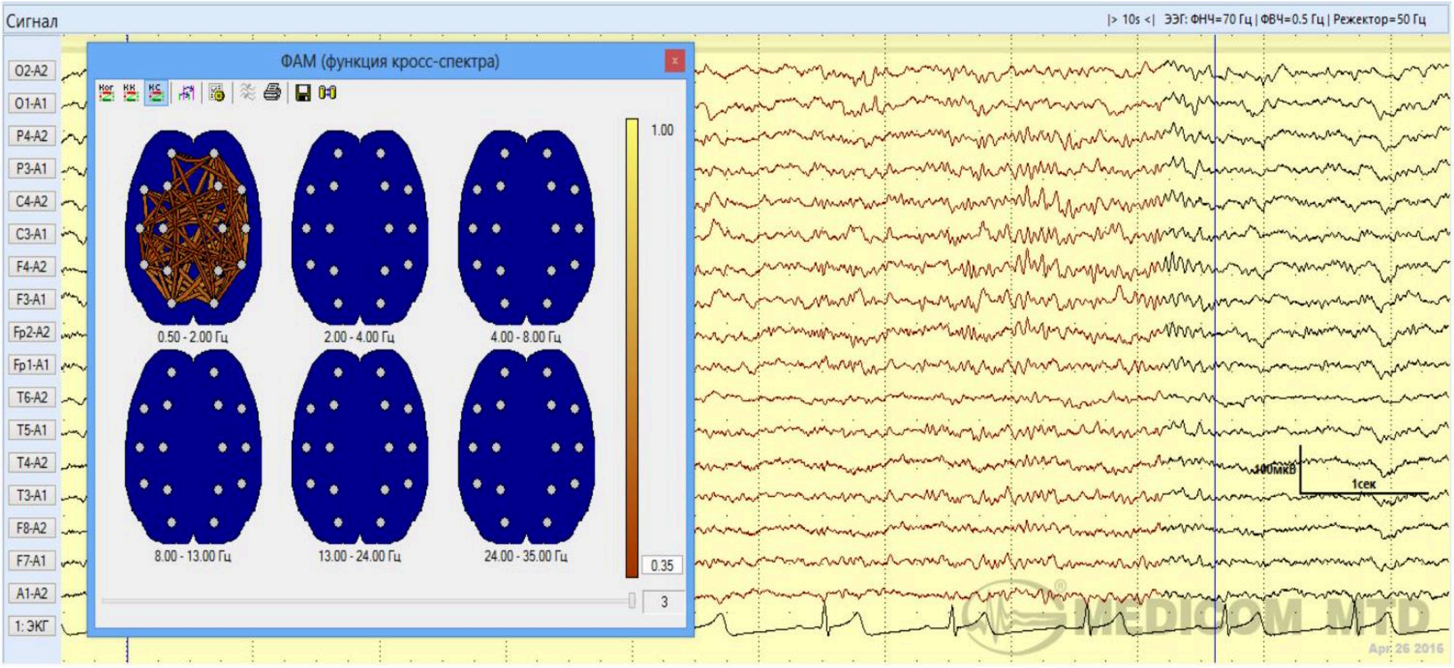
b



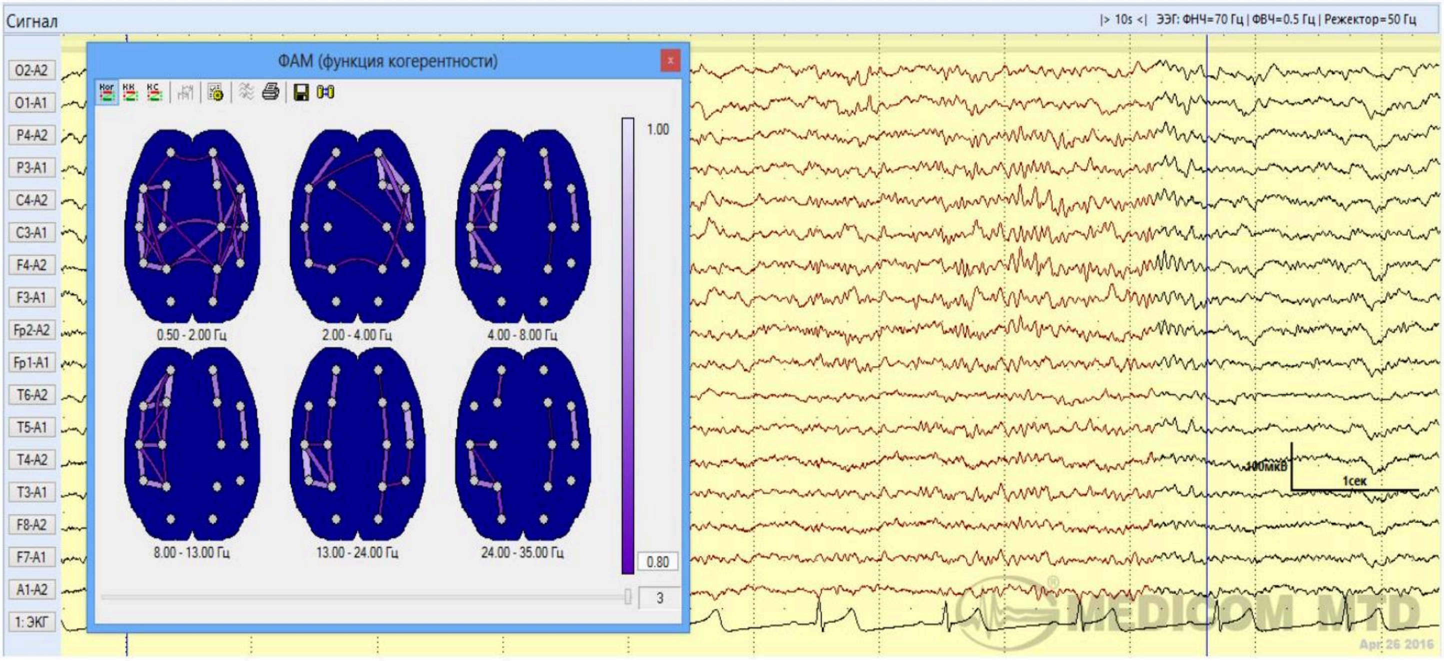
Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция кросс-корреляции)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
1.00
0.95
-0.95
-1.00
0.50-35.00 Гц
2
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

c

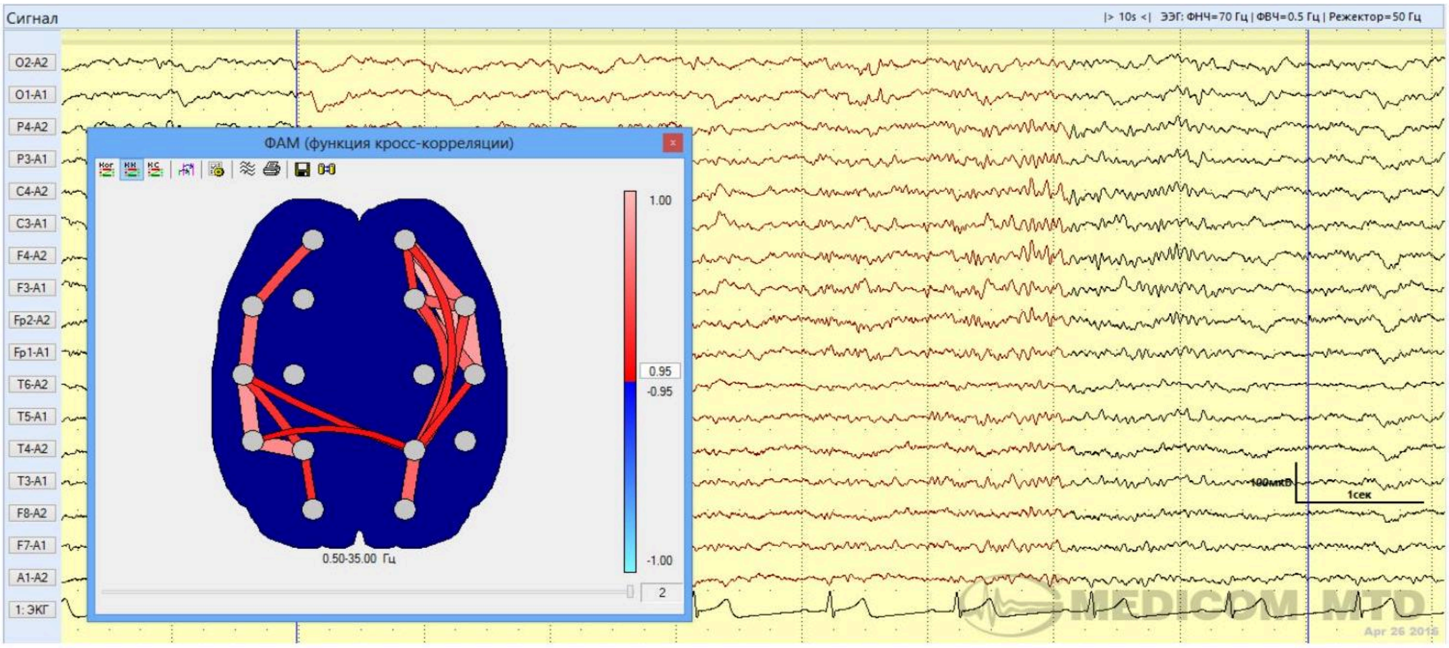
Fig.3. A2


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция кросс-спектра)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.35
3
100мкВ
1сек
MEDICOM MTD

a

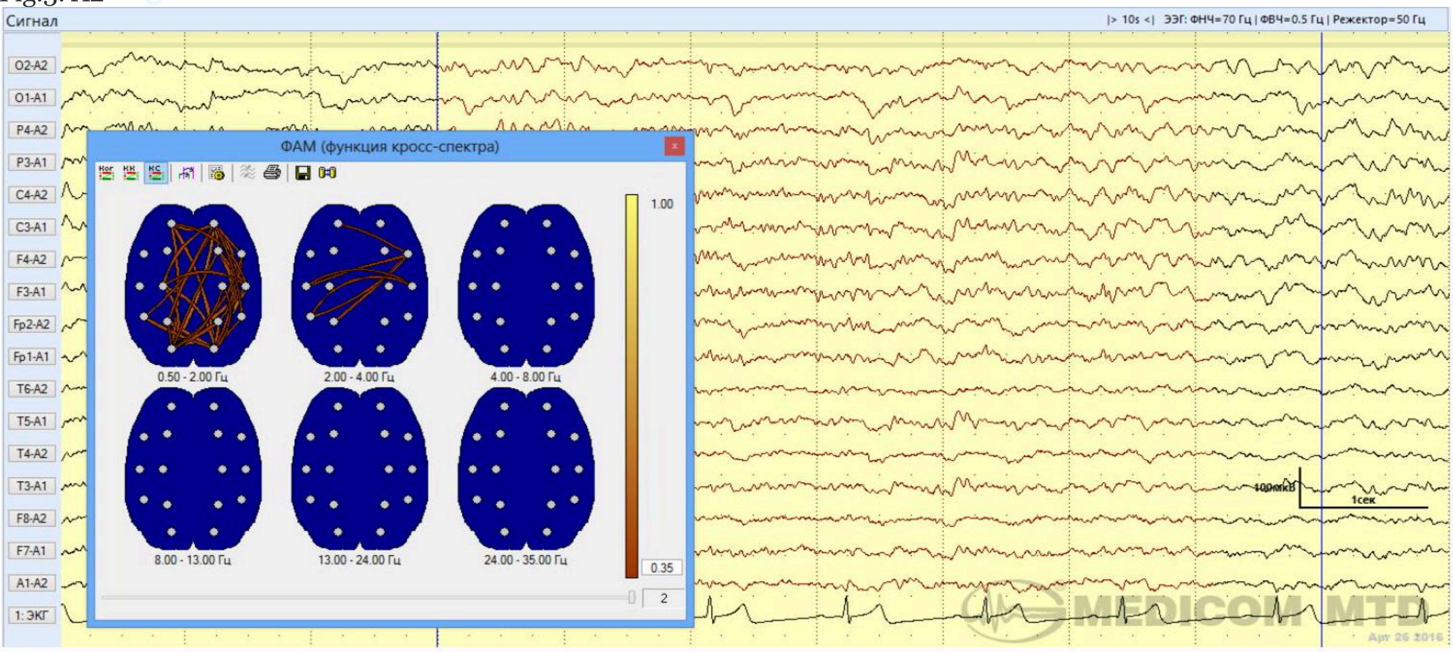

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция когерентности)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.80
3
100мкВ
1сек
MEDICOM MTD

b

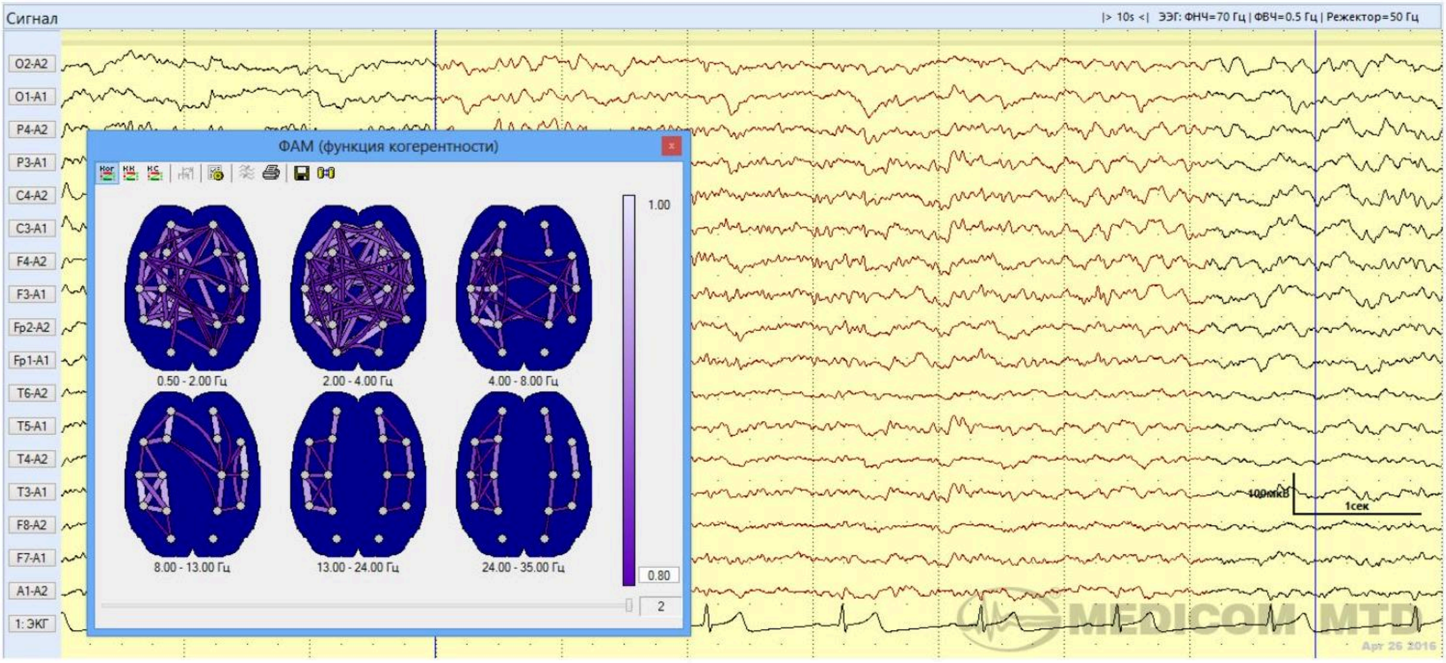

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция кросс-корреляции)
1.00
0.95
-0.95
-1.00
0.50-35.00 Гц
2
100мкВ
1сек
MEDICOM MTD

C

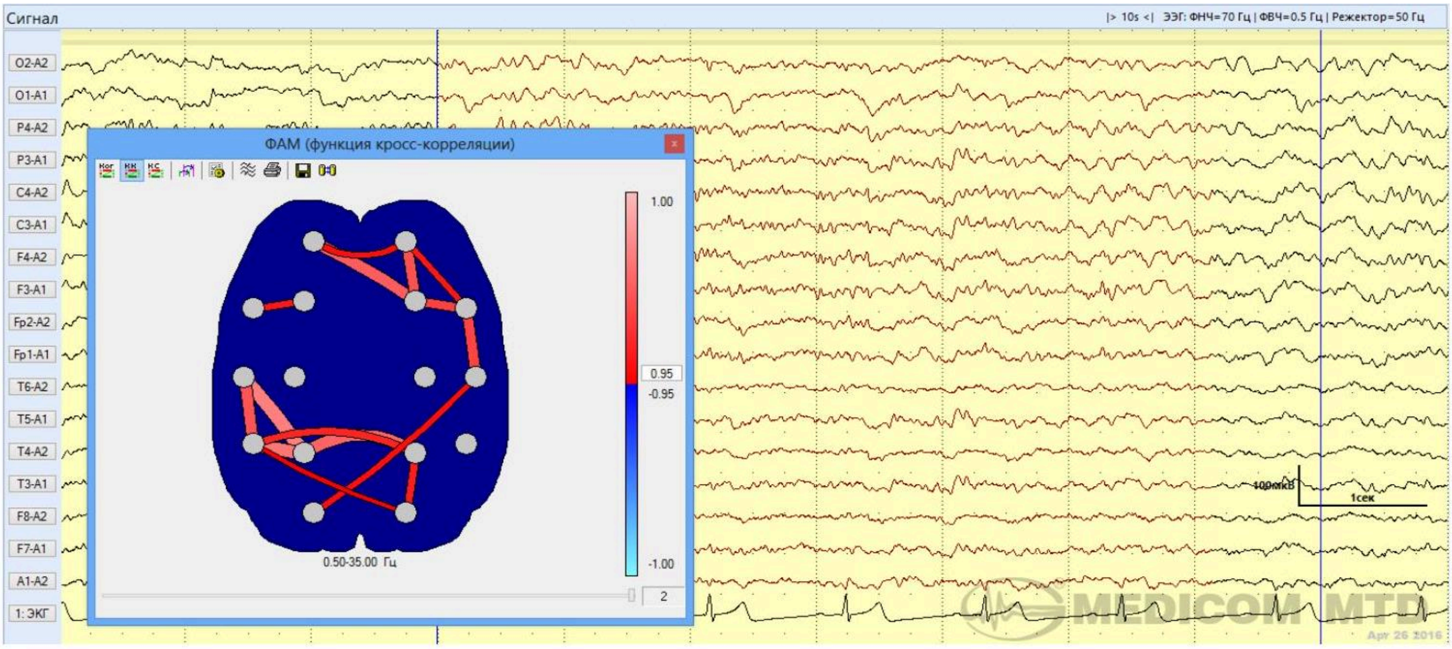
Fig.3. A2 [1]


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция кросс-спектра)
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.35
2
100мкВ
1сек
MEDICOM MTD

a

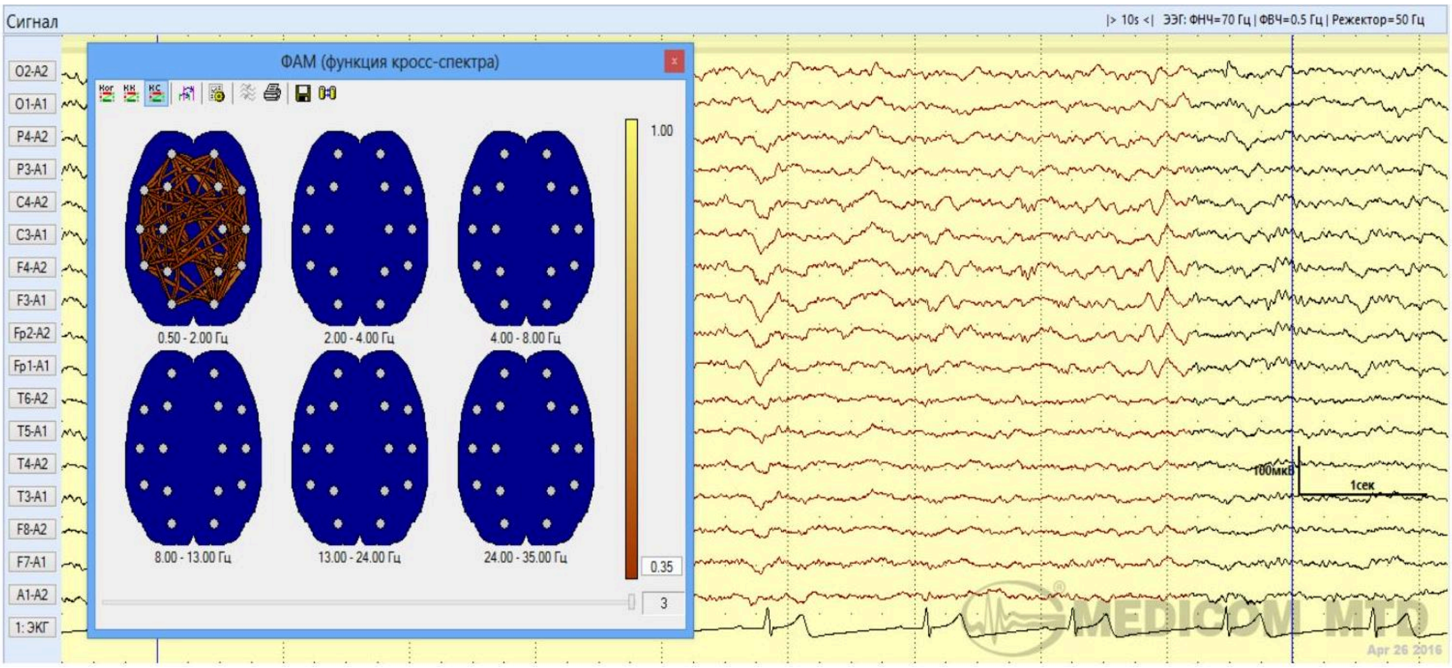

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция когерентности)
1.00
0.80
2
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
100мкВ
1сек
MEDICOM MTD

b

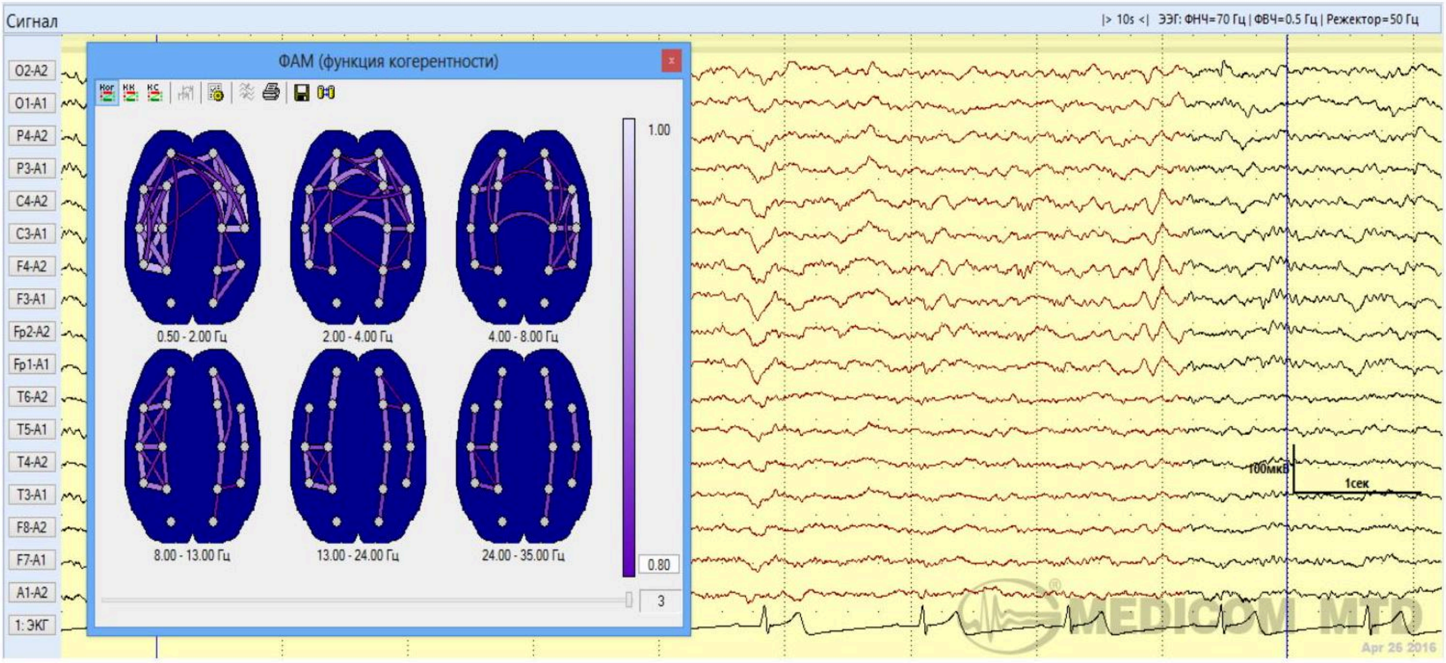

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
ФАМ (функция кросс-корреляции)
1.00
0.95
-0.95
-1.00
2
0.50-35.00 Гц
100мкВ
1сек
MEDICOM MTD

c

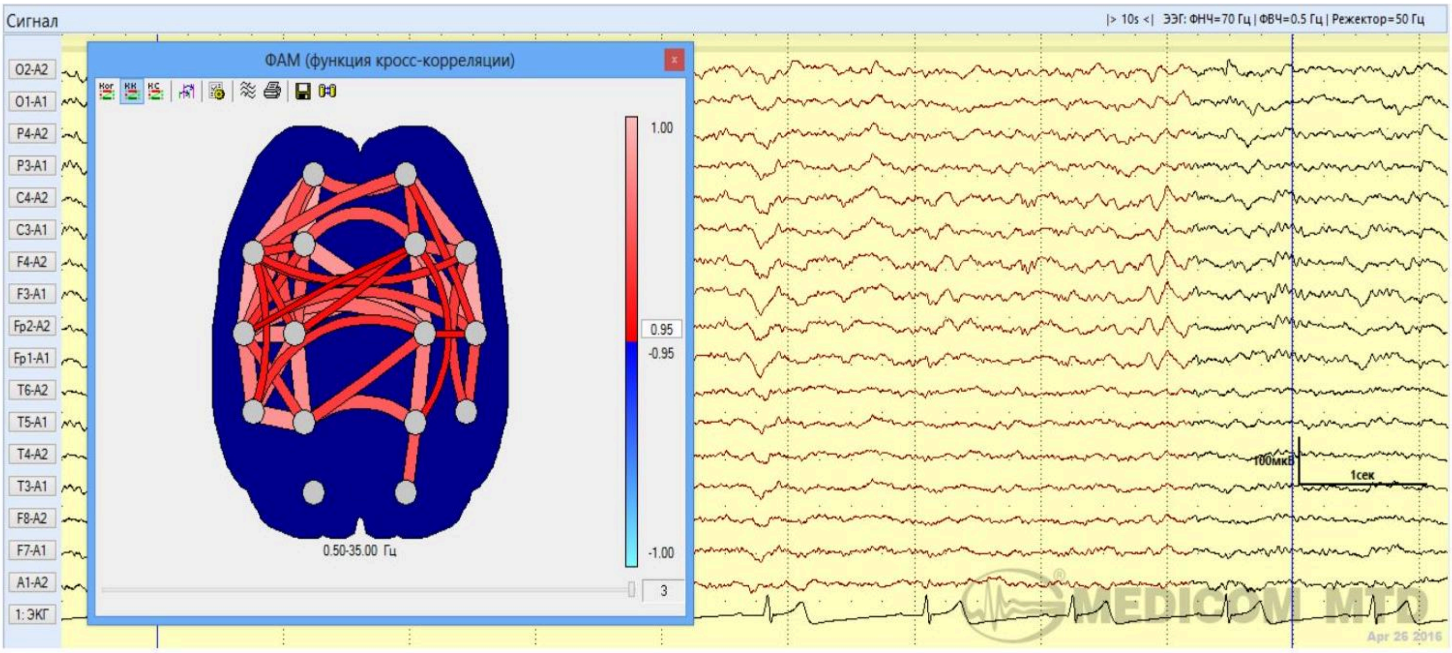
Fig.3. A3


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция кросс-спектра)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.35
3
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

a

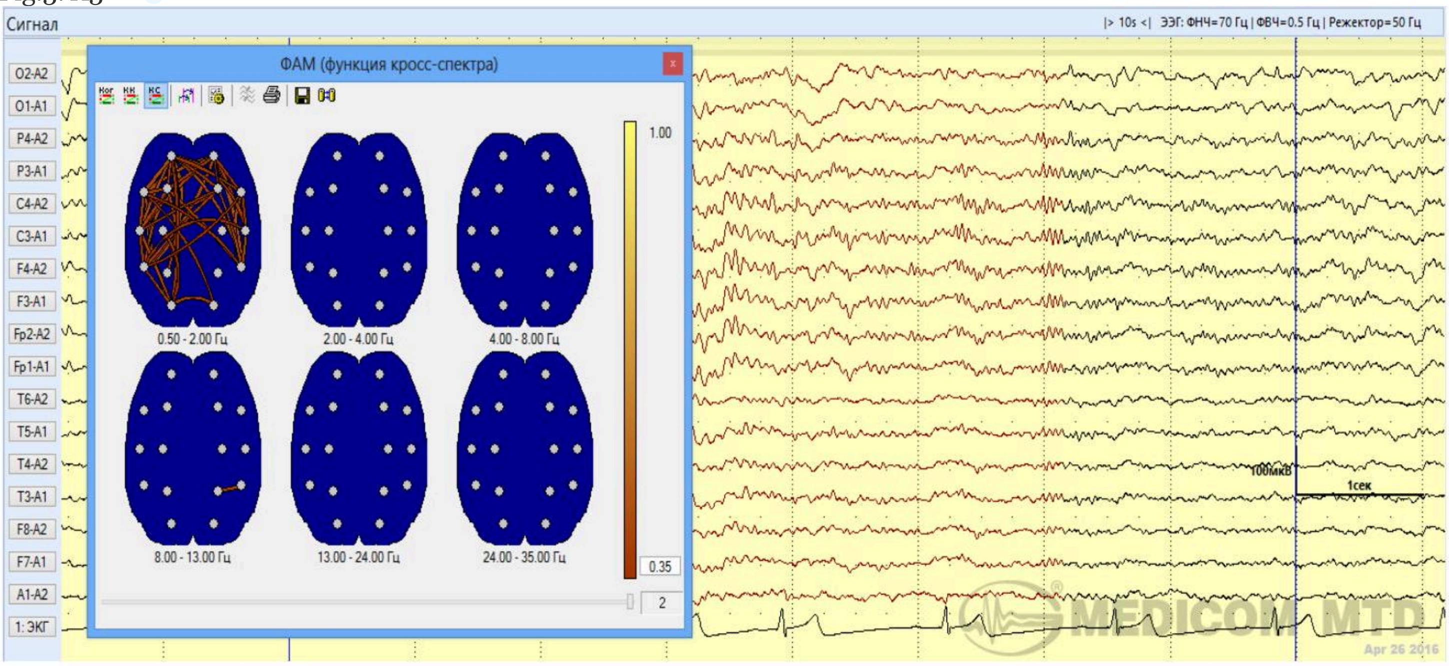

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция когерентности)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.80
3
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

b

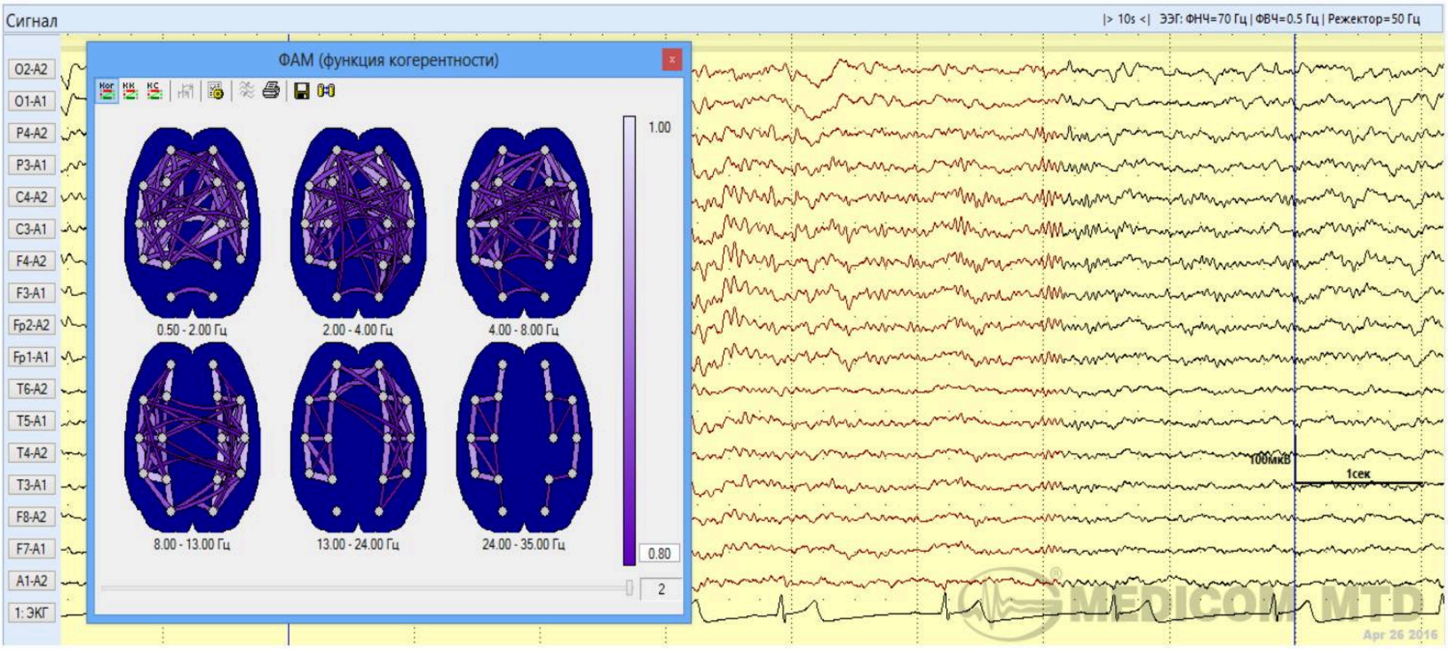

Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция кросс-корреляции)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
1.00
0.95
-0.95
-1.00
0.50-35.00 Гц
3
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

C

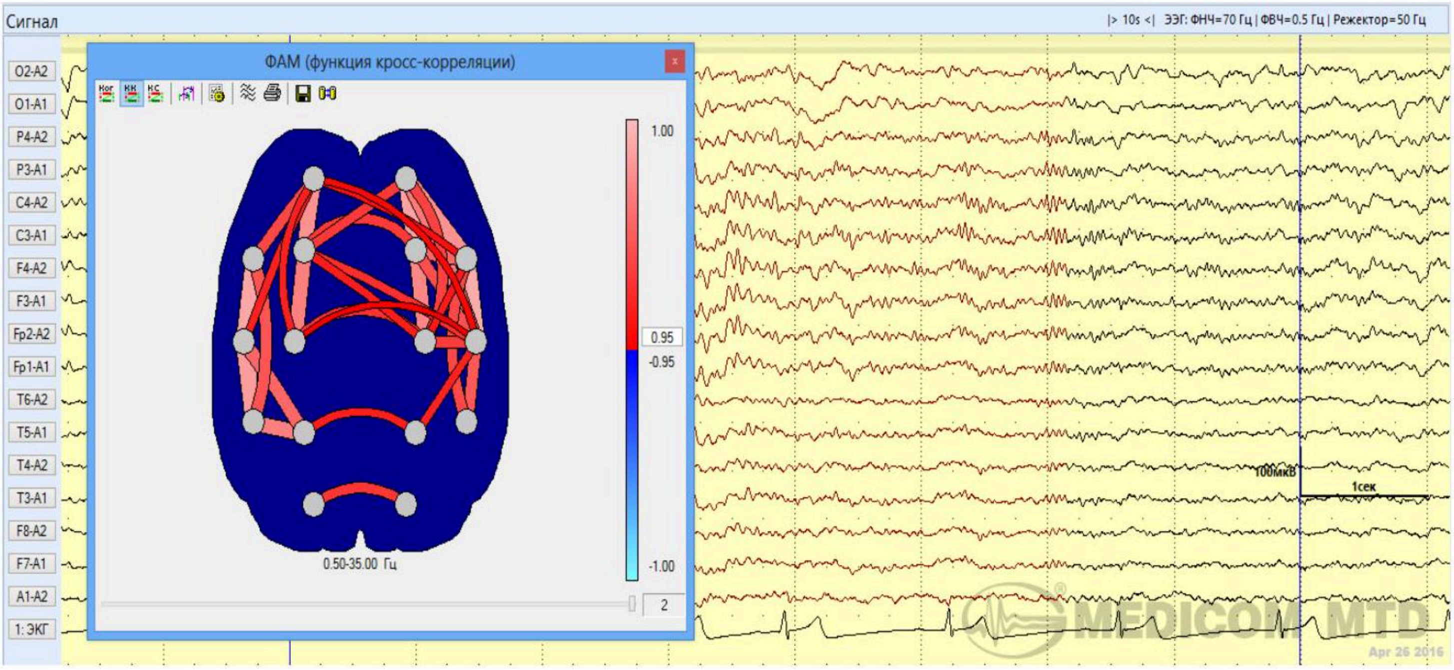
Fig.3. A3 [1]


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция кросс-спектра)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
1.00
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
0.35
2
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

a


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция когерентности)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
0.50 - 2.00 Гц
2.00 - 4.00 Гц
4.00 - 8.00 Гц
8.00 - 13.00 Гц
13.00 - 24.00 Гц
24.00 - 35.00 Гц
1.00
0.80
2
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

b


Сигнал
|> 10s <| ЭЭГ: ФНЧ=70 Гц | ФВЧ=0.5 Гц | Режектор=50 Гц
ФАМ (функция кросс-корреляции)
O2-A2
O1-A1
P4-A2
P3-A1
C4-A2
C3-A1
F4-A2
F3-A1
Fp2-A2
Fp1-A1
T6-A2
T5-A1
T4-A2
T3-A1
F8-A2
F7-A1
A1-A2
1: ЭКГ
0.50-35.00 Гц
1.00
0.95
-0.95
-1.00
2
100мкВ
1сек
MEDICOM MTD
Apr 26 2016

c

Fig. 4. **圖 4。**

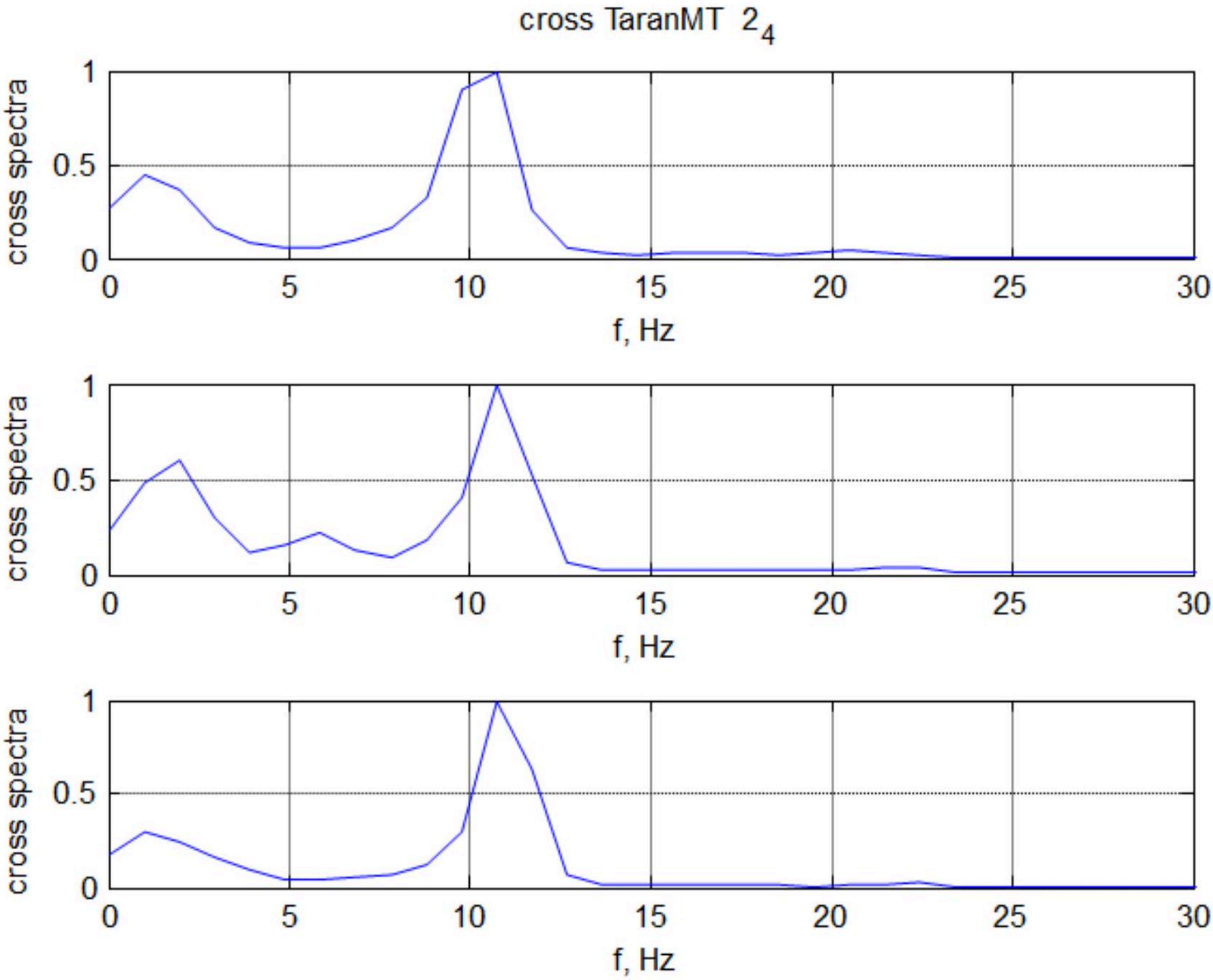
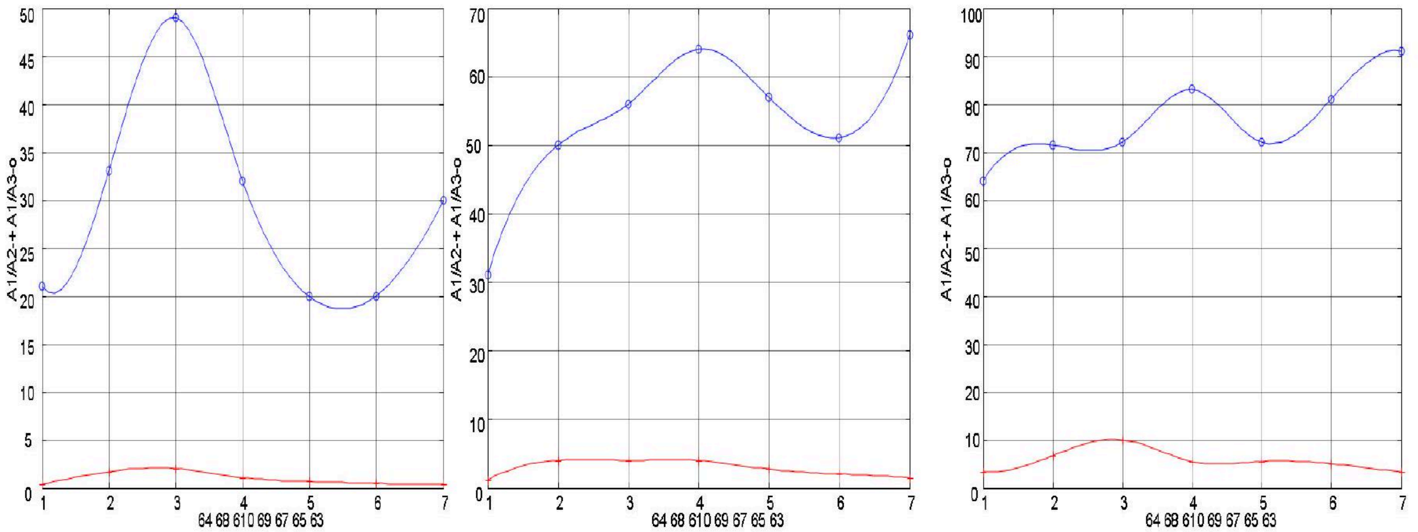
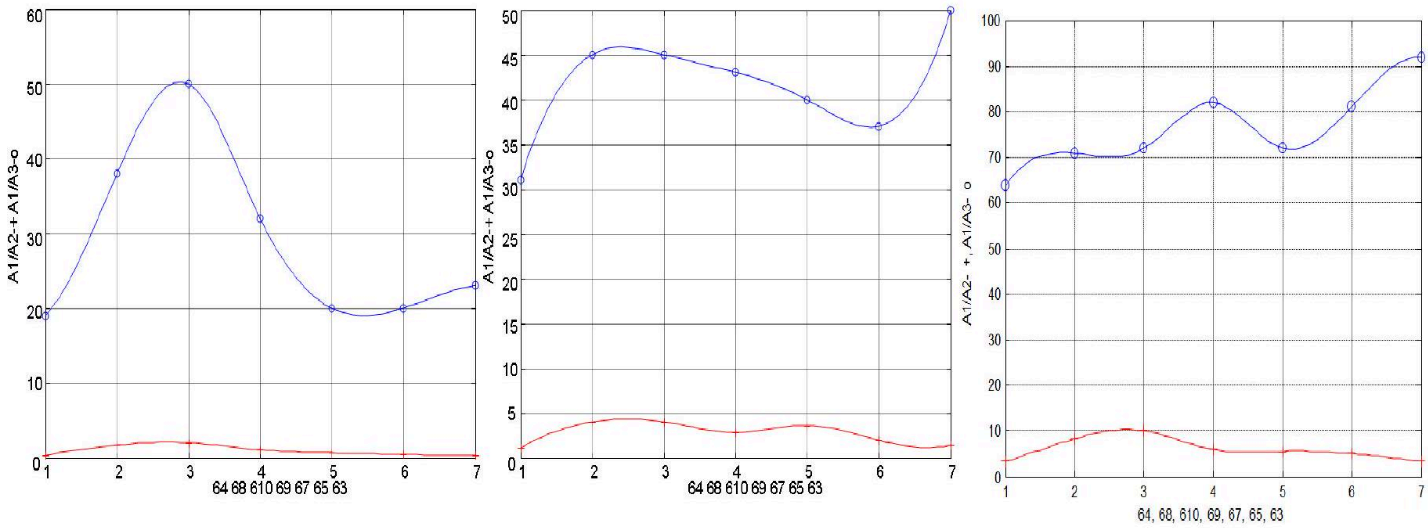


Fig. 5 **圖 5**

Abd_center



Abd_MP_center



4. Figure captions: **4. 圖表說明：**

Fig. 1 Spectral analysis of EEG rhythms distribution by bands: delta1 + delta2 (0.5-4.0 oscillations per second - color white + red); theta (4.0-8.0 oscillations per second color: yellow); alpha (8.0-13.0 oscillations per second - color: green); beta (13 and higher, color: blue). A - background recording prior to exposure to electromagnetic radiation, emitted by the MP: B - after exposure to the MP; C - after exposure to the MP in combination with AIRES SHIELD.

Fig.2. A1. Native EEG of A-v I. and examples of processing with Encephalic Asymmetry (ECA) Program during aftereffect of Hyperventilation (HV) functional test - hypoxia, hypercapnia:
a - background after HV - rhythm topogram of the cross spectrum (CS);
b - background after HV - rhythm topogram of the coherence function (COH);
c - background after HV - structure of cross-correlation (CC) positive coefficients distribution.

c - 暴露於 HV 後的背景 — 互相關（CC）正係數分佈的結構。

Fig.2. A2. Native EEG of A-v I. and examples of processing with Encephalic Asymmetry (ECA) Program against the background of exposure to electromagnetic radiation, emitted by the mobile phone (EMR MP):

圖 2. A2. A-v I. 的原始腦電圖（EEG）及在受到行動電話所發射之電磁輻射（EMR MP）影響背景下，使用腦偏斜（ECA）程式處理的範例：

a - against the background of (2min) exposure to EMR MP - rhythm topogram of the cross spectrum (CS);

a - 在（2 分鐘）暴露於 EMR MP 背景下 — 交叉頻譜（CS）節律拓朴圖；

b - against the background of (2min) exposure to EMR MP - rhythm topogram of the coherence function (COH);

b - 在（2 分鐘）暴露於 EMR MP 背景下 — 相干函數（COH）節律拓朴圖；

c - against the background of (2min) exposure to EMR MP - structure of crosscorrelation (CC) positive coefficients distribution.

Fig. 2 .A2 [1]. Native EEG of A-v I. and examples of processing with Encephalic Asymmetry (ECA) Program after exposure to EMR MP:
a - background after exposure to EMR MP - rhythm topogram of the cross spectrum (CS);
b - background after exposure to EMR MP - rhythm topogram of the coherence function (COH);
c - background after exposure to EMR MP - structure of cross-correlation (CC) positive coefficients distribution.

Fig.2. A3. Native EEG of A-v I. and examples of processing with Encephalic Asymmetry (ECA) Program against the background of exposure to electromagnetic radiation, emitted by the mobile phone in combination with AIRES SHIELD (MP+):
a - against the background of (3min) exposure to EMR MP+ - rhythm topogram of the cross spectrum (CS);
b - against the background of (3min) exposure to EMR MP+ - rhythm topogram of the coherence function (COH);
c - against the background of (3min) exposure to EMR MP+ - structure of crosscorrelation (CC) positive coefficients distribution.

Fig.2. $A3^1$. Native EEG of $A - v$ I. and examples of processing with Encephalic Asymmetry (ECA) Program after exposure to electromagnetic radiation, emitted by the mobile phone (EMR MP) in combination with AIRES SHIELD (MP+).
a - after exposure to EMR MP+ - rhythm topogram of the cross spectrum (CS);
b - after exposure to EMR MP+ - rhythm topogram of the coherence function (COH);
c - after exposure to EMR MP+ - structure of cross-correlation (CC) positive coefficients distribution.

Fig.3. A2. Native EEG of B-v R. and examples of processing with Encephalic Asymmetry (ECA) Program against the background of exposure to electromagnetic radiation, emitted by the mobile phone (EMR MP).
a - against the background of (2min) exposure to EMR MP - rhythm topogram of the cross spectrum (CS);
b - against the background of (2min) exposure to EMR MP - rhythm topogram of the coherence function (COH);
c - against the background of (2min) exposure to EMR MP - structure of crosscorrelation (CC) positive coefficients distribution

Fig.3. A2 [1]. Native EEG of B-v R. and examples of processing with Encephalic Asymmetry (ECA) Program after exposure to electromagnetic radiation, emitted by the mobile phone (EMR MP). Hereinafter:
a - after exposure to EMR MP - rhythm topogram of the cross spectrum (CS);
b - after exposure to EMR MP - rhythm topogram of the coherence function (COH);
c - after exposure to EMR MP - structure of cross-correlation (CC) positive coefficients distribution.

Fig.3. A3. Native EEG of B-v R. and examples of processing with Encephalic Asymmetry (ECA) Program against the background of exposure to electromagnetic radiation, emitted by the mobile phone (EMR MP) in combination with AIRES SHIELD (MP+).
a - against the background of (3min) exposure to EMR MP+ - rhythm topogram of the cross spectrum (CS);
b - against the background of (3min) exposure to EMR MP+ - rhythm topogram of the coherence function (COH);
c - against the background of (3min) exposure to EMR MP+ - structure of crosscorrelation (CC) positive coefficients distribution.

Fig.3. A3[1]. Native EEG of B-v R. and examples of processing with Encephalic Asymmetry (ECA) Program after exposure to electromagnetic radiation, emitted by the mobile phone (EMR MP) in combination with AIRES SHIELD (MP+).
a - after exposure to EMR MP - rhythm topogram of the cross spectrum (CS);
b - after exposure to EMR MP - rhythm topogram of the coherence function (COH);
c - after exposure to EMR MP - structure of cross-correlation (CC) positive coefficients distribution.

Fig.4. Example of reciprocal spectral power density for signals from electrodes O1 (occipital left) and P1 (sincipital left). The upper figure - before exposure, the figure in the middle - exposure to the MP, bottom figure - exposure to the MP in combination with the resonator (AIRES SHIELD). The diagram in the middle clearly shows an additional peak, emerging at 6 Hz frequency upon exposure to the MP. During exposure to the MP in combination with the resonator (bottom diagram), the peak disappears, which may be considered as return to normal state.

Fig. 5. Interaction among signals from electrode couples: C1-P1, C1-F3, C1-Fp1, C1Fp2, C1-F4, C1-C4, C1-P2 (see the electrodes layout according to the scheme 10×20), recorded in one subject. The Figure shows intensity of interaction rated by the maximum value. The blue curves reflect ratio between amplitudes of reciprocal spectral power density peaks at 2 Hz frequency and amplitudes at 10 Hz frequency, while the red curves reflect ratio between amplitudes of reciprocal spectral power density peaks at 2 Hz frequency and amplitudes at 20 Hz frequency for the above-mentioned electrode couples.

The time interval between the upper and the bottom diagrams makes approximately 1 month. In the diagrams from left to right: left - background without the MP, middle exposure to the MP without the resonator, right - exposure to the MP with the resonator.