Research Report: **研究報告：**
Influence of the Aires Shield electromagnetic anomaly neutralizer on changes in EEG parameters caused by a mobile phone's electromagnetic field

Aires Shield 電磁異常中和器對手機電磁場引起之腦電圖參數變化的影響

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Objective **目的**

The objective of this work was to study the electroencephalographic (EEG) changes resulting from the influence of a mobile phone's EMF and the possibility of using an Aires Shield electromagnetic anomaly neutralizer to reduce these changes.

本研究的目的是探討行動電話電磁場（EMF）影響下的腦電圖（EEG）變化，及使用 Aires Shield 電磁異常中和器減緩這些變化的可能性。

Materials and methods **材料與方法**

Twelve basically healthy subjects of both genders, aged 19-31, and three relatively healthy subjects participated in the experiments. Two experiments were conducted on each subject: under the influence of the EMF from a mobile phone and under the influence of the EMF from a mobile phone with an Aires Shield applied to its back panel. The experiments were conducted with a 24 -hour interval between them.

共有十二名基本健康的受試者（男女皆有），年齡介於 19 至 31 歲，以及三名相對健康的受試者參與實驗。每位受試者進行兩次實驗：一次是在行動電話 EMF 影響下，另一次是在行動電話背板貼有 Aires Shield 時的 EMF 影響下。兩次實驗之間間隔 24 小時。

To determine the baseline functional state of the central nervous system (CNS), a baseline EEG was recorded for 6 minutes before exposure was introduced. The EEG responses to standard loads were evaluated: opening/closing of eyes, hyperventilation for two minutes. The EEG changes resulting from the influence of a mobile phone's EMF were analyzed in "wait" mode (5 min .), "talk" mode with no audio (5 min .), and "post-conversation" (5 min .).

為了確定中樞神經系統（CNS）的基線功能狀態，於暴露前記錄 6 分鐘的基線 EEG。評估對標準負荷的 EEG 反應：睜眼 / 閉眼、兩分鐘的過度換氣。分析行動電話 EMF 影響下的 EEG 變化，於「待機」模式（5 分鐘）、無聲的「通話」模式（5 分鐘）與「通話後」（5 分鐘）。

The EEG was recorded from 21 discharge electrodes arranged according to the international 10×20 scheme. The test subject and the EEG recording equipment were in a chamber shielded from the mobile phone's base station. The selected spectral-correlation EEG analysis method included evaluating the spectral power dynamics in each physiological range: delta ($0.5 - 2.0$ Hz and $2.0 - 4.0$ Hz), theta ($4.0 - 8.0$ Hz), alpha ($8.0 - 13.0$ Hz), beta $_1 (13.0 - 24.0$ Hz), and beta $_2 (13.0 - 24.0$ Hz), as well as the coherence and correlation among all of the EEG leads. The spectral power index (Figure 2) reflects the energy of the EEG frequency components in each lead and lets us analyze the intensity and general distribution of each activity type. Coherence reflects the level of synchronization between EEG changes at two different points in this frequency band. When analyzing cross-correlation, the concept of a cross-correlation coefficient is introduced. The magnitude of this coefficient can be used to judge the level of correlation in processes occurring in different parts of the brain. A visualization of analytical results is shown in Figures 4 and 5.

腦電圖採用國際 10×20 佈局排列的 21 個放電電極進行記錄。受試者與腦電圖記錄設備置於一個能抵擋行動電話基地台訊號的屏蔽艙中。所選的頻譜—相關腦電分析方法包括評估各生理頻段的頻譜功率動態：δ 波（ $0.5 - 2.0$ Hz 與 $2.0 - 4.0$ Hz ）、θ 波（ $4.0 - 8.0$ Hz ）、α 波（ $8.0 - 13.0$ Hz ）、β $_1 (13.0 - 24.0$ Hz) 與 β $_2 (13.0 - 24.0$ Hz) ，以及所有腦電導聯之間的相干性與相關性。頻譜功率指數（圖 2）反映每一導聯中腦電頻率成分的能量，使我們能分析各類活動的強度與整體分布。相干性反映在該頻段中兩個不同點位的腦電變化之同步化程度。在分析互相關時，引入了互相關係數的概念。該係數的大小可用以判斷不同腦區發生之過程的相關程度。分析結果的視覺化如圖 4 與圖 5 所示。

Results and discussion 結果與討論

No significant changes to the EEG parameters were discovered in standby mode. However, this does not eliminate the possibility of changes appearing during extended exposure to EMF from a mobile phone in this mode. It is known from the literature that minimal changes in biological parameters under the influence of a low-intensity EMF accumulate over an extended period (more than a year), negatively affecting an organism.

在待命模式下，未發現對 EEG 參數有顯著變化。然而，這並不排除在長時間暴露於行動電話的電磁場（EMF）時，於此模式下可能出現變化的可能性。文獻已知，在低強度電磁場影響下，生物參數的微小變化會在長期（超過一年）累積，對生物體產生不利影響。

The change in the cerebrum's bioelectric activity in the presence of a mobile phone is so pronounced it could be called a localized electromagnetic storm. The figure shows the EEG spectrum change before and during the operation of a mobile phone with the audio turned off (Fig. 1).

在有行動電話存在時，大腦皮層的生物電活動變化如此明顯，可以稱之為局部的電磁風暴。圖中顯示了在行動電話開啟且音訊關閉時的 EEG 頻譜變化（圖 1）。

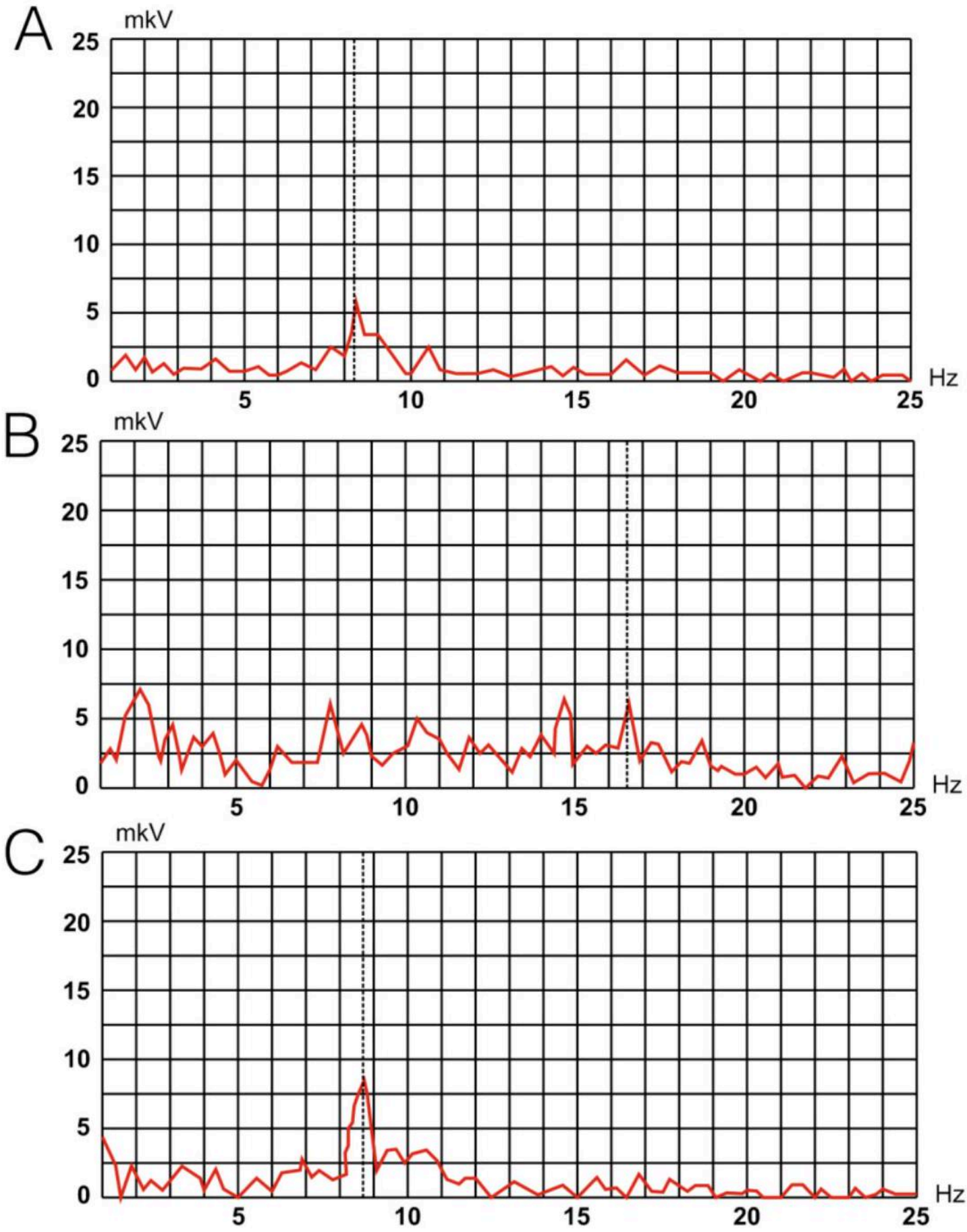


Fig. 1 EEG spectral density in the Pz lead (10 × 20 scheme) in a basically healthy subject.

圖 1 基本健康受試者在 Pz 導聯（ 10 × 20 方案）之 EEG 頻譜密度。

A - Before turning on the mobile phone

A - 行動電話開啟前

B - While the mobile phone is operating

B - 手機運作中

C - While the mobile phone is operating and in the presence of the neutralizer

C - 手機運作中且存在中和裝置時

As can be seen from Fig. 1, the use of a mobile phone significantly changes the structure of the EEG, disorganizing the baseline activation-deactivation balance. Fig. 1A shows the baseline EEG distribution across the recorded frequencies. This subject has a fairly balanced EEG. But even in this subject turning on the phone significantly disrupts the baseline EEG's rhythmic pattern (Fig. 1B). In the presence of Aires Shield, the EEG changes caused by the operation of the cellular phone are almost completely eliminated. During the operation of the cellular telephone, not only is the rhythmic pattern is disturbed, but also the distribution of rhythms over the surface of the head, as shown in Fig. 2.

如圖 1 所示，使用手機會顯著改變腦電圖的結構，擾亂基線的活化—去活化平衡。圖 1A 顯示記錄頻率範圍內的基線腦電分佈。此受試者的腦電相當平衡。但即便在此受試者身上，開啟手機也會明顯破壞基線腦電的節律模式（圖 1B）。在 Aires Shield 存在的情況下，手機運作所引起的腦電變化幾乎完全消失。手機運作時，不僅節律模式受到干擾，如圖 2 所示，節律在頭表面的分佈也受到影響。

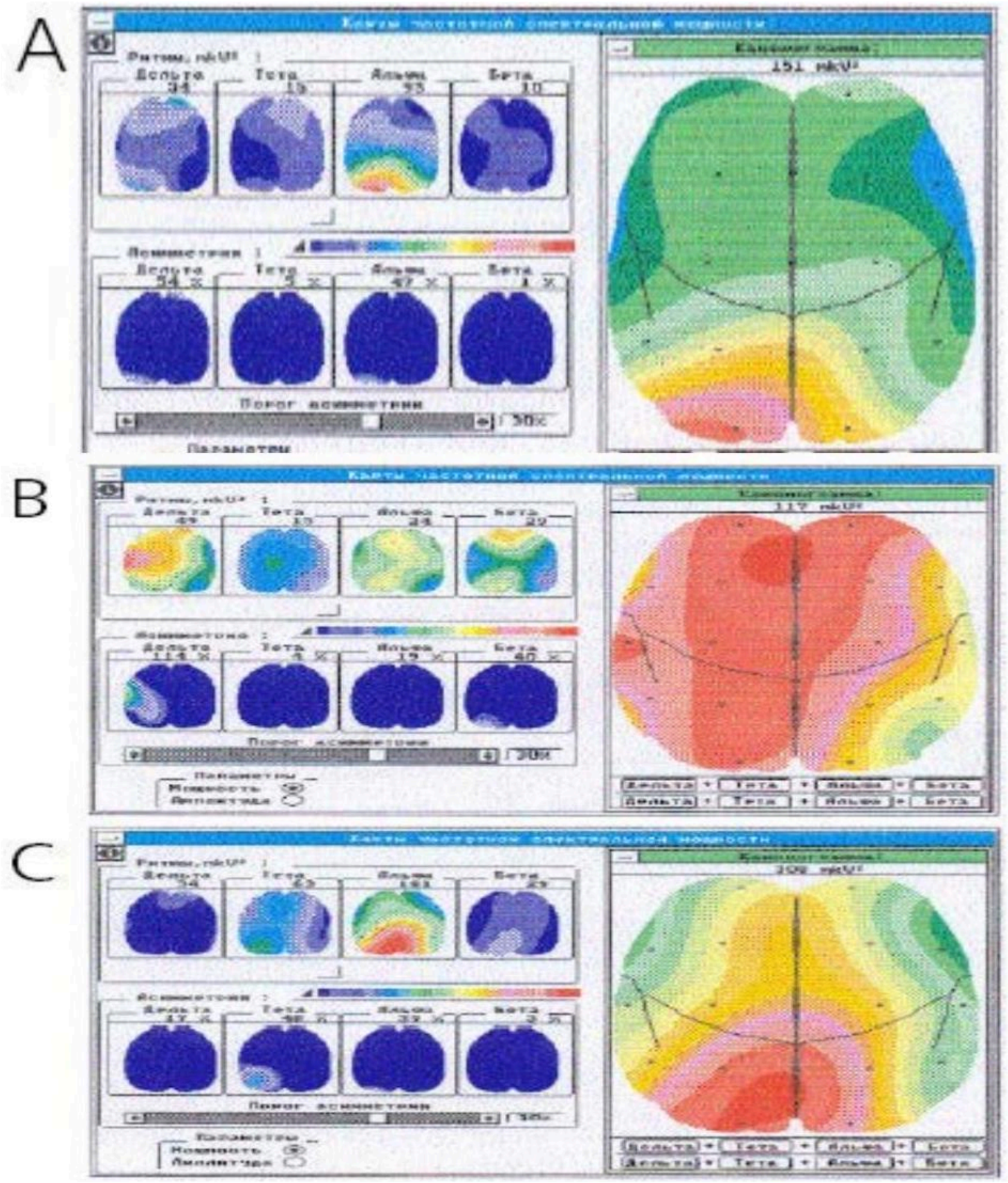


Fig. 2.EEG spectral power distribution

圖 2. 腦電頻譜功率分佈

A - Before operation of the mobile phone

A - 手機未開機前

B - While the mobile phone is operating

B - 手機運作中

C - While the mobile phone is operating in the presence of the Aires Shield Location of the phone and the Aires Shield near

the left ear.

C - 手機運作中且有 Aires Shield 在場（手機與 Aires Shield 位於左耳附近）

Fig. 2 shows another subject's cumulative rhythmography-topogram and rhythm power distribution for specific bands. Importantly, in addition to a disruption to the pattern of the source EEG, all test subjects exhibited an asymmetry in the distribution of rhythms on the convexital surface (Fig. 2B), which was induced by the operation of the mobile phone even when the audio signal was disabled. In the area of the mobile phone, the asymmetry of delta activity increased by 37%. However, with an Aires Shield, the asymmetry induced by the mobile phone leveled out (Fig. 2C). An analysis of spectral density dynamics showed the destructuring of the EEG's rhythmic pattern while the mobile phone was operating (Figures 3A and B) and the restructuring (relative to the baseline EEG) in the presence of the Aires Shield (Fig. 3C). Analyzing Fig. 2 and Fig. 3, you can see that the most pronounced changes in the alpha range are: disorganization of the pattern while the mobile phone is operating, reorganization of the pattern relative to the original state in combination with increased alpha activity in the presence of the Aires Shield.

圖 2 顯示了另一名受試者的累積節律圖-拓樸圖以及特定頻段的節律能量分佈。重要的是，除了來源腦電圖模式的破壞外，所有受試者在凸面頭皮表面的節律分佈均出現不對稱（圖 2B），該不對稱即便在音訊訊號被關閉的情況下仍由手機運作所誘發。在手機所在區域，δ 節律活動的不對稱性增加了 37% 。然而，使用 Aires Shield 後，手機誘發的不對稱性被抹平（圖 2C）。對頻譜密度動態的分析顯示，在手機運作時腦電圖節律模式遭到破壞（圖 3A、B），而在有 Aires Shield 存在下則出現相對於基線腦電圖的重組（圖 3C）。綜觀圖 2 與圖 3，可見在 α 頻段變化最為顯著：手機運作時模式的紊亂；在配合 Aires Shield 時相對於原始狀態的模式重組，並伴隨 α 活動的增加。

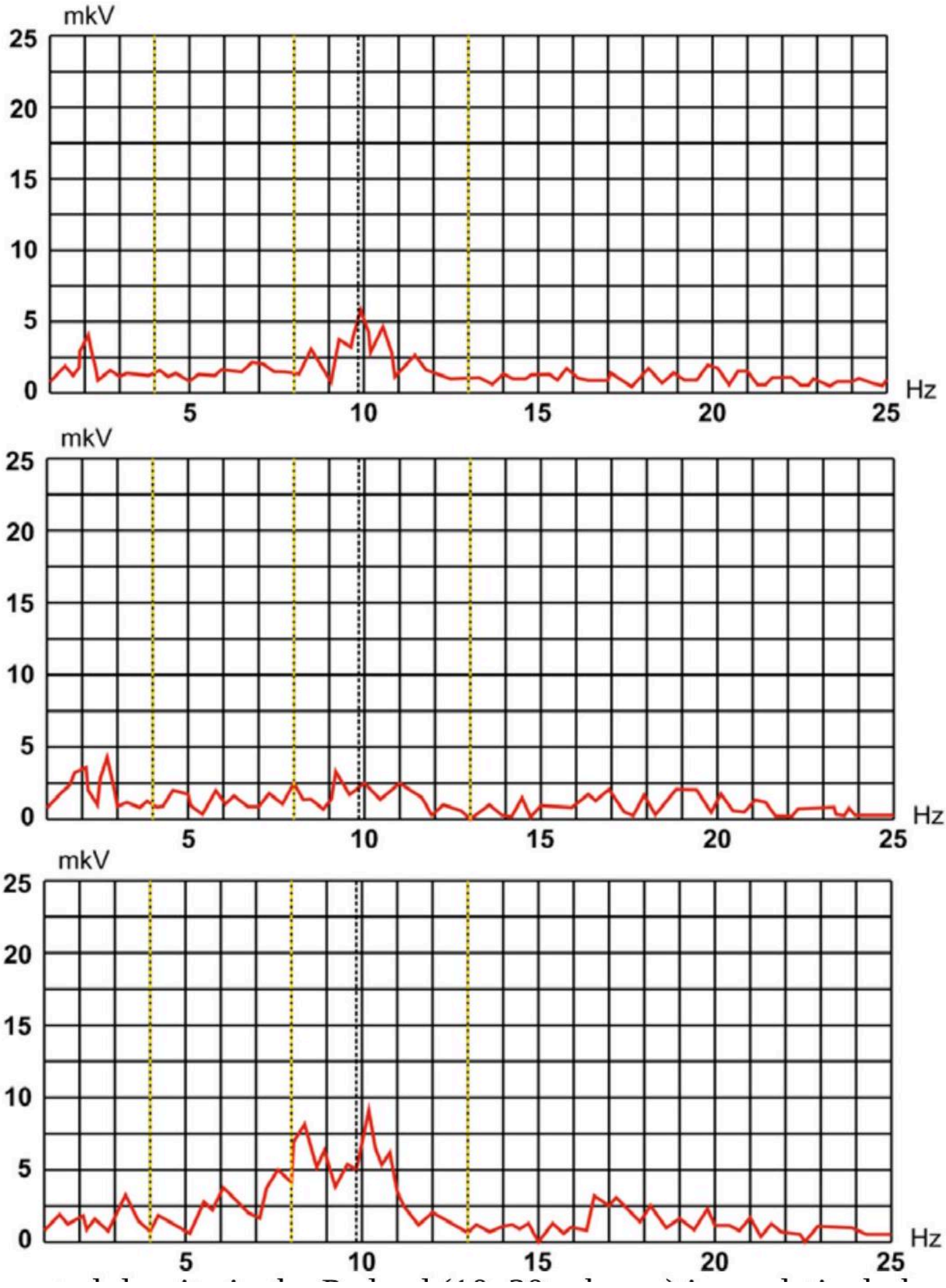


Fig. 3 EEG spectral density in the Pz lead (10 x 20 scheme) in a relatively healthy subject.

圖 3 在相對健康受試者中 Pz 導聯（10 x 20 方案）的腦電頻譜密度。

A - Before operation of the mobile phone

A - 在手機啟動前

B - While the mobile phone is operating

B - 手機運作時

C — While the mobile phone is operating in the presence of the Aires Shield

C — 手機運作時且有 Aires Shield 存在時

Summarizing these results, we can conclude that the presence of the Aires Shield neutralizes the effect of the directional electromagnetic radiation produced by the mobile phone. We do not rule out that the correction of local EEG changes is explained by the neutralizer's ability to harmonize the electromagnetic field generated by an external source of electromagnetic oscillations. In addition, as we noted above, changes in the EEG's frequency-amplitude parameters were also monitored. Statistically, the most significant changes ($p < 0.05$) were detected in the alpha range. According to the literature, the alpha rhythm can be considered a "clock" that regulates as information signals are received by and transmitted from the cortex (M.A. Brazier). D.B. Lindley considers the alpha rhythm to be a "coding system" needed by the brain so that perceptions of the external world and reactions to external stimuli are not distorted or erased by the constant influx of sensory stimuli. Other authors also point out the alpha rhythm's special role in the mechanisms of adaptation to external factors, including natural and social factors.

總結這些結果，我們可以得出結論：Aires Shield 的存在中和了行動電話所產生的定向電磁輻射的效應。我們並不排除局部腦電圖(EEG)變化的修正，是由於該中和器能夠協調外部電磁振盪來源所產生的電磁場所致。此外，如上所述，我們也監測到腦電圖頻率—振幅參數的變化。從統計上看，最顯著的變化（$p < 0.05$）出現在α波段。根據文獻，α節律可被視為一個「時鐘」，在皮層接收及傳送資訊信號時發揮調節作用（M.A. Brazier）。D.B. Lindley 認為α節律是一種大腦所需的「編碼系統」，使對外界的感知與對外部刺激的反應不會被持續湧入的感官刺激所扭曲或抹除。其他作者亦指出α節律在對外在因子（包括自然及社會因子）適應機制中具有特殊角色。

In the presence of the Aires Shield, thanks to the local resonant interaction between the Aires Shield and brain tissue, the entire aggregate rhythmic activity is rebuilt, reflecting the mobilization of regulatory processes in the central nervous system, and optimization of the brain as a whole. In other

在 Aires Shield 的作用下，得益於 Aires Shield 與腦組織之間的局部共振相互作用，整體聚合的節律活動被重建，反映出中樞神經系統調節過程的動員，以及腦整體功能的優化。換言之，

words, when encountering an external source of negative interactions, we might say that the brain forms "alpha protection".

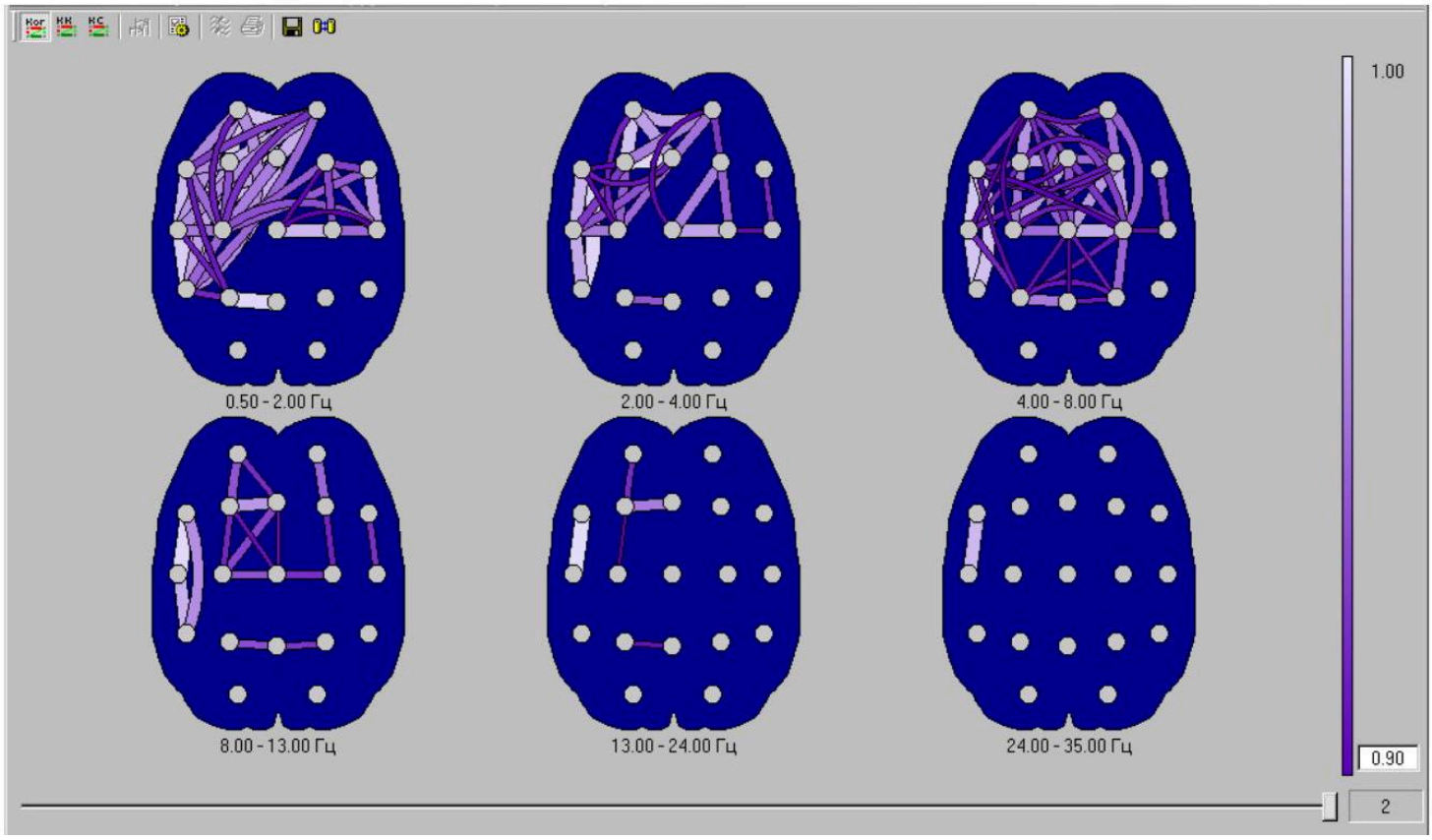
當面對外來的負面互動源時，我們可以說大腦形成了一種「α 保護」。

This assertion is confirmed by an analysis of intercentral interaction with respect to the average level of coherence (Figure 4) and the cross-correlation coefficient (Figure 5). As can be seen in Fig. 4, the sub-sensory (imperceptible) effect of the mobile phone's EMF (phone on the left) is the local focus of synchronous cortical activity, which can be traced in all EEG bands. At the same time, synchronicity in the theta range increases significantly, which indicates the activation of the emotionogenic structures of the paleocortex and related structures. As our studies have shown, the detected local changes level out with time. But it should be noted that the user is exposed to a mobile phone's EMF more than once a day. Thus, a phone's EMF can become a weak repeated stimulus that triggers the emergence and development of a dominant focus of excitation in the neocortex, or generates pathological activity. A pathological activity generator forms its own system of connections, while simultaneously disrupting balanced relationships both at the level of the cerebral cortex and at the level of the subcortical structures. Ultimately, long-term disruption of cortical-cortical and corticalsubcortical processes disorganizes the normal brain function. This is evidenced by the pattern of disruption of cross-correlation relationships in the alpha range (Fig. 5 a), where negative feedback between the frontal and occipital divisions (fat black line) are clearly seen, both during operation of the mobile phone operation in "talk" mode and after the influence of the phone's EMF. This leads to the appearance of various diseases: diseases of the CNS, and, considering the disruption of CNS regulatory functions, a variety of somatic abnormalities. Particular attention should be paid to the fact that the three relatively healthy subjects, who suffer from vegetative-vascular dystonia, and whose intercenteral pattern was initially impaired, were most sensitive to the impact of the mobile phone's EMF.

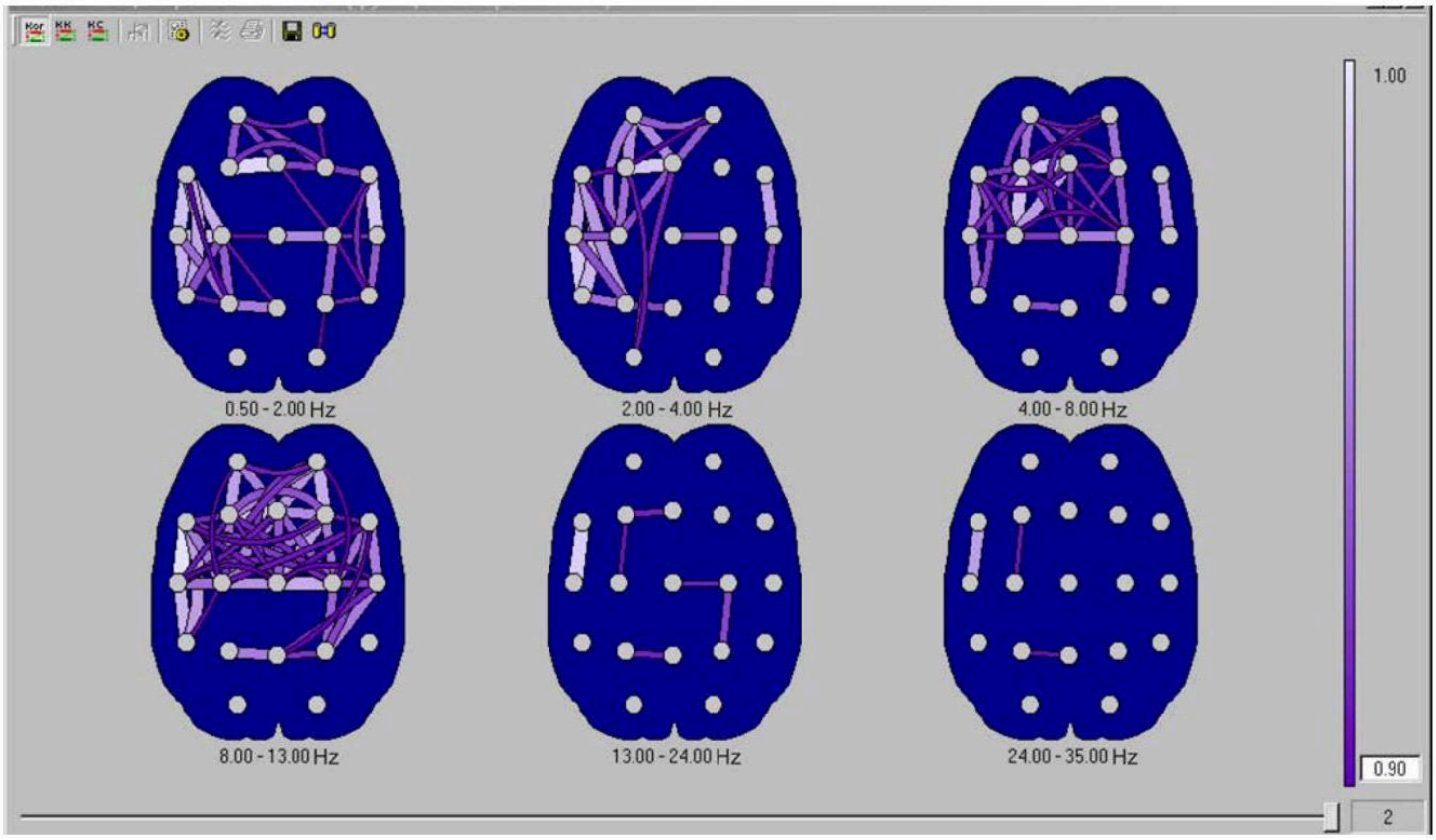
這一論斷可由對中央間相互作用的分析得到印證，分析採用平均相干度（圖 4）與互相關係數（圖 5）。如圖 4 所示，行動電話電磁場的次感覺（不可察覺）效應（手機置於左側）會成為同步皮質活動的局部焦點，該現象可在所有腦電頻帶中追蹤到。與此同時，θ波段的同步性顯著增加，這表明古皮質及相關結構中情感產生區的活化。如我們的研究所示，觀測到的局部變化會隨時間逐漸平復。但應注意，使用者每天多次暴露於行動電話的電磁場。因此，手機的電磁場可能成為一種微弱但反覆出現的刺激，誘發新皮質中興奮的優勢性焦點的產生與發展，或產生病態活動。病態活動產生器會形成其自身的連結系統，同時擾亂大腦皮質層面與皮質下結構層面的平衡關係。 最終，皮質—皮質及皮質—皮質下過程的長期干擾會擾亂正常的大腦功能。這可由α波範圍內交互相關關係被破壞的模式顯示（圖 5 a），其中額葉與枕葉分區之間的負回饋（粗黑線）在手機以「通話」模式運作時及手機電磁場影響之後皆明顯可見。這導致各種疾病的出現：中樞神經系統的疾病，並且考量到中樞神經系統調節功能的破壞，各種體徵異常亦會發生。特別值得注意的是，那三位原本相對健康但患有植物血管性功能不全、且其中心間模式一開始即受損的受試者，對手機電磁場的影響最為敏感。

In the presence of Aires Shield (Figures 4b and 5b), local coherence was weakened, and the synchronous activity and structure of cross-correlation relationships in the alpha range were formed with an emphasis in the front sections.

在使用 Aires Shield 的情況下（圖 4b 及 5b），局部相干性被削弱，α波範圍內的同步活動與交互相關關係的結構形成，且重心偏向前額區域。



a)



b)

Fig. 4. Diagram of intercentral relationships with respect to the average coherence level:

圖 4。關於平均相干性水準的腦區間關係圖：

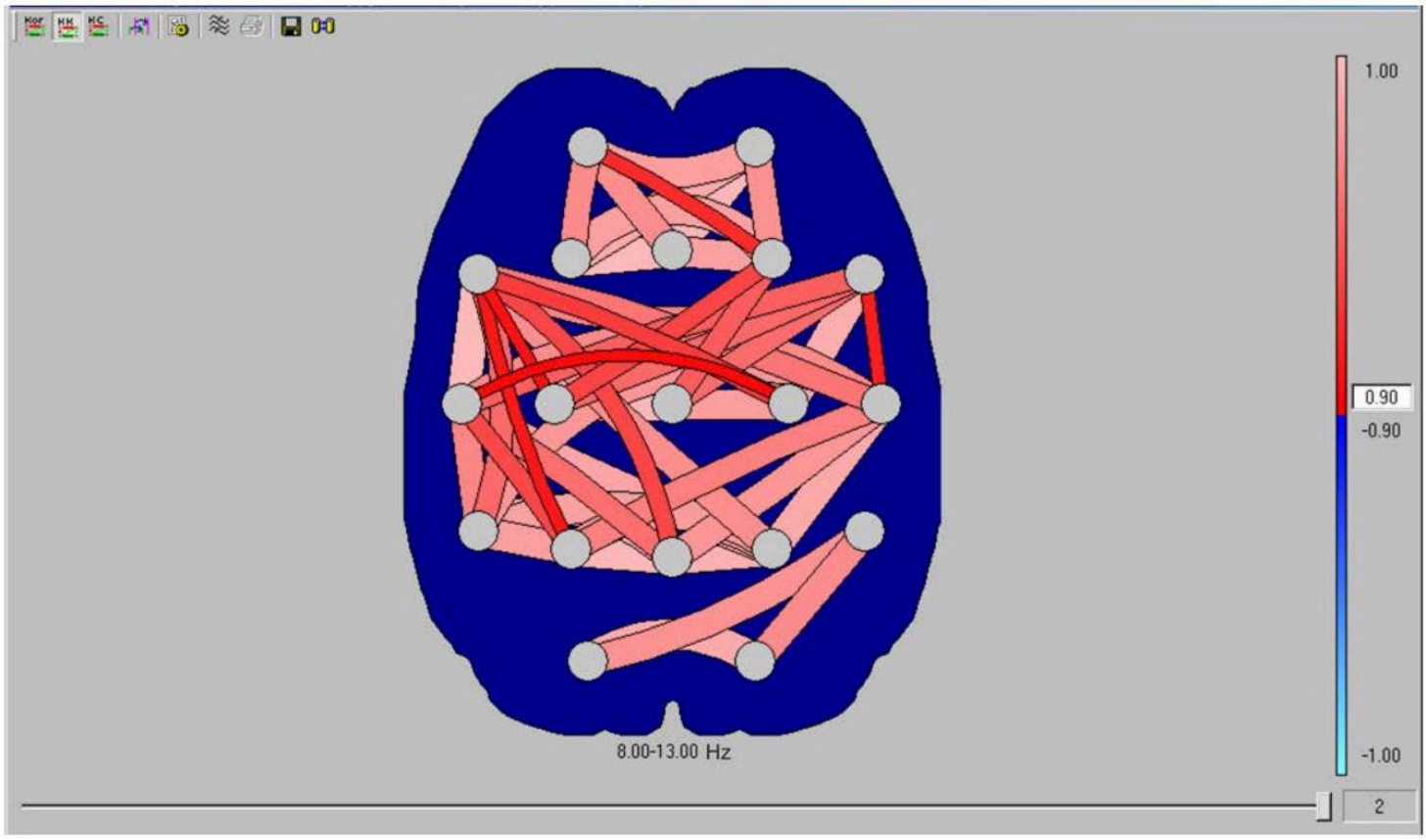
a) While the mobile phone is operating;

a) 手機運作時；

b) While the mobile phone is operating in the presence of the Aires Shield

b) 在有 Aires Shield 存在下手機運作時

a)



b)

Fig. 5. Diagram of intercentral relationships with respect to cross-correlation coefficient:

圖 5. 中心間關係圖（依交叉相關係數）：

a) during operation of the mobile phone;

a) 在行動電話運作期間；

b) while the mobile phone is operating in the presence of the Aires Shield.

b) 在行動電話於 Aires Shield 保護下運作時。

Conclusion 結論

These experiments have shown that exposure to a mobile phone's EMF causes local changes in the EEG, and disrupts the picture of intercentral relationships, which can cause many diseases of the central nervous system and internal organs.

這些實驗顯示，暴露於行動電話的電磁場會在腦電圖上引起局部變化，並擾亂腦區間關係的圖像，這可能導致中樞神經系統及內臟的多種疾病。

Restructuring of the mobile phone's EMF in the presence of the Aires Shield prevents the development of negative changes in the EEG. This gives us grounds to assert that the presence of the Aires Shield neutralizes the negative effects of the influence of the mobile phone's EMF on the CNS and lets the CNS retain its regulatory functions.

在有 Aires Shield 存在下重構行動電話的電磁場可阻止腦電圖出現負面變化。這使我們有理由斷定，Aires Shield 的存在能中和行動電話電磁場對中樞神經系統的負面影響，使中樞神經系統保有其調節功能。