

## **REPORT ON THE RESEARCH WORK**

### **“Influence exerted by “AIRES” electromagnetic anomalies neutralizer on changes of EEG parameters caused by exposure to the electromagnetic field of a mobile telephone”**

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## **Object**

The object of this work was to study electroencephalographic (EEG) changes caused by exposure to EMR of the mobile telephone and the possibility to arrest them using the “AIRES” electromagnetic anomalies neutralizer (NEMA).

## **Materials and methods**

12 apparently healthy subjects of both sexes at the age of 19-31 and 3 relatively healthy subjects took part in the studies. Each subject participated in two experiments: exposure to EMR of the mobile telephone and exposure to EMR of the mobile telephone with NEMA pasted on the backplate. The experiments were performed at intervals of 24 hours.

To determine the initial level of the central nervous system (CNS) functional state before beginning of exposure during 6 minutes we recorded the background EEG, estimated EEG reactions to the standard stress: opening-closing the eyes, hyperventilation during 2 minutes. EEG changes caused by exposure to EMR of the mobile telephone were analyzed in the “expectation” mode (5 min), “conversation” mode with sonic signal switched off (5 min) and during the period of the “conversation” aftereffect (5 min).

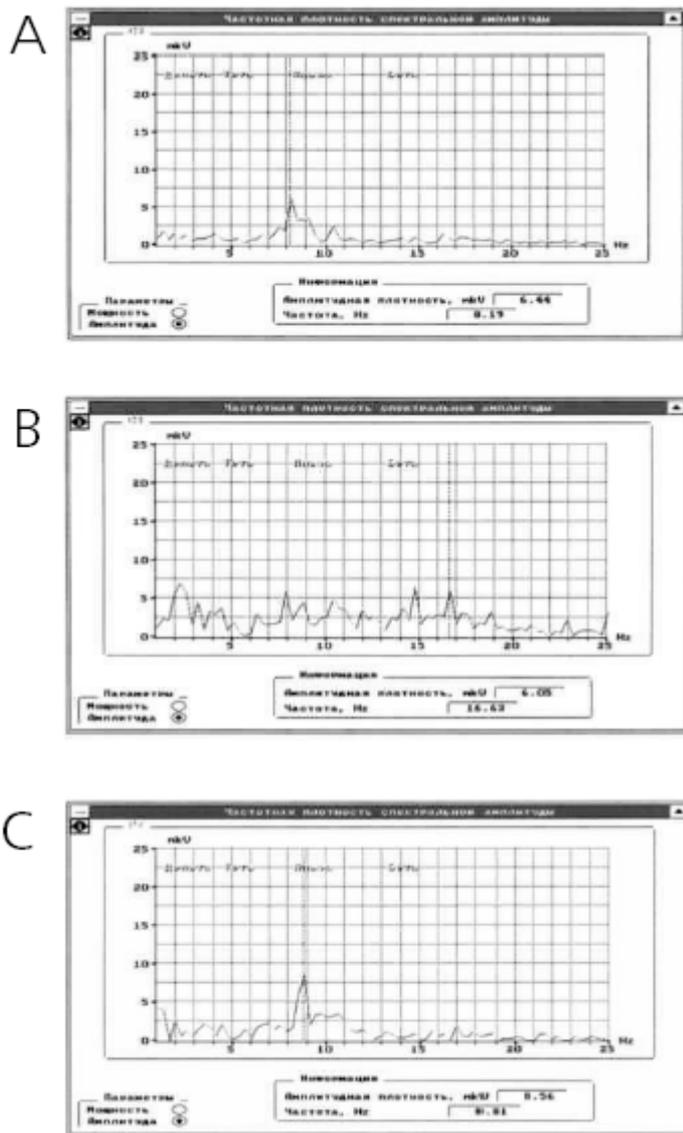
EEG was recorded from 21 exploring electrodes positioned according to the international scheme 10x20. The subject and the equipment for registering EEG were in a chamber shielded from the base station of the mobile telephone. Recording and analyzing EEG were carried out using the “Encephalan-131-08” encephalograph-analyzer. The selected spectral-correlative method of EEG analysis included the assessment of 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<sub>1</sub> (13.0-24.0 Hz), beta<sub>2</sub> (13.0-24.0 Hz)], the level of coherence and correlative intercommunication for all the leads. The spectral power index (Fig. 2) reflects the energy of the EEG frequency components in each lead and allows to analyze the degree of manifestation and the topical distribution of each activity type. The coherence is a degree of synchronism of EEG changes in two different points in the given frequency range. When analyzing the cross-correlation function, we introduced a concept of a cross-correlation index, by the magnitude of which one can judge about the degree of the correlative connection between processes in different cerebral zones. Visual results of the analysis are presented in Fig. 4, 5.

## **Results and discussion**

In the “expectation” mode significant changes of the EEG parameters were not revealed. But this does not exclude the appearance of changes in case of more prolonged exposure to EMR from the mobile telephone in this mode. From the literature we know the fact of summarizing the minimum changes in biological parameters under the influence of low intensity EMR with a negative reaction of the bioobject after a long time period (more than one year).

When the mobile telephone is being operated, changes in the cerebral bioelectrical activity are so pronounced that it is possible to call them an electromagnetic storm in the local volume. The change of the EEG spectrum before and during the operation of the mobile telephone with switched off sonic signal is presented in Fig. 1.



**Fig. 1.** Frequency density of the EEG spectral amplitude in Pz lead (scheme 10x20) in an apparently healthy subject.

A – before switching on of the mobile telephone;

B – the same during the operation of the mobile telephone;

C – the same during the operation of the mobile telephone with the structurizator.

As one can see from Fig. 1, operating the mobile telephone considerably changes the EEG structure causing the disorganization of the initial activation-deactivation balance. In Fig. 1A is presented the initial picture of the EEG amplitude distribution on the registered frequencies. This subject has a sufficiently balanced EEG picture. But even in this subject switching on of the telephone significantly disturbs the initial rhythmical EEG pattern (Fig. 1 B). When using NEMA, the EEG changes caused by the operation of the radiotelephone are practically completely levelled. When the radiotelephone is being operated, not only the rhythmical picture but also the rhythms distribution on the head surface is disturbed, what is shown in Fig. 2.

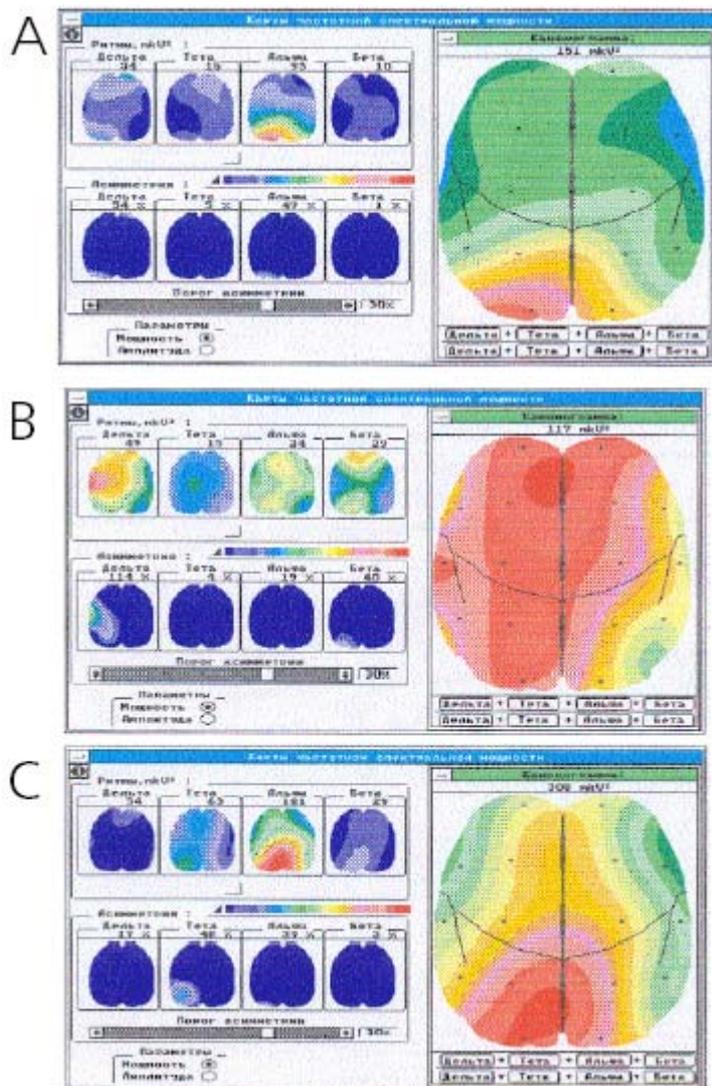


Fig. 2. Distribution of the EEG frequency spectral power.  
 A – before the operation of the mobile telephone;  
 B – during the operation of the mobile telephone;  
 C – during the operation of the mobile telephone with NEMA.

The telephone and NEMA are positioned near the left ear.

In Fig. 2 are presented both the total rhythmotopogram and the rhythms power distribution in certain ranges in another subject. In addition to the disorder in the rhythmical picture of initial EEG, the main phenomenon, observed in all the subjects, was the pronounced asymmetry of the rhythms distribution on the convex surface (Fig. 2 B) caused by the operation of the mobile telephone even with switched off sonic signal. In the zone, where the mobile telephone was positioned, the asymmetry in the delta activity increased on the average by 37%. But when NEMA was used, the asymmetry, caused by the operation of the mobile telephone, was levelled (Fig. 2 C). Analyzing the dynamics of the frequency density of the spectral amplitude showed destructurization of the EEG rhythmical picture during the operation of the mobile telephone (Fig. 3A, B) and the restructurization (compared to initial EEG) when NEMA was used (Fig. 3C).

When analyzing Fig. 2 and Fig. 3 one can see that changes in the alpha range are the most pronounced: pattern disorganization when the mobile telephone is being operated, pattern reorganization, compared to the initial state, in combination with increasing the power of the alpha activity when NEMA is used.

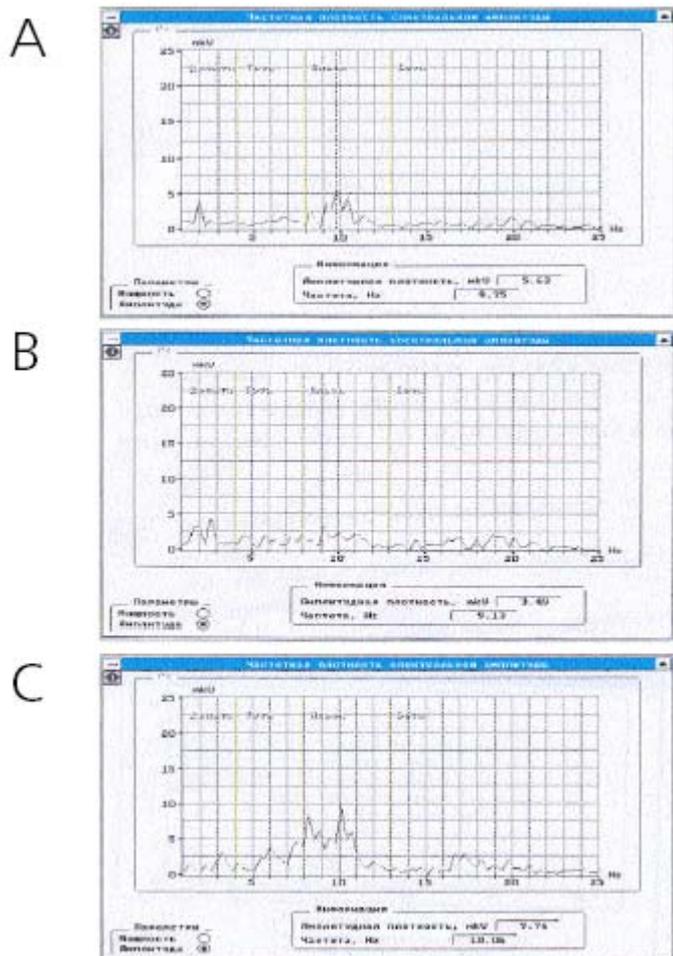


Fig. 3. Frequency density of the EEG spectral amplitude in Pz lead (scheme 10x20) in a relatively healthy subject.

- A – before the operation of the mobile telephone;
- B – during the operation of the mobile telephone;
- C – during the operation of the mobile telephone with NEMA.

Summarizing the obtained results, it is possible to make a conclusion that using “AIRES” NEMA levels the effect of the directional electromagnetic radiation produced by the mobile telephone. One can not exclude that the correction of local EEG changes is explained by the capability of the structurizator to harmonize the electromagnetic field generated by an external source of electromagnetic oscillation. Besides that, as we mentioned above, the changes of frequency-amplitude EEG parameters are also observed. When performing the statistical data processing, the most confident changes ( $p < 0.05$ ) are revealed in the alpha range. According to the literary data, alpha rhythm can be considered as a “clock-work” which regulates the entrance of information signals into the cortex and sending them out of it in time (M. Brazier). D.B.Lindley considers the alpha rhythm as a “coding system” which is necessary for the brain in order that the perception of the world around and reactions to its irritants may not be distorted and obliterated by the constant influx of sensory stimuli. Other authors also point out the specific role of the alpha rhythm in mechanisms of the adaptation to external factors including natural and social ones.

When NEMA is used, due to the local resonance interaction between NEMA and cerebral tissues, there takes place the reorganization of the whole summary rhythmical activity which reflects mobilizing the regulatory processes in CNS, optimizing the activity of the brain as a whole. In other words, when encountering an external source of the negative influence, the brain forms, if it is possible to say so, the “alpha protection”.

Analysis of the interaction between central structures basing on the average coherence level (Fig. 4) and the cross-correlation index (Fig. 5) confirms the above –stated facts. As one can

see from Fig. 4, the subsensory (unperceived) influence exerted by EMR from the mobile telephone (the receiver on the left side) forms a local focus of the synchronous activity of cortical elements observed in all the EEG ranges. In this case the synchronism significantly increases in the theta range what is evidence of activating the emotigenic structures in the archicortex and connected structures. As our studies show, the revealed local changes are eventually levelled. But it should be taken into account that the user is exposed to EMR of the mobile telephone not only once during 24 hours. So, EMR from the telephone can become a weak repeatedly acting stimulus which provokes the appearance and the development of a dominant stimulation focus in the neocortex, or a pathological activity generator. The pathological activity generator forms its own system of connections, disturbing at the same time the balanced relationships at the level of both the cerebral cortex and subcortical structures. The prolonged disorder of cortical-cortical and cortical-subcortical processes eventually disorganizes the normal activity of the human brain. This is confirmed by the picture of disturbing the cross-correlative connections in the alpha range (Fig. 5 a), where one can clearly observe the negative reverse connections between frontal and occipital regions (thick black line), during both the operation of the mobile telephone in the “conversation” mode and the aftereffect of exposure to EMR from the mobile telephone. This leads to development of different diseases of CNS and also, taking into account the disturbance of its regulatory functions, to multiple somatic disorders. Particular attention should be given to the fact that three relatively healthy subjects, who suffered from vegetovascular dystonia and had an initially disturbed picture of intercentral connections, were the most sensitive to exposure to EMR of the mobile telephone.

When NEMA was used (Fig. 4b and 5b) we observed slackening the local coherence, forming the synchronous activity and the structure of cross-correlative connections in the alpha range with an accent on the frontal regions.

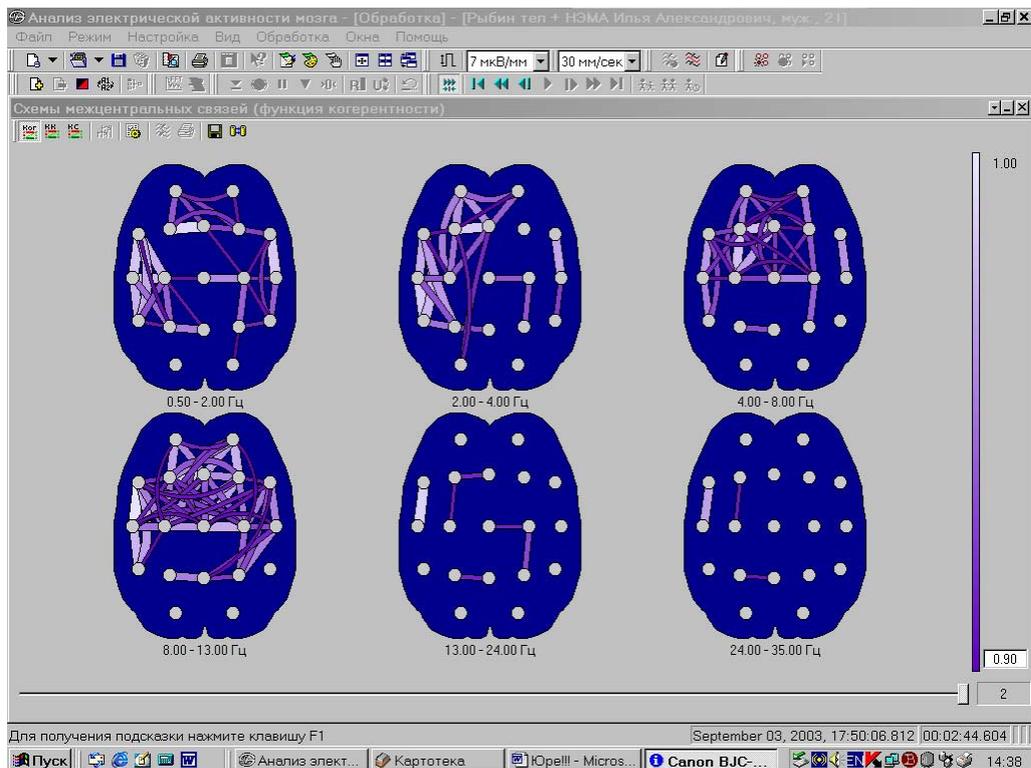
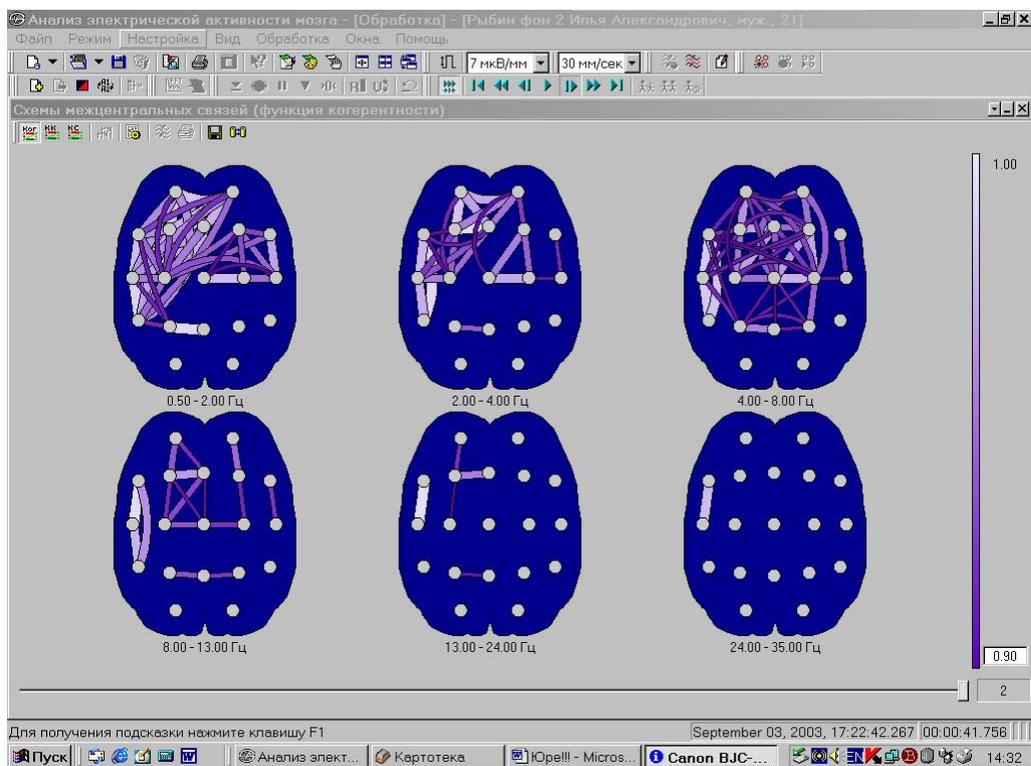


Fig. 4. Scheme of intercentral connections basing on the average coherence level  
 a) – during the operation of the mobile telephone;  
 b) – during the operation of the mobile telephone with NEMA.

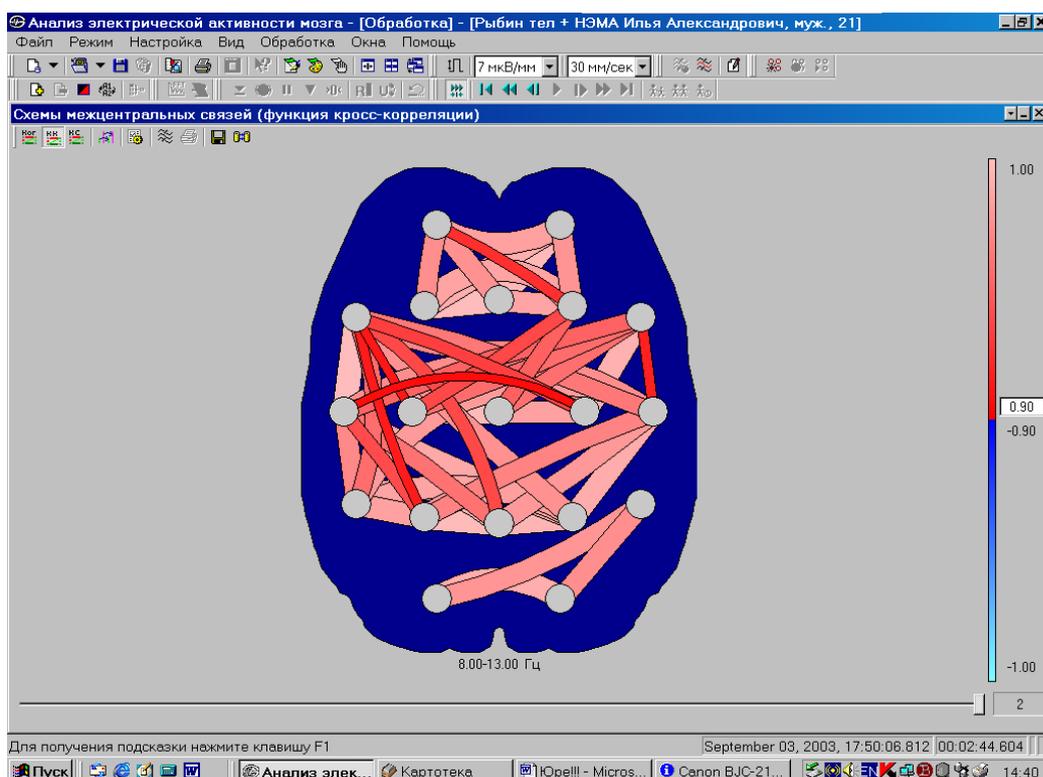
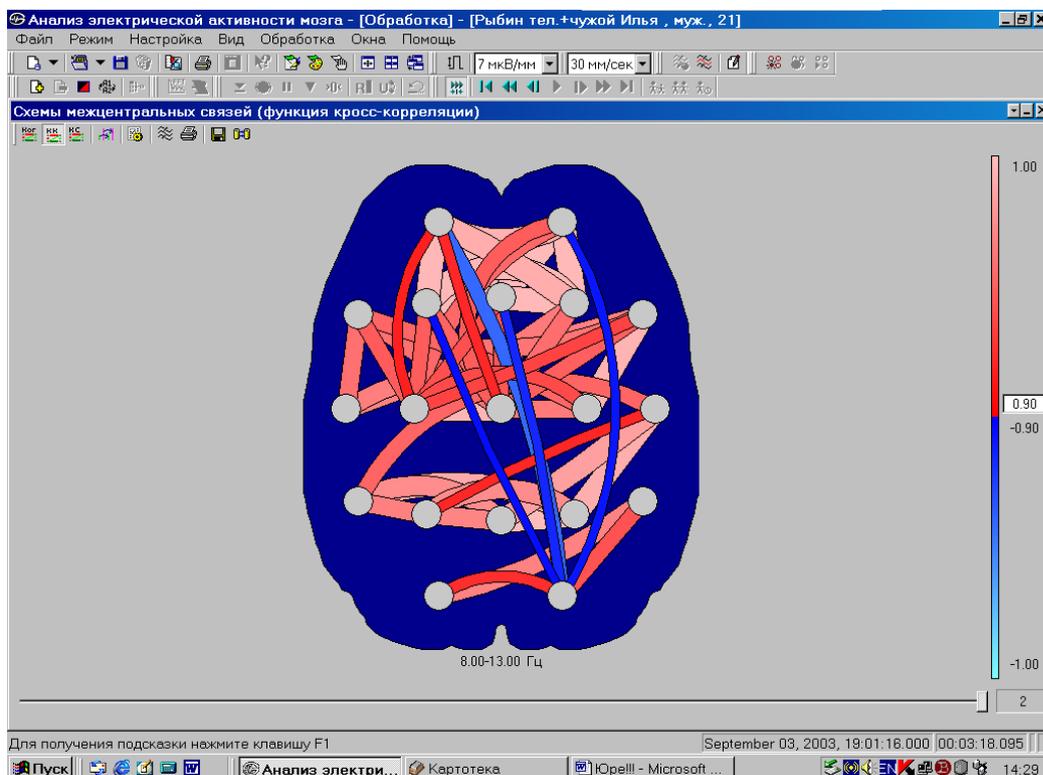


Fig. 5. Scheme of intercentral connections basing on the cross-correlation index.

- a) – during the operation of the mobile telephone;
- b) – during the operation of the mobile telephone with NEMA

### Conclusion

The performed studies show that exposure to EMR of the mobile telephone causes local changes in EEG, disorganizes the picture of intercentral connections, what can be the reason for many diseases of CNS and internal organs.

Restructurizing EMR of the mobile telephone with “AIRES” NEMA prevents from the development of the negative changes in EEG. This gives every reason to assert that using the “AIRES” NEMA levels the negative influence exerted by exposure to EMR of the mobile telephone on CNS and allows to preserve its regulatory functions.