

## The problem of ICNIRP (safety)-guidelines

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### Introduction

Worldwide there is an increasing number of healthy problems by electromagnetic field (EMF) exposures, namely produced by wireless telecommunication techniques. But the safety guidelines by ICNIRP (International Commission on Non-ionizing Radiation Protection) accept only a thermal effect in biosystems, given by a maximal immission of  $10 \text{ W/m}^2$  for these electromagnetic fields. This value was tested by EMF-exposures with the aim of maximal temperature increase of  $0,5 \text{ K}$  in a dead human body by 6 min exposure (A-Forschungszentrum Seibersdorf). Apart from this thermal effect there are biological reactions by some orders lower compared to the value range stipulated by ICNIRP [1].

The next fundamental problems of the ICNIRP-guidelines are, that only the energy of a continuous-wave electromagnetic field (cw-EM-field) is discussed as the relevant parameter. Not discussed is the exposure in low-frequently modulated EM-fields. For example it is well known, that periodical visible light pulses e.g. as in discotheques- might produce epileptical disorders. The sole difference between these two emitters is their basic frequency. Wireless communication like WLAN (WiFi) produce an EM field, modulated with a strong periodicity of  $10 \text{ Hz}$ . Longtime exposure results in many kinds of health-disorders as described [2].

### Method

The relaxed test-person was tested in an HF-shielded laboratory-equipment with the following experimental setup:

Step 1: control

Step 2: exposure (active WLAN-router)

Step 3: control after exposure

At first no interference by WLAN with the analyzing system-electronics was tested.

Each episode was about 9 min, the electromagnetic WLAN-immission at the head was about  $25\text{-}30 \mu\text{W/m}^2$

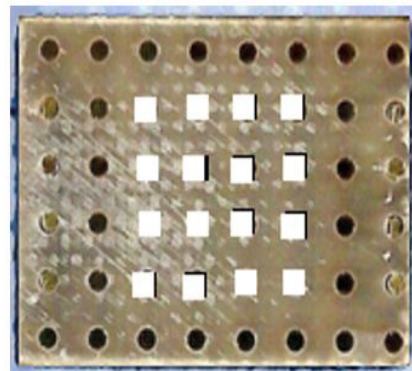
The following parameters were tested:

Electrocardiogram: At ICR-4-position.

Microcirculation was detected at ear-lope measurement with Laser-Doppler-System.

Electromyography (non-invasive-sampling) by a special electrode matrix fixed at lower arm (figure 1).

All data were sampled continuously with a LabView-System by



**Figure 1:** Electrode matrix for EMG; each of the 16 electrodes is connected with the data sampling system.

time-series and frequency analysis (FFT). The test person has no information of WLAN "on/off".

### Results

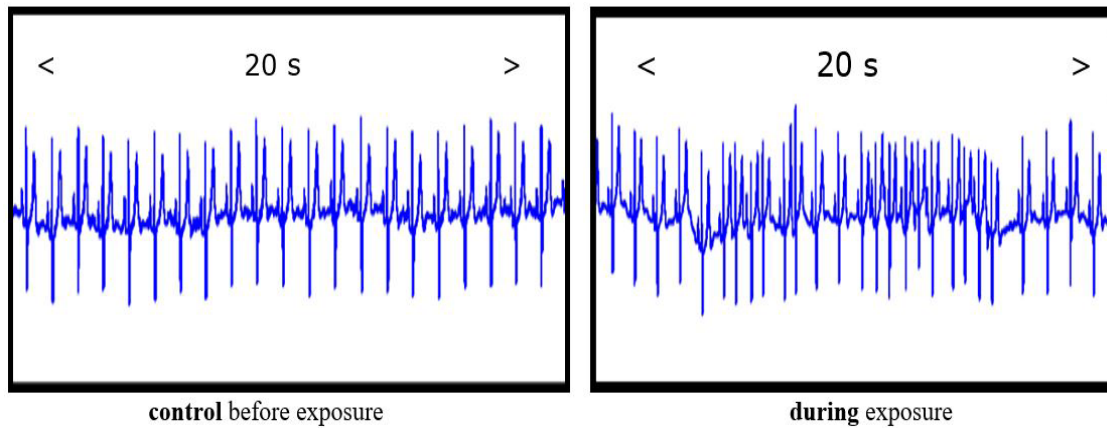
For example, this patient disclaimed health problems like an increased heart rate by WLAN-exposure in office.

### EMG

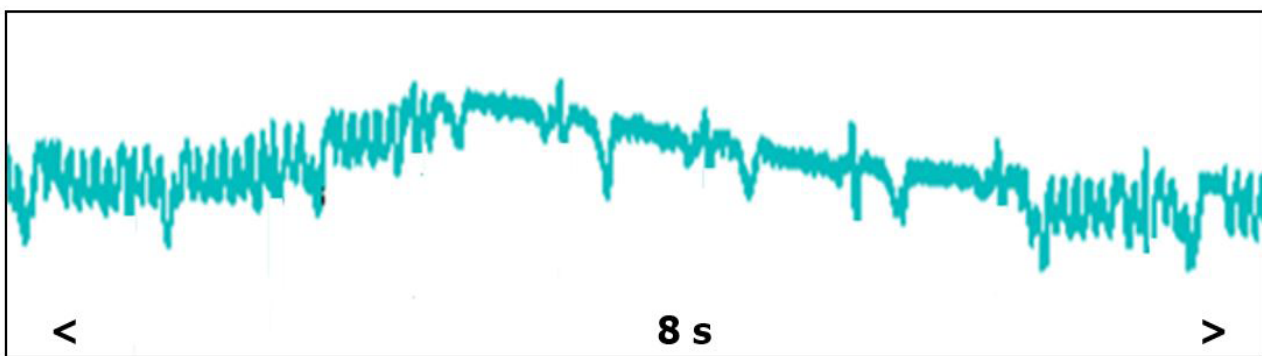
Additionally, EMG detected artificial  $10 \text{ Hz}$ -signals during and after WLAN-exposure.

Furthermore, there was a "bloc" in the microcirculation-activity of skin surface blood-flow, during and after WLAN-exposure.

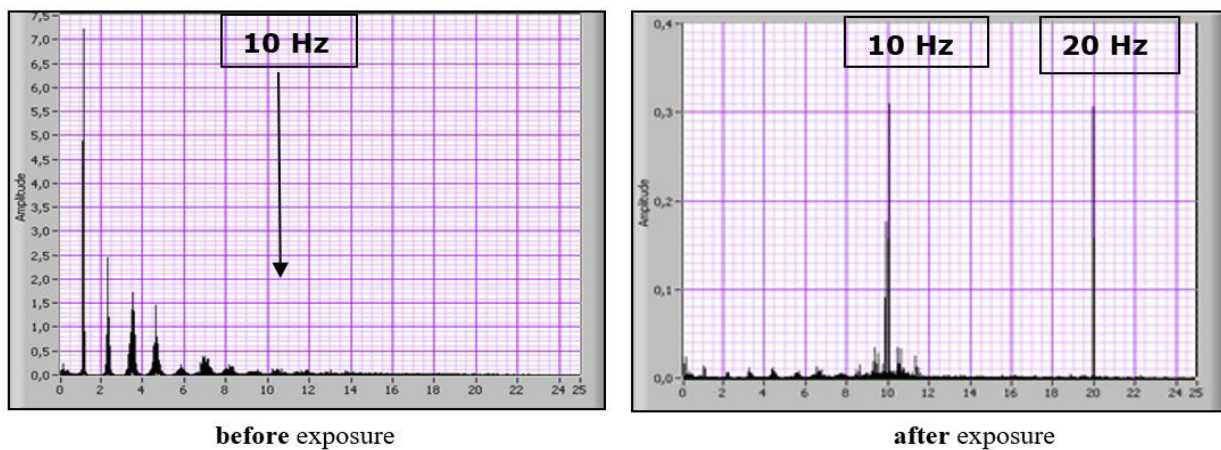
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**Figure 2:** ECG-data during exposure with artificial ECG signals.

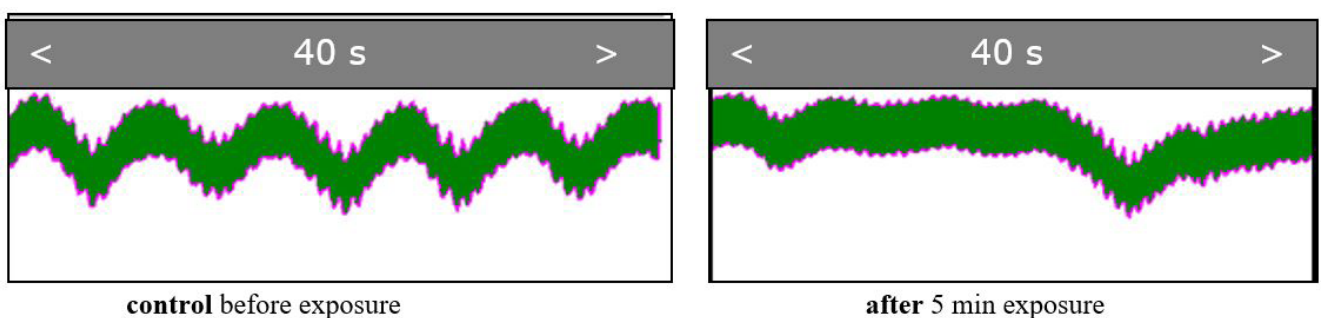


**Figure 3:** EMG after about 5 min exposure.



**Figure 4:** Frequency analysis of EMG by FFT (fast-fourier-transformation). After exposure, there was measured the 10-Hz-signal with the overwave of 20 Hz.

**Microcirculation**



**Figure 5:** Microcirculation before/after exposure. The typical periodicity of “normal” microcirculation is about 7 sec.

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## Discussion

All of these data point to problems in bioregulation of electro-sensitive patients by exposure in electromagnetic field at immission-level several magnitudes lower than given by ICNIRP safety guidelines. Therefore, electrosensitivity is a real clinical symptom. When approached for an explanation of this physical event at these low-energy fields, the ICNIRP replied “no comment”. These effects triggered by EMF-exposures are classified by ICNIRP as ‘psychogenic phenomenons’. On the other hand, in the worldwide medical science it is well known, that artificial signals in EMG point principally to a problem in the whole nervous system. Scientists recognize abnormal EMG readings as pointers towards abnormalities of the central and peripheral nervous system similarly to abnormal ECG readings can point to severe cardiac illness. Therefore, the ICNIRP-guidelines are not suitable in the discussion about bioeffects by electromagnetic field exposures.

## References

1. Levitt, B.B. and Lai, H. “Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays” *Environmental Reviews*. 2010; 18:369-395.
2. Von Klitzing L. Healthy disorders by WLAN-exposure. *J Clin Images Med Case Rep*. 2022; 3(2): 1639