

# Artificial EMG by WLAN-Exposure

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## Abstract

WLAN (wireless local area network) is used as an important worldwide communication-technique. By this, always there is an electromagnetic field exposure. In contrast to the ICNIRP-safety guidelines, whereby no bioeffect is possible by these low-energetic electromagnetic fields, we found artificial signals in the nervous system in dependence on WLAN- exposure.

**Keywords:** WLAN; EMG; Electrosensitivity; Safety Guidelines (ICNIRP)

## Background

By a diagnostic routine of a “burn-out”-patient, additionally claiming an electrosensitivity, there was tested the nervous system by electromyogram (EMG), recording from the lower arm skin surface. As well in the time series as by analyzing the frequency we found an artificial 10 Hz-component as a dominant signal. By the following anamnestic discussion, the patient told about a longtime exposure to active WLAN- equipment in office. Testing other patients using this communication- technique, there was a great number with the same 10 Hz-artifact in EMG. WLAN itself is characterized by a 10 Hz-modulated high-frequency signal. The measured EMG-data demonstrate the conflicts with the ICNIRP safety guidelines for this type of electromagnetic exposures.

Because of these data with artifacts in EMG we tested patients with different healthy disorders by WLAN-exposure.

## Method

The relaxed patients were tested in an HF-shielded lab under following experimental setup:

**Step 1:** Control

**Step 2:** Active WLAN-router

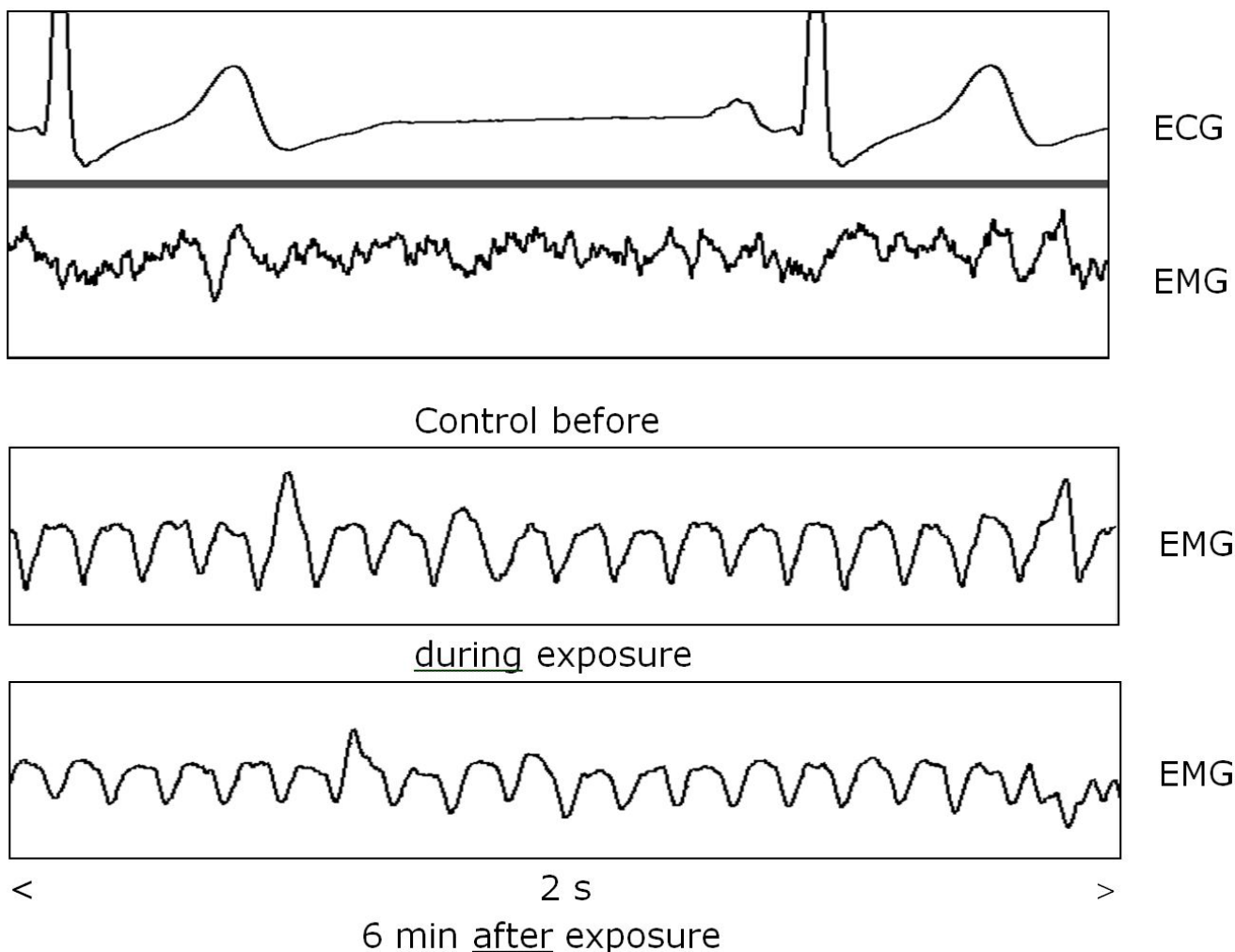
**Step 3:** Control after

Each epoch was about 9 min, the electromagnetic immission by WLAN at the head was about 25-30  $\mu\text{W}/\text{m}^2$ . EMG was sampled by a special electrode matrix fixed at the lower arm skin. The data were sampled continuously by a LabView-System with following frequency analysis (FFT). Additionally the ECG was monitored for time-comparing. The test person has no information of WLAN “on/off”.

It was tested, that there is no interference with the analyzing system during active WLAN.

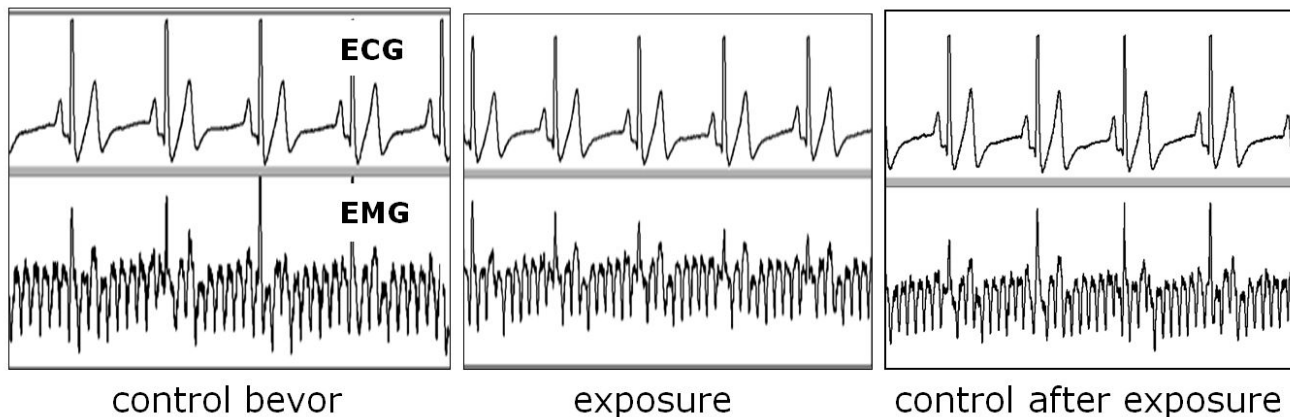
### Results

#### Patient A



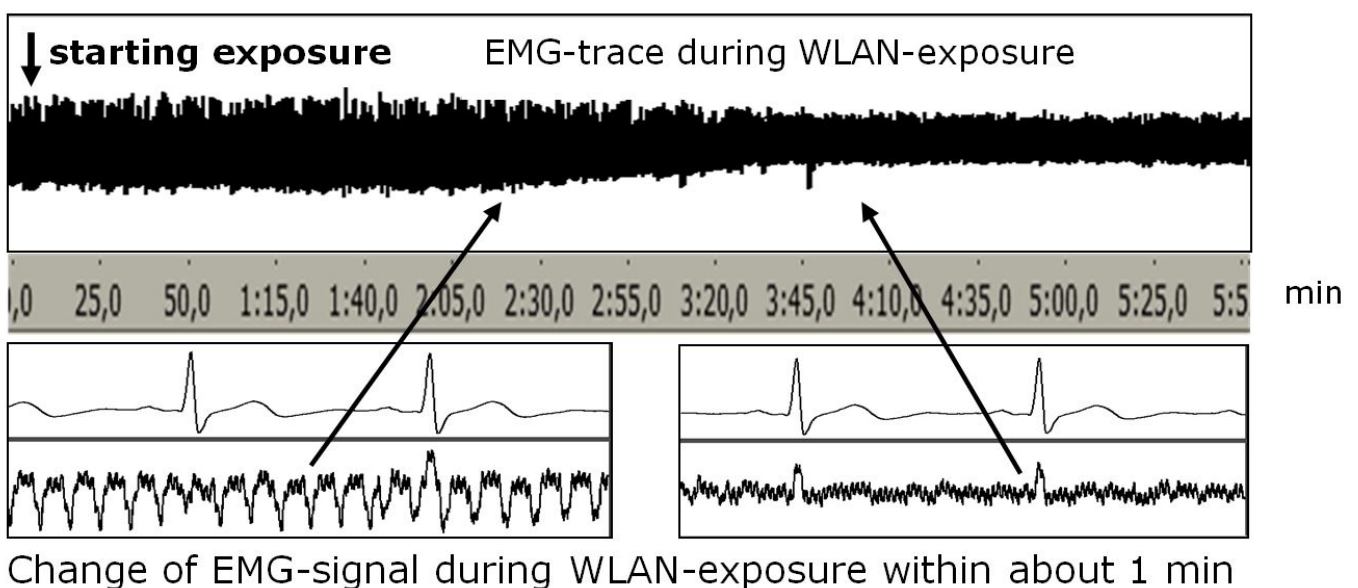
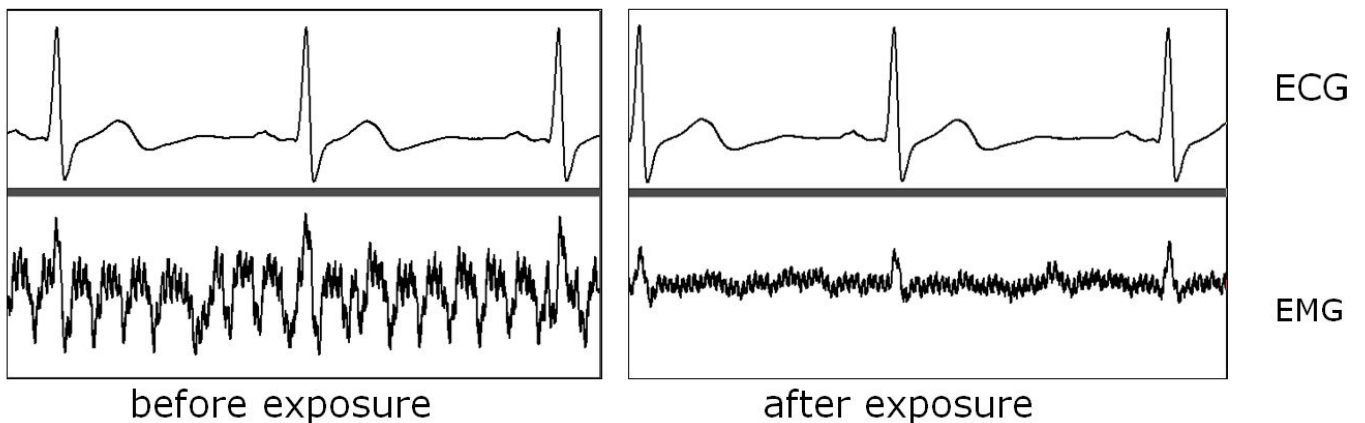
These data demonstrate the 10 Hz-artifacts of EMG-trace during and after exposure. The patient claimed a reaction during exposure like heart troubles. This healthy effect disappears about 20 min after exposure.

#### Patient B



As well in the first control as during and after WLAN-exposure there was monitored an EMG-trace superimposed by a 10 Hz-signal. This patient reported about increasing head-aches during “home-office” activity.

### Patient C



This patient reported about many healthy disorders during working hours in open-plan office. In the control before exposure, there was detected the 10Hz-artifact. In this case, this artificial signal disappears during exposure.

### Conclusions

The influences in EMG during and after WLAN-exposure are obviously depending of the individual biosystem as demonstrated by the different data. That means: there is no uniform effect on EMG by WLAN-exposure. But this effect must be discussed about the consequence of artificial signals in the nervous system and influences on following biofunctions.

The demonstrated data point to the necessary for a new discussion about healthy effects by low-energetic electromagnetic exposures. This especially under the background of WLAN-exposure in "home-office" or in schools by "digital-learning".

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