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The Situation in Germany and

the Experience of Building Biology Professionals

Excerpt: Case History 2 – DECT Cordless Phones and Blood Pressure

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Case History 2: DECT Cordless Phones

Background

Mr. Schmitz, who recently retired and spends most of his time at home, suffers from high blood pressure. He monitors his condition by taking regular blood pressure measurements. In the late afternoon of September 15, 2004, he got an extremely severe headache. A control measurement of his blood pressure read 189/127 so that Mr. Schmitz immediately went to the hospital where he was treated and remained as a patient for six days. His prescribed medication regimen to lower his blood pressure (Acatand 16, Nebilet, Cynt) was maintained; however, additional injections were administered. Within one day, his blood pressure returned to normal and remained within normal range for his entire hospital stay.

The first night after returning home from the hospital, his blood pressure showed a serious increase.

Mr. Schmitz suspected that his roller-coaster blood pressure had something to do with his living environment. He booked an EMF assessment with a building biology professional to have his sleep environment checked for ELF and RF electromagnetic field exposures. When making the appointment, he described the location of his residence as a small side valley of the Central German Uplands. In this area it is almost impossible to get good radio or TV reception and consequently, TV coverage is provided via cable; the feed point is located in a neighboring house that is ca. 100 m (300 feet) away and connects via underground cable. He was not aware of any cell phone base stations in his immediate neighborhood.

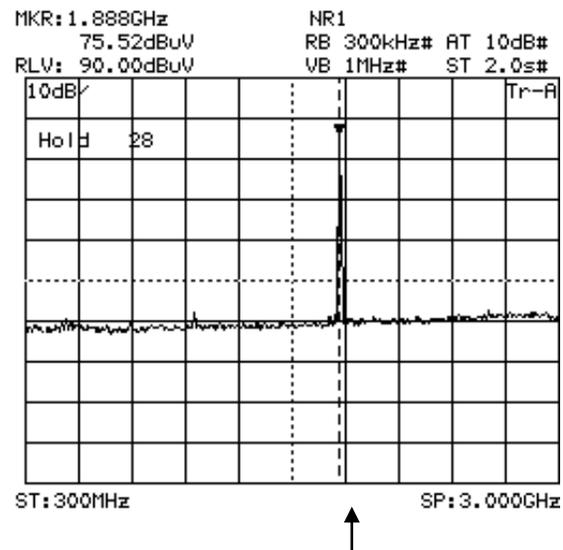
In reply to a direct question concerning DECT cordless phones, however, he admitted that he owns and uses such a device. He complied with a request to disable the DECT cordless phone by unplugging the entire device for the couple of days prior to the day of the EMF assessment.

Exposure Level Testing

Several days later during the on-site visit, Mr. Schmitz indicated that even after unplugging the DECT cordless phone in the living room his blood

pressure remained high. Thus, it would seem very unlikely that the health problem was due to the DECT cordless phone.

However, an RF measurement revealed that there still was a very clear DECT signal present in the house. The power density level in his bed reached $140 \mu\text{W}/\text{m}^2$, which falls within the highest exposure category called “extreme anomaly” ($> 100 \mu\text{W}/\text{m}^2$) according to the reference values for pulsed RF radiation of the *Building Biology Evaluation Guidelines for Sleeping Areas* (SBM-2003¹).



Peak within frequency range of DECT cordless phones

RF measurements across sleeping area:
Overview spectrum 300 MHz – 3 GHz (3000 MHz)

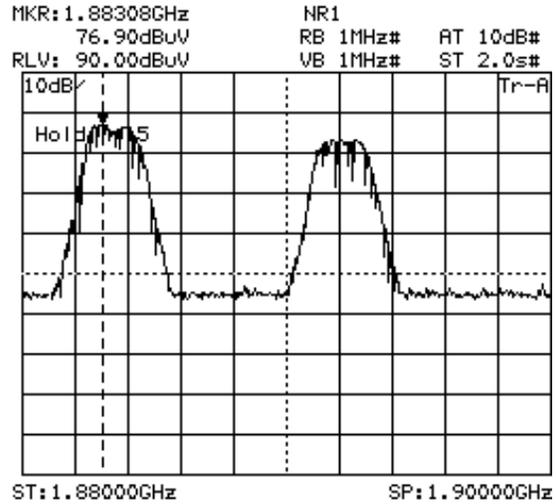
Within the broad frequency range from 300 MHz to 3 GHz, the DECT signal was the only one with a

¹ See more details on the *Building Biology Evaluation Guidelines for Sleeping Areas* in the chapter on the *Evaluation of Exposure Levels of Wireless Communication Technologies* in the Conference Proceedings.

[Translator’s Note: Since the publication of the Proceedings in 2005, the SBM-2003 has been reviewed in 2008. Though the category of “extreme concern” now starts from $1,000 \mu\text{W}/\text{m}^2$, pulsed DECT signals continue to be listed as a “more critical RF” source.]

relevant exposure level that could be shown in the spectrum analysis. There were no other wireless sources detected above the sensitivity level of the measuring instrument such as TV, cell phones, or the like, which is quite rare these days.

Thus, the problem was homemade. But where was the transmitter? The DECT phone in the living room had been disabled, but further testing very quickly revealed that there was a second DECT base station in the house—located in the hallway only two meters away from the living room and close to the bed. This base station was not even connected to the phone network and it only served as charging cradle for a second DECT handset. Mr. Schmitz was astounded to learn that a DECT base station would constantly—and completely unnecessarily—emit RF radiation even if it was only used for charging.



DECT phone in the hallway (left peak) and in the living room (right peak)

RF measurements across sleeping area:
DECT frequency range: 1.880 – 1.900 GH

RF Source	Frequency	Electric Field Strength	Power Density	Anomaly according to SBM-2003	Anomaly Thresholds
Pulsed	MHz	mV/m	$\mu\text{W}/\text{m}^2$	pulsed	pulsed
DECT hallway	1,883.08	230	140	extreme	>100
DECT living room	1,892.08	150	60	strong	5-100

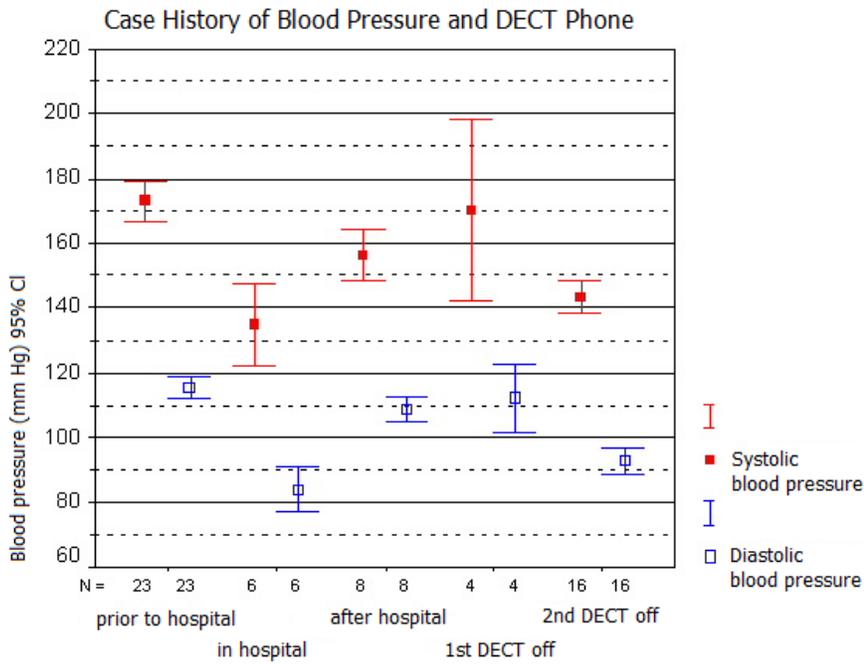
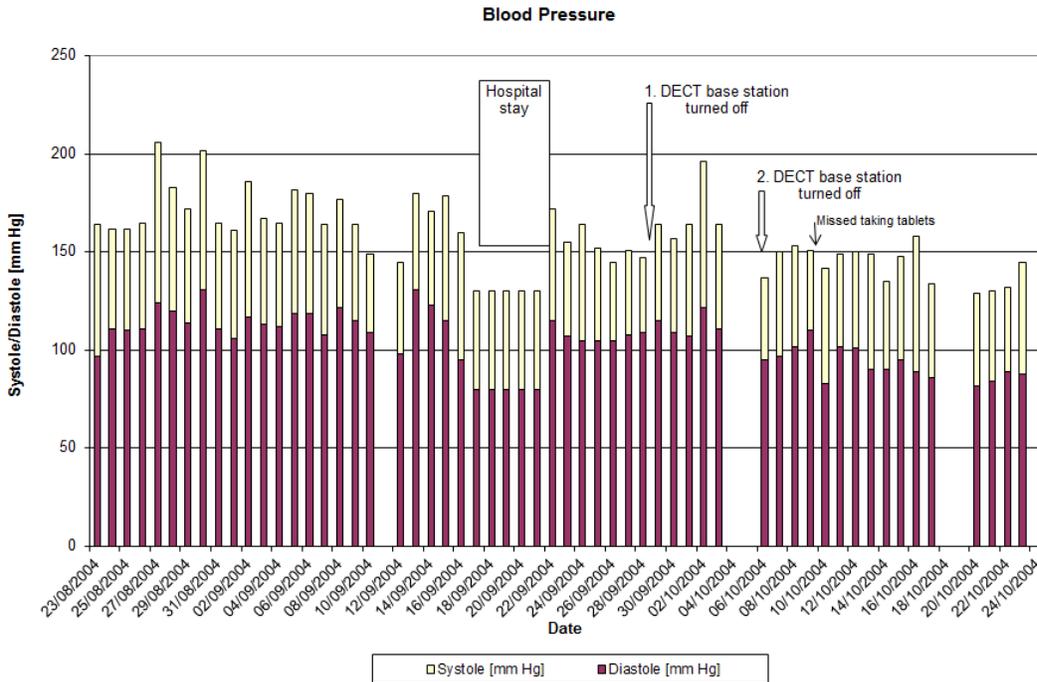
Remediation Measures and Monitoring

Mr. Schmitz was advised to use a wired phone rather than a cordless phone, and if a cordless phone was essential, the DECT cordless phone should be replaced with a cordless phone based on the analog standard CT1+. Base stations of CT1+ phones only transmit RF radiation during a phone call; when not in use, RF radiation is not generated. Furthermore, the RF signal emitted during the phone call is not pulsed.

After the second DECT base station had also been disabled, the Mr. Schmitz' blood pressure quickly returned to normal.

Even more notable than the quick response time, the statistical analysis (based on the common confidence interval (CI) of 95% or the probability value $p < 0.05$, respectively) shows that a significant low-

ering of the blood pressure occurred when all DECT signal emissions were actually eliminated—and not when Mr. Schmitz had mistakenly believed that there were no devices operating. For the analysis, the entire time period was divided into five segments (see horizontal axis of graph). The statistical significance for the 95% confidence interval can be derived from the graph wherever the average value of a time segment is above or below the 95%-end of the vertical lines of another segment to which it is compared.



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This case history impressively illustrates that the favorite argument of the “ICNIRP believers,” which claims that all those physiological effects are based

on psychological factors (in other words, the fear of electrosmog!) won't cut it here.

Detailed information about DECT and CT1+ is provided below [1]. The first and so far only DECT phone “with transmission pauses” called “DECT Light,” which transmits RF radiation only during a phone call—at least as long as a single mobile handset is used—is described here [2].

A current list of CT1+ phones still commercially available can be found here [3].

In this same document, you will also find an extensive list of „good old“ CT1+ phones (not commercially available anymore) listed according to manufacturer; you may still find them at flea markets or popular Internet auctions.

What was said about DECT also applies to Wi-Fi or WLAN (Wireless Local Area Network).



The Wi-Fi base stations, which also emit pulsed beacon signals on a continuous basis, are called access points; they provide the wireless Internet connection between the PC or notebook, respectively, and the analog phone network, ISDN or DSL [4].

Additional Testing

In addition to the RF radiation exposure levels, the ELF magnetic field levels were also measured across the sleeping area. A magnetic flux density of 50 nanotesla (nT) at a frequency of 50 Hz was measured. With the bed area as the baseline reading, the magnetic flux density increases considerably in the following directions:

- Right corner of both exterior walls, to the right toward the footboard
- Ceiling at the right exterior wall.

While tracing the source of this magnetic field, it was discovered that the connection cable of the cable TV runs along here.

The feeder cable enters the neighbor’s house at Talweg 33. An ammeter reading on the TV cable showed a 50-Hz AC stray current of 380 mA, which runs across the cable sheath. After cutting the TV cable where it enters the neighbor’s house, the magnetic flux density in the sleeping area and also directly around the cable dropped to below the sensitivity threshold of the testing equipment (< 5 nT).

Because it is typical for magnetic fields to fluctuate considerably over time, long-term data logging was carried out for several days (TV feeder cable re-connected) in addition to the spot measurements.

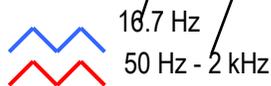
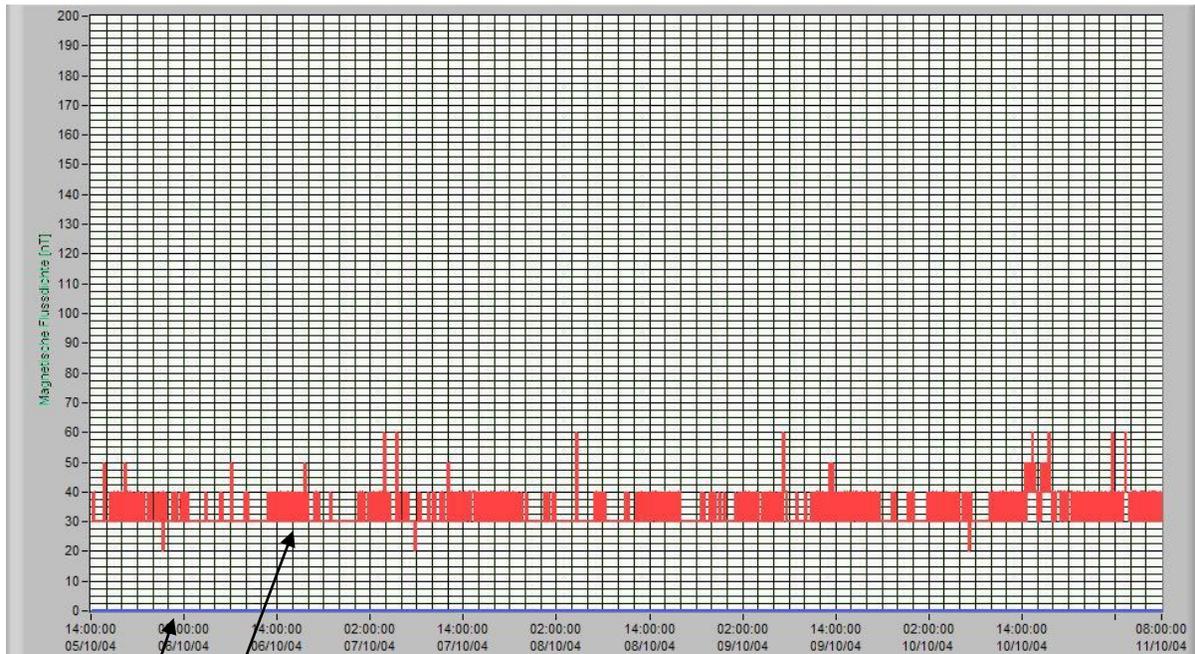
Magnetic fields caused by traction currents were not detected during the long-term data logging.

The 50-Hz magnetic field is very constant. This means that the TV feeder cable—in addition to its own current—does not carry any substantial amount of electricity from other field sources.

To evaluate the exposure situation, the assessment value is consulted. The latter is calculated by adding the value of the standard deviation twice to

the average value in order to consider peak values but at the same time not to overestimate them.

To permanently reduce the magnetic field exposure, a sheath current filter was installed at the feeder connection of the neighbor’s house (late October). Thus, it became possible to disconnect the ELF frequency (50 Hz) of the power grid galvanically while the RF TV signal is still being transmitted.



Long-term data logging :
 05/10/2004, 02:00 p.m. – 11/10/2004, 08:00 a.m.

Statistical Analysis:

Frequency Range	Minimum [nT]	Maximum [nT]	Average (AVG) [nT]	Standard Deviation (σ) [nT]	Assessment Value (AVG+ = AVG + 2 · σ) [nT]	Anomaly According to SBM-2003 (assessment value)
16.7 Hz	0	0	0	0	0	none
50 Hz - 2 kHz	20	60	33	4	41	slight

Lastly, ELF electric fields given off by energized appliances and electric wiring were also measured.

With the installation of a special circuit interrupter (also called a demand switch) at the bedroom circuit in the main panel, the electric field exposure could be reduced from 3 V/m to 0.2 V/m during sleep.

Conclusions:

- Individual health symptoms and serious disease symptoms—in this case high blood pressure—are observed well below ICNIRP-based exposure limits.
- The case history impressively illustrates that the favorite argument of the “ICNIRP believers,”

which claims that all those physiological effects are based on psychological factors (in other words, the fear of electrosmog!) won’t cut it here.

- A holistic approach should be used such as the comprehensive evaluation approach of building biology: other types of fields (ELF, DC fields) must also be included in the assessment.
- The public’s knowledge about “homemade” wireless exposures due to such continuous transmitters as DECT or Wi-Fi is still rather poor. More awareness is needed.
- By substantially reducing exposure levels, the overall health status improves and disease symptoms can even disappear.

Literature

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www.baubiologie.net/docs/elektrosmog-dect_ct1.shtml
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www.baubiologie.net/docs/elektrosmog-DECT-light.pdf, see also
www.bossart-funk.ch
 [Translator's Note: In Europe, there are several zero-emission (in standby) DECT cordless phones available now.
 See also:
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http://www.baubiologie-virnich.de/pdf/DECT_zero.pdf
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[http://www.baubiologie-virnich.de/pdf/SIEMENS_ECO-DECT_ECO-Modus+.pdf\]](http://www.baubiologie-virnich.de/pdf/SIEMENS_ECO-DECT_ECO-Modus+.pdf)
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www.baubiologie.net/docs/elektrosmog-wlan1.shtml