

"White zones", free from mobile phone coverage

– unrealistic or required by law?

Richter am VG a.D. **Bernd Irmfrid Budzinski** (formerly judge at the German administrative court) and **Professor Dr.-Ing. Wilfried Kühling***

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Like in other countries, it is not a negligible number of people in Germany, who respond very sensitively towards the radiofrequency radiation emitted by RADAR, mobile phones and mobile phone masts. Often they seek shelter in basements with low levels of radiation, or in "white zones" (areas in a signal shadow), if their so-called "electromagnetic hypersensitivity" (EHS) has become unbearable. "White zones" are becoming increasingly rare, no other treatment promises success, and those affected are left to their own devices. Therefore, environmental organizations demand that in some places or nature reserves, like near Grenoble in France, "white zones" without mobile phone coverage are maintained or created. One example is the "Weiße Zone in der Rhön" (= a white zone in the German Rhön region - Mainpost of 5 September 2011).

I. Introduction

In the light of a flood of new radio communication networks and sources of radiation, like e.g. "all-round radar" for self-driving vehicles, and an increase in the number of those who get ill because of it in all sections of the population, protected zones are definitely of relevance today: Even the former head of research and development of the mobile phone manufacturer NOKIA meanwhile has become 'electrohypersensitive'.¹ He does not seem to be the only affected insider. After all, "due to experience" his colleagues e.g. keep their children away from radio-emitting devices as far as possible. The most prominent figure among them was Steve Jobs of Apple (New York Times).² Along the same lines the former head of Microsoft/Canada warns against the use of wifi in schools³, just as the president of the Belgian mobile phone

*The author Budzinski used to be a judge at the Administrative Court (Verwaltungsgericht) in Freiburg, Germany. The author Kühling is professor for area and environmental planning at Martin-Luther-Universität, Halle-Wittenberg, Germany, and chair of the scientific advisory council of the Bund für Umwelt und Naturschutz Deutschland e. V. (BUND; the German branch of Friends of the Earth). – For the presentation of the physical and technological basis, the authors want to express their thanks to Herr Dipl.-Physiker (physicist) Dr. Peter Nießen, head of the EMF-Institut für Elektromagnetische Verträglichkeit zur Umwelt (EMF Institute for the Compatibility of Electromagnetic Fields with the Environment), Cologne, Germany, as well as to Bernd Rainer Müller (BUND für Umwelt und Naturschutz Deutschland e. V. [BUND]) for valuable comments and observations.

¹ "I can no longer go to the cinema or stay in public areas with lots of radiation for long ... says Niemelä, who in his forties, must accept that the four walls of his home are now a prison"; Satakunnan Kansa v. 18.10.2014 (in a Finnish newspaper); <http://www.satakunnankansa.fi/Satakunta/1194934030776/artikkeli/entinen+nokiapomo+kannykka+vei+terveyteni.html> translated in: <http://mieuxprevenir.blogspot.de/2014/10/former-nokia-technology-chief-mobile.html>

² "That's because we have seen the dangers of technology first-hand. I've seen it in myself, I don't want to see that happen to my kids" (Anderson); http://www.nytimes.com/2014/09/11/fashion/steve-jobs-apple-was-a-low-tech-parent.html?_r=1

³ Clegg; <http://www.techvibes.com/blog/wifi-in-schools-is-a-potential-health-hazard-2013-05-10->

operator Belgacom did before him⁴. After all, the Swiss mobile phone operator Swisscom even received a patent for the reduction of the "clearly genotoxic effects" of wifi (2004).⁵

Everyone can be affected: In residential areas, where serious nervous and sleep disorders occur, it is no negligible number of people, who fight against mobile phone masts or for a greater distance from the masts with so called mobile phone network plans. In France, a law now legislates the protection of residents, who are irradiated by mobile phone masts in an "uneven" manner, i.e. far above the average.⁶ Furthermore, there are attempts to create an area without mobile phone coverage in each Department for severely affected electrohypersensitive people.⁷ Apart from the Council of Europe (2011), again 194 scientists from 34 countries recently demanded such "white zones".⁸

Nevertheless, in Germany areas without mobile phone coverage or with reduced mobile phone coverage are flatly rejected as unrealistic.⁹ This seems to be short-sighted and also legally not tenable.

II. Starting point

1 It is not even stated that there is no need for areas without mobile phone coverage. Due to unbearable health complaints from the neighbouring mobile phone antennae, for many years countless people have been living in the basements of their houses or even in a caravan in the forest. In 2007 it was 25,000 people, according to – probably very conservative estimates – by the German Federal Office for Radiation Protection (Bundesamt für Strahlenschutz).¹⁰ This figure probably does not include those, who constantly move home, in the search for less radiofrequency radiation.¹¹ The need for action and the volume of the potential for risk in Germany is demonstrated by another 8 million people (10 %), who "suffer silently", but who – when asked – despite the social discrimination which goes with it, call themselves "electrosensitive" (Bundesamt für Strahlenschutz 2012).¹²

⁴ "Les ondes sont dangereuses" ("The waves are dangerous"), Didier Bellens, Südpresse of 25 November 2011 and Trends-Tendances of 17 October 2007; see Diagnose-Funk kompakt of 1 February 2013, p. 5 (in German); http://www.diagnose-funk.org/assets/df_kompakt_2013-01-2.pdf

⁵ Patent no. WO 2004/07583 A1; <http://www.diagnose-funk.org/technik/wlan/swisscom-beschreibt-krankmachende-funktechnik.php>

⁶ Law of 29 January 2015; <http://www.powerwatch.org.uk/news/2015-02-05-france-wifi-restrictions.asp> No wifi in crèches; "as far as possible" only 1 V/m for residents (otherwise the same legal limit as in Germany: 61 V/m).

⁷ http://www.next-up.org/NewsOfTheWorld/Ein_land_fur_die_EHS.php.

⁸ Appeal of international scientists <https://emfscientist.org/index.php/emf-scientist-appeal>

⁹ Reply by the Ministry of Health of Baden-Württemberg to the small parliamentary interpellation (Splett); http://www.landtag-bw.de/files/live/sites/LTBW/files/dokumente/WP14/Drucksachen/5000/14_5113_D.pdf - despite an increasing number of people, who become ill: <http://www.emfacts.com/2006/09/550-will-we-all-become-electrosensitive/>

¹⁰ Lauer, Financial Times Deutschland of 1 August 2008, Weekend 30, pages 1 and 2 ; www.ftd.de/lifestyle/outofoffice/393254.html?mode-print; also Der Standard, Wien, of 9 October 2008 www.derstandard.at/?url=/?id=1577836824337%26sap=2%26pid=11237524

¹¹ The Swiss scientist Rössli commented on the evaluation of the sleep behaviour of the residents in Basel on behalf of the government that some people could "sense" the radiation and would "avoid it for their own protection" and they therefore would "no longer be discovered" or recorded; University of Basel „aktuell“ of 4 October 2010; <https://www.unibas.ch/de-fault/de/Aktuell/News/Uni-Research/Handystrahlen-verursachen-laut-Basler-Studie-keine-Schlafprobleme.html>

¹² Pölzl-Viol, "Bundesamt für Strahlenschutz" dated 22 March, 2012; <http://www.bfr.bund.de/cm/343/elektromagnetische-felder-risikowahrnehmung-in-der-oeffentlichkeit.pdf>, p. 7 (in German): "Perceived health impairments due to EMF: 10 %". - Schmidt, practitioner of environmental medicine (formerly Austrian medical association), in 2015: Even up to 18% are electrohypersensitive (10% of them severely); <http://www.diagnose-funk.org/themen/mobilfunkversorgung/gesundheits-und-elektrosensibilitaet/das-sind-wirklich-krank-leute.php>

2 The attempt on the part of the government to dismiss so many affected people as a "psychological phenomenon"¹³ seems to be equally absurd as the claim that the number of "true" illnesses has not increased in the past years – despite mobile phone radiation. It is not just in surveys that 82% of all Germans "feel" ill (Die ZEIT in 2014)¹⁴, but more and more also take sick leave and undergo medical treatment: Two thirds, among them countless school children,¹⁵ suffer from headaches.¹⁶ Around half the population suffer from sleep disorders¹⁷ and approximately just as many suffer from depressions, including burnouts¹⁸ – an unprecedented state, which has come about within 10 years, during which the level of sickness doubled, which even then was not low.

3 Developments of such epidemic proportions point towards environmental factors: And here it can be assumed that mobile phone radiation is one of the most significant causes, if one looks at the explanatory approaches, which point towards an effect mechanism for health effects and health damage¹⁹ – especially since the doubling of the cases of illness occurred "seamlessly" during the roll-out and upgrade of mobile telephony.

4 Explaining epidemiological illnesses instead with "imagination" also contradicts medical experience. According to that, only 1 to 7% of all Germans at the most ought to be considered as "hypochondriacs" (AOK; German public health insurance).²⁰ Similarly, headaches can hardly arise because of imagination;²¹ therefore the Robert-Koch-Institut expressed a clear concern about the headache epidemic among (school) children.²² Moreover, children – like the vast majority of all Germans – from the start don't expect to become ill by mobile telephony at all.

¹³ Mrs. Stolz, the former health minister of the German region of Baden-Württemberg, said according to Badische Zeitung of 16 October 2009: "This phenomenon ... points to underlying psychological conditions."; <http://www.badische-zeitung.de/suedwest-1/geschuetzte-funkloecher-wird-es-nicht-geben-21108172.html>

¹⁴ Die ZEIT – Wissen - of 8 May 2014, "Imagination, a common illness" (Volkskrankheit Einbildung), page 33; <http://www.genios.de/presse-archiv/artikel/ZEIT/20140508/die-krankheitskranken/14AA6C183F525EAD7164AAC237AED838.html>

¹⁵ Die Welt of 23 June 2011: 4 out of 5 pupils; <http://www.welt.de/gesundheit/article13446609/Viele-Jugendliche-klagen-ueber-Kopfschmerzen.html> (in German); see also Budzinski's comment on the study on children and teenagers in the "Deutsches Mobilfunkforschungsprogramm" (German mobile phone telephony research programme); NVwZ 2010, 1205 (1206)

¹⁶ "SWR Wissen" of 3 February 2015; <http://www.swr.de/swr2/wissen/kopfschmerzen-ein-vielfaeltiges-volksleiden/-/id=661224/did=15006898/nid=661224/1853pek/index.html>

¹⁷ "Jeder Zweite", "Aus dem Takt gebracht" ("Every second person", "Taken out of their rythm"), Die Zeit of 27 March 2010; <http://www.zeit.de/2010/13/M-Schlaf>.

¹⁸ Rasanter Anstieg psychischer Störungen zur Volkskrankheit Nr. 1 (Rapid increase in psychological disorders make it the common illness no. 1); Ärztezeitung (German medical journal) of 14 April 2011 http://www.aerztezeitung.de/politik_gesellschaft/article/650287/depressionen-volkskrankheit-nummer-eins.html and Fehlzeitenreport (and report on rate of absence due to illness) of 2012, AOK (general public health insurance) of 16 August 2012; http://www.wido.de/fzr_2012.html

¹⁹ Desai N. R., Kesari K. K. and Agarwal A. (2009): Pathophysiology of cell phone radiation: oxidative stress and carcinogenesis with focus on male reproductive system, in: Reproductive Biology and Endocrinology, 2009, 7:114. (www.rbej.com/content/7/1/114) and Von Baehr, V. (2012): Efficient laboratory diagnostics for chronic inflammatory system diseases (Rationelle Labordiagnostik bei chronisch entzündlichen Systemerkrankungen); umwelt-medizin-gesellschaft 25 (4): 244-247

²⁰ https://www.vigo.de/de/behandeln/krankheiten/psychische_erkrankungen_1/hypochonder/hypochonder.html

²¹ Schenk, director of the "Zentrum für Integrative Schmerzmedizin" (centre for integrative pain medicine) in Berlin as well as member of the board of directors of the German "Berufsverband der Ärzte und Psychologischen Psychotherapeuten in der Schmerz- und Palliativmedizin" (professional association of doctors and psychological psychotherapists in pain medicine and palliative medicine); <http://www.n-tv.de/wissen/frageantwort/Kann-man-sich-Schmerzen-einbilden-article13381306.html> and Barth, Freiburg University, Badische Zeitung of 18 May 2009, page 23: „Schmerzhaftes Gewohnheiten“ – „Es gibt keine eingebildeten Schmerzen“ ("Painful habits" – "There is no such thing as imaginary pain").

²² Ellert et al., KIGGS; <http://link.springer.com/article/10.1007%2Fs00103-007-0232-8>

Consequently they could not have "imagined" anything to that effect.

5 With such unprecedented and varied 'nationwide epidemics', even on the basis of assumptions, precautionary measures would be justified and called for²³ – also with regard to mobile telephony, which to that effect has been suspected of being a 'secret pathogen' for many years. Even the private specialist association ICNIRP apparently considered electrosensitive people to be in need of increased protection.²⁴ Moreover, the insurance sector with relevant experience already demanded early on: Beyond an "order to minimize", "binding precautionary exposure limits ought to be introduced urgently".²⁵

6 It is well known that for many years all insurance companies have refused to offer insurance against health damage from mobile phone radiation. Along those lines a German health insurance company recommended their customers in 2013, to take precautionary measures themselves, namely to replace the mobile cordless phone "as much as possible", and to prefer cable connections for the internet instead of wifi.²⁶

7 There is no sensible reason, not to take these precautionary measures by giving priority to cable connections, by shielding and through protected zones on a large scale, in order to complement legal exposure limits. Even though all of this will probably not require great effort, nothing is happening. It needs to be investigated, whether there may also be other explanations, apart from suspected ideological reasons, for this inaction:

III. Obstacles to responsible action

Apart from the belief in "purely psychological" effects, the main obstacle to measures of policymakers seems to be a lack of any awareness of danger, due to the alleged "extreme weakness" of the energies, the human body is exposed to ("It is impossible that this will do any harm."). This idea disregards the energies, which are actually applied and it ignores the scientific knowledge up to now concerning the effects of even weak mobile phone radiation. Therefore it needs to be corrected urgently.

1 Along those lines, mobile phone operators and their supporters, and in their wake also government authorities, for years have wrongly spread the assertion that after all mobile phone base stations transmitted with a power of "only 20 watts" ("like a small light-bulb"). This line of argument continues: The radiation hardly penetrated the skin and due to its "weakness",

²³ Along those lines, the German Federal Administrative Court (Bundesverwaltungsgericht), in its ruling of 24 November 2010, BvF 2/05, concerning genetic engineering it pointed to the entitlement of the legislature to limit any risk already at an early stage and comprehensively, due to their "special duty of care", especially in view of a still incomplete degree of knowledge.

²⁴ "Amendment to the ICNIRP directives" of 1998 (on which the legal exposure limits are based), ICNIRP, general approach, 2002, page 546: "Different groups in a population ...may have a lower tolerance (like photo-sensitivity)....Some guidelines may not have adequate protection for certain sensitive individuals..."

²⁵ E+S Rück, "Emerging Risks - Schadenpotenziale der Zukunft" (emerging risks - potentials for harm in the future), 2006, page 46 onwards, 71; <https://www.es-rueck.de/184453/schriftenreihe-nr-10-emerging-risks-schadenpotenziale-der-zukunft.pdf>

²⁶ With a foreword by the chief executive about precaution; Die Continentale BKK; "Mitgliedermagazin Puncto" (magazine for members) no. 2, 2013 | ZKZ 83855 | 64th year; page 3. 10/13: „Elektrosmog | Gesunder Umgang mit Handy & Co.“ ("electric smog | a healthy approach to the use of mobile phones and similar devices"; <http://www.epaper-archiv.de/fkm/puncto/2013-02/#10>

which is not sufficient for ionization, it was anyway unable to trigger any 'biological reactions' in the human tissue. It could at the most be compared to the "pleasant jet of water of a warm shower".²⁷ The 'radiation intensity' of the cosmos and the sun was many orders of magnitude higher. Also analogue radio and television transmitted with a much higher power, without it having an effect on health.

2 Alarming results from the laboratories, by contrast, were – if at all – downplayed as "extreme individual cases" or attributed to the "mobile phones with much stronger emissions" (this was also the response to the cancer warning of the WHO/IARC). Allegedly this does not allow any conclusions concerning the "weak everyday exposure" of the population through 'masts'.

This playing down is based on serious errors. Due to the knowledge we have today, it will even smack of legal negligence in future hindsight. This will be illustrated by the following details:

IV. The potential of non-ionizing mobile phone radiation

Completely independent of psychological influences, which can play a role in every process in life, and also in any illness, for the assessment of biological responses to physical stimuli it is first of all the true energy of the field of radiation that is of relevance, as well as the energies, which actually hit the human being in the form of microwave radiation. Moreover, their position and significance in nature are also relevant.

1 The "20-watt transmitter"

The catchy image of the "weak light-bulb with a power of 20 watts", which is used to describe the power of mobile phone masts²⁸ is inappropriate in several respects. This power rating is even incorrect in absolute terms:

a) In the case of GSM base stations (the classic language-based system of mobile communication) 20 watts only refer to one single channel of the mobile phone transmitter. When running at full capacity, what the base stations are designed for, each of these typically 4 (in individual cases even up to 8) channels receives this power input.²⁹ Thus, the "light-bulb" can reach a power of up to 80 to 160 watts. Moreover, there are also 50-watt GSM transmitters.

b) Furthermore, in the modern mobile communication systems UMTS (3G) and LTE (4G) you regularly find 40 to 80 watts per channel, respectively. Consequently, the power input of each antenna on a 'mast' with 5 systems of mobile communication (GSM 900, GSM 1800, UMTS, LTE 800, LTE 1800) could even in a rough guess add up to several hundred watts. These may

²⁷ Glaser expressed himself along those lines in the Forschungsgemeinschaft Funk - FGF (Research Association on Radio-communications), which is close to the German government: „15 Jahre Forschung über biomedizinische Wirkungen hochfrequenter Felder des Mobilfunks – Eine Erfolgsstory oder eine endlose Geschichte?“ ("15 years of research on the biomedical effects of radiofrequency fields of mobile phone radiation – a success story or a never-ending story?"), FGF, news letter 3/07, page 6; www.fgf.de/publikationen/newsletter2007.html

²⁸ "This corresponds to the power of just ten mobile phones", which "passes horizontally above the neighbours". This is the symptomatic explanation of Gehlen, the mobile phone expert of Deutsche Telekom, which he literally expressed before residents. <http://www.rp-online.de/nrw/staedte/rommerskirchen/t-mobil-keine-gefahr-durch-mobilfunksender-aid-1.140429>

²⁹ <http://www.elektrosmog-messen.de/mobilfunk-eirp.html>

be multiplied further at each site by 3 for each mobile phone operator. Then the total power input of the base station can be up to 1500 watts per sector, instead of "just 20 watts".

For the entire site with typically 3 sectors, consequently there can be a power input of almost up to 5000 watts. Calling even such a site a "secondary base station" in juris-prudence (referring to article 14 of the German construction law = § 14 BauNVO) constitutes the judicial counterpart of a lack of technological knowledge and idea.

c) Moreover, in the case of UMTS and LTE there occurs a turbo-like "charge" to power peaks, which can increase the regular power by a factor of up to 20 (13 dB). Thus, even an individual '20-watt' UMTS or LTE transmitter can – for individual short periods – have a power of up to 400 watts (the so-called crest factor).³⁰

d) That this is nothing negligible, is also demonstrated by the connected load of the base stations, which is designed for a power consumption of around 2000 watts on average per antenna³¹ – even though according to the vague information of the operators a large proportion may be required for the supporting technology.

e) The intensity of the ubiquitous energy, which mainly emanates from mobile phone transmitters, is impressively demonstrated by plans of a large manufacturer. In the future, mobile phones are to be charged through their antennae, by harnessing the electric smog in the air.³² Moreover, the intention to operate mobile phones in this way in the future, even without battery, is proof of the density and consistency of this "ocean of radiation".³³

2 On the true equivalent output power

Comparing a modern mobile phone antenna with a lamp, which sends light all round, or rather merely taking into consideration the power input, basically gives a distorted picture.

a) What is relevant for the potential exposure is the power output, i.e. the energy, which leaves the mobile phone antenna in the direction of those, who get irradiated. And it is to be rated several times higher than that of a lamp, which sends light in all directions. After all, the mobile phone antenna sends its power almost exclusively in a focussed way, like a spotlight, this means not only in a horizontal direction, but even more strongly focussed in the vertical direction (with an opening angle of sometimes considerably less than 10°). Mobile phone transmitters are like "light-houses", the operators explain in another context, with the pur-

³⁰ Virnich, during a lecture at the hearing on the subject of "mobile telephony" in the regional parliament of South Tyrol, Italy, on 29 April 2015, "Technische Aspekte der Mobilfunktechnologien" (technological aspects of mobile phone technologies), pages 2 and 4 (increases are also possible with GSM-EDGE); http://www.diagnose-funk.org/downloads/virnich_mobilfunktechnik_web_bozen_150429.pdf

³¹ Lutz, study of the University of Chemnitz, Germany, in the German computer magazine Chip of 10 May 2007; http://www.chip.de/news/Mobilfunkmasten-sind-extreme-Stromfresser_26396570.html

³² Development by NOKIA: Online news: EE/Times, News & Analysis; www.eetimes.com/electronics-news/4195530/Nokia-working-on-energy-harvesting-handset

³³ „Kommunikationsgeräte ernähren sich von Funkwellen“ (communication devices receive their energy from radio waves) (Ambient backscatter) <http://www.golem.de/news/ambient-backscatter-kommunikationsgeraete-ernaehren-sich-von-funkwellen-1308-100992.html>

pose of reassuring the residents, who live in the "radio shadow", directly underneath the antenna.

b) The energy withheld from the "radio shadow" which is formed in this way, must of course be added to the main beam, in which the radiation is focussed. With this so-called antenna gain one calculates the "equivalent isotropically radiated power" (EIRP), which acts on the main service area of the antenna.

c) Like with a potentially dazzling spotlight, the "equivalent isotropically radiated power" (EIRP) is crucial for estimating the power exposure and getting an idea of it. This is already demonstrated by the fact that the authorization requirements of a radio transmitter are dependent on the EIRP and not on the power input (German law: § 4 I BEMFV: ab „10 W EIRP“). It stipulates, what power a source of radiation that radiates evenly all round (for example a light-bulb) ought to have, in order to cause the same radiation exposure of the residents, as the spotlight-like beam of the mobile phone antenna. For example, for this reason in Switzerland the similar "equivalent radiated power" always needs to be indicated, when applying for building permission.

Concerning the actual radiation exposure in the environment, therefore many mobile phone transmitters with their focussed output power reach thousands up to tens of thousands of watts (EIRP) of transmission power. Thus – if you keep using this illustration – the residents could truly be "dazzled".

d) The security distance of the German site certificate only allows to infer this true (equivalent) power thanks to a table,³⁴ for example in case of a security distance of 15.5 m = 30,000 watts (EIRP) output power for UMTS 2100.³⁵

3 Harmless radio transmitters for radio and television broadcast?

Thus, the further comparison (popular with mobile phone operators) of mobile phone antennae with the hitherto (analogue) transmitters for radio and television broadcasts have also been disproved. It is inconceivable that e.g. a transmitter for television broadcast with the equivalent power of 30,000 watts would have ever been erected and tolerated in a residential area on the roof of a neighbour.

a) Rather in the vicinity of residential areas you only find so-called broadcast relay stations, which are typically only operated with a weaker transmission power than present-day mobile phone base stations. Since the transmission antennae usually also have a lower antenna gain, the radiation exposure of the residents is much lower than with usual mobile phone base stations.

³⁴ "Taking into consideration the emissions of other stationary radio transmitters", which need to be included in the calculation (e.g. transmitters for radio stations) (German law: § 3 BEMFV).

³⁵ Bayerisches Landesamt für Umwelt (Bavarian Regional Authority for the Environment) and Umweltamt Baden-Württemberg (Environmental Authority of Baden-Württemberg), „Elektromagnetische Felder im Alltag“ (electromagnetic fields in everyday life), page 82; https://www.lubw.baden-wuerttemberg.de/servlet/is/6515/felder_im_alltag.pdf?command=downloadContent&filename=felder_im_alltag.pdf

b) Once again, their final impact is in any case by many times smaller, since they were not fitted on rooftops in residential areas, but always outside them.

c) Where large radio and television towers might actually have transmitted with a power of 100,000 watts and more, they were mostly located at a distance of many kilometres, often dozens of kilometres, from residential areas. The fact that the radiation level, which reached the residential areas was not high, is also illustrated by the signal not being strong enough for reception inside buildings. An external receiving aerial had to be fitted on the rooftop, instead.

d) Moreover, in close proximity, i.e. where flats were not so far away and where the radiation "fully" 'penetrated' the buildings, the radio and television waves from the large transmitters were shown not to be "harmless" at all. Around 15 studies provide proof of this.³⁶

An outstanding example is a transmitter of the Vatican, whom the Italian Supreme Court sentenced to compensation because of many cases of childhood leukaemia in the neighbourhood.³⁷ Apart from that, further transmitters with considerable health complaints became noticeable (e.g. Radio Luxembourg, Radio Free Europe (discontinued) and Schwarzenburg (dis-mantled)).³⁸

e) Moreover, already decades ago nervous complaints occurred among radio communication technicians. This was debated under the term "radio sickness". It was radio broadcast, which was the starting point for the later findings concerning 'electrohypersensitivity'.³⁹

4 The dangers of pulsed signals

Furthermore, the radio waves of mobile telephony cannot be compared in their structure to former (analogue) "radio" immissions. Irrespective of the strength of the signal – they are in reality biologically more active, due to their makeup.⁴⁰

a) Like RADAR, they are pulsed (this is true for the GSM network and for TETRA) or they are similarly structured and therefore act as "aggressively", as if they were pulsed from the outset.

³⁶ Warnke, 1. Bamberger Mobilfunk-Ärzte-Symposium (symposium of physicians on mobile telephony) 29 January 2005, Tagungsband (conference compendium) page 9; [http://buergervelle.de/assets/files/bamberg_warnke_manuskript.pdf](http://buergervelle.de/assets/files/bamberg_warnke_manuskript.pdf?cultureKey=&q=pdf/bamberg_warnke_manuskript.pdf)

³⁷ WIK, EMF-Brief of 2 March 2011 and ANSA news agency of 25 February 2011: "Vatican ordered to pay damages for radio electrosmog" www.ansa.it/web/notizie/rubriche/english/2011/02/25/visualizza_new.html_1583011632.html

³⁸ Switzerland. Swiss environmental authority BAFU, current news on 20 August 2014: "Gesundheitliche Auswirkungen von Hochfrequenz-Strahlung" (Health effects of radiofrequency radiation): .. "A statistically significant correlation between sleep disorders and the operation of the ... short-wave radio transmitter in Schwarzenburg. Moreover, there was an increased number of residents in the closer vicinity of this transmitter, who complained about health impairments, such as nervousness, restlessness, general weakness, fatigue and pain in the limbs"; <http://www.bafu.admin.ch/elektromog/01095/01096/index.html?lang=de> and studies in Diagnose-Funk (in German): <http://www.diagnose-funk.org/themen/forschung/schwarzenburg-resultate-doch-noch-publiziert.php>

³⁹ Warnke, 1. Bamberger Mobilfunk-Ärzte-Symposium (Symposium of physicians on mobile telephony), aaO.; footnote 36

⁴⁰ A quote from ICNIRP: "Compared to continuous-wave radiation, pulsed microwave-frequency fields with the same average rate of energy deposition in tissue are generally more active in producing a biological response, ... (ICNIRP 1996)"; ICNIRP Guidelines 1998, German version of the Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (German Federal Ministry for the Environment, Nature Protection and Reactor Security), page 72.

This could be specifically shown with UMTS⁴¹ and it is not unlikely with LTE.⁴²

b) Where analogue television broadcasting stations, which no longer exist today, may also have used a clear pulsed structure (a line frequency of around 15 kHz and an image frequency of around 50 Hz), in the way their power was modulated they were nonetheless different from mobile phone transmitters. The latter show considerably faster changes of amplitude, what reinforces the characteristic of the pulse considerably.

c) After all that has been mentioned, the (non-pulsed) radiation of the sun or the background radiation of the cosmos cannot be compared to mobile phone radiation either. Thus, apart from the main radiation (light and warmth) the only relevant microwave radiation of the sun reaches 0.06 V/m and is only present in the daytime, and the natural non-ionizing background radiation of the cosmos is 0.000014 V/m⁴³ (the German legal limit for mobile phone radiation: 61 V/m).

5 Mobile phone radiation is 'pervasive'

Moreover, mobile phone radiation does not just "negligibly" penetrate the skin.⁴⁴ Much rather, it basically reaches all internal organs and penetrates the brain,⁴⁵ especially since due to the density of transmitting sources, today it comes from all sides – even during the night, all the way into the bedroom.

a) This has intensified with the additional launch of the new LTE (4G) networks and with TETRA, which led to a 50% increase of radiation levels.⁴⁶ Moreover, this just seems to be the beginning of an increase with numerous LTE networks in the future, i.e. LTE 800, LTE 1800 and LTE 2600.

b) In this, the so-called depth of penetration does not describe, where the penetration of the radiation truly ends; it is rather an artificial term. By definition the penetration of non-ionizing mobile phone waves 'ends' at that place in the body, where only 37% of the degressively decreasing initial energy is still present.⁴⁷

⁴¹ Forschungsbericht 2009 der AUVA - Österr. Unfallversicherungsanstalt (Research Report of 2009 of the AUVA - Austrian accident insurance), e.g. on pages 77, 92 and 134; http://www.auva.at/mediaDB/555261_R47.pdf

⁴² The German federal government did without an investigation into the effects of LTE, since this "...in terms of signal shape ... is similar to the UMTS standard ..." (consequently, it ought to have the same effects, at the most), "6. Bericht der Bundesregierung..." (6th Report of the Federal German Government...), page 2; <http://dipbt.bundes-tag.de/dip21/btd/18/037/1803752.pdf> - Study from China of 2014: Significant effects of LTE in the EEG; <http://www.emf-portal.de/viewer.php?l=g&aid=26349> - Thus, possibly in this respect the need for a stricter limit according to the German law § 2 I No. 2 26.BImSchV (German federal regulation for immission protection) for "pulsed" signals ought to be examined.

⁴³ Neitzke, quoted according to Diagnose-Funk, Ratgeber Mobilfunk Nr. 5 für Gemeinden (manual no. 5 on mobile telephony for municipalities), 2nd edition, 2015, page 45.

⁴⁴ Moreover, the skin itself could be damaged, since its protein expression gets changed; the Finnish radiation protection authority "STUK", Karinen, Leszczynski et al. - www.stuk.fi/stuk/tiedotteet/en_GB/news_481/_print/ - The current rapid increase in skin cancer seems to confirm this; <http://www.tagesspiegel.de/weltspiegel/barmer-gek-arztreport-zahlen-fuer-hautkrebs-steigen-in-deutschland-stark-an/9429866.html>

⁴⁵ In fact sheet no. 193, page 2, the WHO confirms that "in the internal organs" a ("negligible") heating effect is produced, thus the mobile phone radiation actually reaches the whole body; <http://www.who.int/mediacentre/factsheets/fs193/en/>

⁴⁶ 6. Bericht der BReg (6th Report of the German Federal Government), aaO., page 9; <http://dipbt.bundes-tag.de/dip21/btd/18/037/1803752.pdf>

⁴⁷ <http://www.pueschner.com/basics/eindringtiefe.php>.

c) The remaining radiation of more than one third continues its path through the human body and generally it penetrates it completely, in no way different from its penetration of e.g. walls. This is all the more the case, since the transmission power is deliberately increased throughout Germany by a factor of 100 (20 db), so that the walls of any house are penetrated (even several times).

V. Conclusions

1 The lack of awareness of danger, as if radiation could not do any harm to (the inside of) our bodies, is therefore in no way justified: It is not just "a warm shower", which "pleasantly" envelopes people, and radio transmitters, which – comparable to "small light-bulbs" – spread weak energies. Instead, according to all indications we are exposed to an artificially created new condition for existence, which is com-parable to 'forces of nature'. Thunderstorm-like "discharges of energy", of a kind and in frequencies which the earth has never seen before,⁴⁸ truly create a brazing climate of a new electromagnetic kind (Art. 20a GG). They hit us with a non-stop staccato. In individual cases, even a 'mere' 20-watt UMTS transmitter can send "flashes" through us with power peaks of the equivalent of 40,000 watts.⁴⁹

2 Mobile telephony according to this is a "high-risk" technology, which cannot be insured⁵⁰. With its unpredictable, subtle biological resonance it seems to be able to at least contribute to the emergence of the current 'epidemics'. After all, apart from e.g. oxidative stress⁵¹ with observable DNA and sperm damage, mobile phone radiation waves "always" trigger nervous effects.⁵² This has not just been proven in the EEG with mobile phones, but also with signals (of equal intensity), which are similar to those of mobile phone antennae.⁵³ As far as their immissions in everyday-life are relatively speaking weaker (by a factor of 50 to 100), than those of mobile phones,⁵⁴ this is no proof of their harmlessness. For no lower limit of effect has been identified so far, below which an absence of nervous influences and other effects can be guaranteed.

⁴⁸ Exceptions are possibly transmitters for analogue television broadcast, whose intensity is considerably lower.

⁴⁹ See Virnich, aaO., footnote no. 30

⁵⁰ Most recently by Swiss Re 2013: "Höchstes Risiko" neben NANO- und Chemotechnologien (The "highest risk" along with nano technologies and chemical technologies); <https://de.nachrichten.yahoo.com/rückversicherer-stuft-mobilfunkstrahlung-als-höchstes-risiko-ein-swiss-00000254.html>

⁵¹ 93 (of 100) positive studies, meta-study of July 2015, Yakumenko et al.; <http://www.ncbi.nlm.nih.gov/pubmed/26151230> - classification by WHO/IARC 2011: Radiofrequency radiation is potentially cancerogenic (Category 2B)

⁵² BAFU 2011, "Nichtionisierende Strahlung – Umwelt und Gesundheit – Programmsynthese Nat. Forschungsprogramm NFP 57" (non-ionizing radiation – environment and health – programme synthesis of national research programme NFP 57), page 49: "The exposure to radiofrequency electromagnetic fields always led to an increase in performance ... in the non-REM sleep-phase"..... "both in the case of mobile phones and with signals similar to UMTS mobile phone antennae"..; <http://www.nfp57.ch/files/downloads/NFP57-d.pdf>

⁵³ "Zukunftstaugliche Mobilfunknetze" (Mobile phone networks that are fit for the future), Swiss Federal Council of 25 February 2015, page 2: "Proven sufficiently according to scientific criteria is an impact on the brain waves."; <http://www.bakom.admin.ch/dokumentation/gesetzgebung/00512/04869/index.html?lang=de>

⁵⁴ Oberlandesgericht (Higher District Court) Frankfurt, judgement of 28 November 2000 (Urt. v. 28.11.2000 - 8 U 190/00), page 5: "... 50 - 100fach niedrigeres elektromagnetisches Feld als ein Handy in 2, 2 cm Entfernung" (an electromagnetic field which is 50 to 100 times lower than that of a mobile phone at a distance of 2.2 cm) and Kuster, NFP 57: "100"; <https://www.youtube.com/watch?v=NIrcvPXylzc>

Quite the contrary, mobile phone frequency waves apparently can have an effect largely independently of their intensity,⁵⁵ i.e. in a non-linear way.⁵⁶ Thus it is really probable that mobile phone base stations, which impact day and night, influence the central nervous system and trigger epidemic-like effects in the population, not any differently from mobile phones, which send "strong" signals for short periods. All the more, as this is reported thousands of times – based on epidemiological studies concerning mobile phone transmitters – and half the population actually suffers, i.e. 82% feel ill.

3 These are compelling reasons to take measures of defence and precaution. Therefore the question of "whether" to take action is not at the "broad discretion" of the government⁵⁷. Something that is proven to "always" have an effect requires attention, even without knowing a 'mechanism of effect'.⁵⁸ Legally, the mere prima facie evidence of a pathogenic effect is already sufficient, since there is an immediate risk, millions are affected, the damage can be enormous, and a priority for cable connections as well as the creation of protected areas would neither impair the availability of the mobile phone networks in general, nor would it require an unreasonable effort.

VI. Measures for protection and precaution

1 Effective precaution and protection demand the reduction in exposure. It has to start either at the source of radiation (antenna/emission source) or with the irradiated party (location of immission) (= the 'how' of precaution). Other equally effective measures of protection cannot be identified.

2 Even after the revision of the 26th Bundesimmissionsschutzverordnung (German Federal Regulation on Immission Protection) of 2013, the permitted emitted transmission power has remained at the same level without any changes (legal limits) and is to stay that way (regardless of what science will still find out!)⁵⁹. Therefore, protection and precaution – as long as there is no judiciousness for a further revision – can only be taken on the part of those affected. The "far-reaching discretion" of the 'how' is therefore confined to this approach.

3 Therefore, it is now the obligation of the government, in case of need to take those affected to a place of protection – by creating "protected spaces", i.e. through shielding or 'evacuation'. Moreover, their participation in civic life is to be made possible through (partly) radiation-free

⁵⁵ Naziroglu M, Akman H (2014): Effects of Cellular Phone - and Wi-Fi - Induced Electromagnetic Radiation on Oxidative Stress and Molecular Pathways in Brain, in: I. Laher (ed): Systems Biology of Free Radicals and Antioxidants, Springer Berlin Heidelberg, 2014, 106, S. 2431-2449 (2435): " ..neurological damage ... found 150 - 200 from a mobile phone mast. ...,the weakest fields are the biologically most harmful."

⁵⁶ Slesin " .. niedrige Dosen wirkungsvollere Tumorförderer" ("... low doses are effective promoters of tumours), micro-waves-news, 2015; http://www.diagnose-funk.org/downloads/df_microwave_news_krebsfoerderung-durch-mobilfu.pdf

⁵⁷ Nur das „Wie“ (Only the question as to "how") – according to Voßkuhle, President of the Bundesverwaltungsgericht (Federal Administrative Court of Germany) in NVwZ 2013, 1 (4)

⁵⁸ Just like that also the UVP-Gesellschaft (German Environmental Impact Assessment Association) in its fundamental review on the risks and dangers caused by EMF: Kühling, W.; Hornberg, C. (2014): Nichtionisierende Strahlung (non-ionizing radiation). In: UVP-Gesellschaft e.V. (German Environmental Impact Assessment Association), AG Menschliche Gesundheit (Hrsg.): Leitlinien Schutzgut Menschliche Gesundheit (Human Health (editor): Guidelines for Human Health as an Interest to be protected), Hamm, 122-137

⁵⁹ Prof. Caroline Herr on behalf of the SSK (German commission for radiation protection): "We may continue doing research, but nothing is to be changed about the exposure limits"; merkur-online dated 5 July 2012, <http://www.merkur-online.de/aktuelles/bayern/streit-mobilfunk-strahlung-landtag-2379152.html>

public buildings and public transport. For example the medical association of Baden-Württemberg also regards this as necessary,⁶⁰ trade unions in France demand this,⁶¹ and at the headquarters of the Chamber of Handicrafts (Handwerkskammer) in Ulm, Germany, this has already largely been implemented.⁶²

4 There is a special need for protection concerning places of residence (Art. 8 I, European Convention on Human Rights (ECHR)). The mobile phone coverage inside places of residence must no longer be enforced from the outside with a transmission power, increased by 100 times specifically for the purpose, in order to penetrate walls. For this so-called indoor coverage is neither permitted nor necessary, and not at all with a dozen mobile phone networks at the same time. Every resident can equip themselves autonomously – as far as this is individually desired – with domestic radio transmitters, as it is already the case with wifi or repeaters.⁶³

5 This means that residential areas with "metered doses of radio communication" are to be created or rather are to be permitted through urban development planning,⁶⁴ in which the general mobile phone coverage is confined to the outside (similar to the "St. Galler Modell" (St. Gallen Scheme) in Switzerland with wifi – outdoors).⁶⁵ At the same time, inside people's homes (private) FEMTO cells could ensure signal coverage. All the more, this will be necessary, since modern buildings, which are increasingly shielded with insulating double-glazed windows, require a higher transmission power, in order to be penetrated.

6 An internal autonomous provision by the user with all mobile phone services transmitted via cable or domestic indoor radio communication in residential areas does not contradict the 'freedom of communication and business'. At issue is only the way of proceeding, but not the permission of communication. From the point of view of the laws, regulating urban planning in residential areas, which require protection with regards to immissions, the adherence to a certain way of proceeding can be reasonably expected, as in the past the duty to mount jointly-used TV aerials on the roof or instead a connection via cable.⁶⁶

⁶⁰ <http://www.aerzteblatt.de/nachrichten/60302/Aerztekammer-Baden-Wuerttemberg-raet-zur-Zurueckhaltung-beim-Mobilfunk>

⁶¹ CGT, CFDT, FO, SUPAP, UCP: « ..doivent exister des lieux publics et des lieux de travail qui protègent les personnes électro-hypersensibles et ne les excluent ni de la vie professionnelle, ni de la vie sociale » (... there is a need for public places and workplaces, which protect electrohypersensitive people and don't exclude them, neither from professional life, nor from social life); http://www.robinstoits.org/Ondes-electromagnetiques-Le-CHSCT-vote-l-application-de-la-loi-Abeille-dans-les-espaces-jeunesse-des-bibliotheques_a2316.html

⁶² <https://www.xing.com/communities/posts/ihk-ulm-laest-ih-gebaeude-gegen-mobilfunkmasten-abschirmen-1004648674>

⁶³ You already find a similar article in "Technology-Review" of 19 October 2009 "Das funkende Heim" (the transmitting home) - <http://www.heise.de/tr/artikel/Das-funkende-Heim-821397.html> - and at <http://www.heise.de/mobil/artikel/Mini-Basisstationen-verbessern-Handy-Telefonate-790519.html>

⁶⁴ Compare BVerwG Urt. (judgement of the German Federal Administrative Court) of 17 December 2013 - 4 A 1.13 - (on extremely low frequencies): .."Die Belastung mit elektromagnetischen Feldern auch unterhalb der Grenzwerte ist in der Abwägung zu berücksichtigen." ("The exposure to electromagnetic fields, also below the legal limits, is to be taken into consideration.")

⁶⁵ Diagnose-Funk Brennpunkt of 15 January 2015: http://www.diagnose-funk.org/assets/df_229_bp_stgallen_150114.pdf

⁶⁶ Another example is the connection to the gas grid with the prohibition of your own heating systems.

7 The 'supply mandate for mobile communication' for 'surface areas' (Art. 87f Grundgesetz (Basic Law for the Federal Republic of Germany))⁶⁷ only applies – if at all – where cables don't reach, and consequently it ends at the front door of private residences, especially since indoors a universal landline service is guaranteed by law (in German so-called "Universaldienst"). – In any case, there cannot be a binding mandate to "provide" mobile phone coverage forcibly into private residences, whose owners or residents may not want to be provided with immissions through the walls of their properties at all.⁶⁸ Also in these cases the basic obligation of the protection of residents by the state has priority, especially with regard to their places of residence, which are strongly protected by Article 8 I ECHR. This protection is by no means negligible, since the risk concerning the nerves, cancer and fertility⁶⁹ is much greater and not just a "residual risk" (what otherwise German jurisprudence demands before it may be neglected).

8 Also outside, 'gaps in the provision' are permitted in principle, as far as property or planning laws stand in the way of the 'irradiation'. Mobile phone operators are no public-interest parties. Moreover, they do not hold any legal powers for seizures. Mobile telephony is not part of the (obligatory) 'universal service'. Just as little as the legal exposure limit the 'supply mandate' at least does not stipulate, who may be irradiated and where. Instead, its only stipulated target is that everywhere, where otherwise no other laws contradict it, a 'comprehensive' (i.e. consistent all over the country) service is to be provided as far as possible. The 'gaps in coverage' in a mobile-phone free zone for the protection of the health of those who permanently live there, some of whom are severely ill, can therefore be reasonably expected to be tolerated by visitors, just like the inconvenience of a car-free zone.

9 Complaints from impaired neighbours of mobile phone antennae must no longer be dismissed with a reference to their allegedly "insignificant particular sensitivity", as long as no alternatives in mobile-phone radiation free zones or zones with controlled levels of mobile phone radiation are available. The question is who will have to "give way". The decision on this question requires alternatives – thus alternative locations for transmitters or alternative locations, where the neighbours can move to.

10 If neither shielding is sufficient nor moving to an alternative residence is possible (and if there is also no alternative location available for the mast), then in individual cases also the immissions are to be reduced (e.g. in France to 1 V/m as far as possible), so that shielding measures can be effective. If necessary, for reasons of public security and order, and also directly due to Art. 2 II 1 of Grundgesetz (The Basic Law of the Federal Republic of Germany), the injured person is entitled to be accommodated in an area free from mobile phone radiation, which might possibly need to be created.

⁶⁷ No guarantee according to Art. 87 and following of Grundgesetz (Basic Law for the Federal Republic of Germany), Administrative Court (Verwaltungsgericht) of Baden-Württemberg, judgement of 28 May 2015 (VGH B-W., Urt. v. 28.5.2015 – 8 S 634/13 -), pages 18 – 20.

⁶⁸ Budzinski, "Von der Versorgung ohne Auftrag zur Bestrahlung ohne Gesetz" ("From the provision without mandate to the irradiation without a legal basis"), NVwZ 2011, 1165 (1170)

⁶⁹ See Budzinski/Hutter "Mobilfunkschäden Ansichtssache? – Höchste Zeit für Beweise statt Vermutungen" (Is damage from mobile phone radiation a matter of opinion? – It is about time to deal with proof instead of assumptions); NVwZ 2014, 418 m.w.N.

VII. Result

The demand for "white zones", free from mobile phone coverage, is not "unrealistic". We have a legal system and a system of values that are oriented towards the principle of precaution. Therefore, the obligation of the government to protect urgently demands the creation, or at least the permission of zones without mobile phone coverage or where the level of mobile phone radiation is controlled in order to protect the interior of private residences, as well as public spaces and public transport. Moreover, the minimization and avoidance of mobile phone radiation and the shielding against it are a law of humanity – and also of reason⁷⁰.

⁷⁰ This is also what the president of the GSMA Association (the worldwide association of GSM mobile phone devices) said concerning the WHO warning against brain tumours ("Will people who use their mobile phone a lot, be warned?"): "Certainly ... this is also a question of common sense" ("questione di buon senso"); RAI Italian television, "Fuori Campo", of 21 November 2011, verbatim record, page 23.