

ICNIRP 2020 guidelines do not protect against harmful health effects

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ICNIRP 2020 guidelines do not protect against harmful health effects
Appendix to the
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In the judgment in summary proceedings to stop the roll-out of 5G, it appeared that the judge, like the Dutch state, fully relied on the exposure guidelines of the ICNIRP . That is striking since there is really a lot to criticize.

Dr. Leendert Vriens, physicist and former Philips Research Fellow, has written an extensive commentary on these guidelines from the ICNIRP. This comment is also attached to the summons of the summary proceedings that the Stop5GNL Foundation conducted against the Dutch state. All parties have therefore been able to take this information.

Given the great importance that the government attaches to these ICNIRP guidelines, we place the full article by Dr. Leendert Vriens below, so that everyone can determine for themselves whether it is wise to blindly sail on these guidelines.

Summary of comments on the ICNIRP 2020 guidelines

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) circulated new guidelines for exposure to electromagnetic fields (EMF) in March 2020 as a prepublication. According to ICNIRP, these guidelines are intended to protect people from the adverse health effects of radio frequency EMF in the frequency range of 100 kHz to 300 GHz. This includes all wireless communications, including 5G. As far as field strengths and radiation intensities are concerned, these guidelines do not differ from those from 1998 and therefore offer no protection.

After the first five introductory pages up to p. 37, the guidelines refer only to thermal effects caused by 6 minutes and 30 minutes of exposure to radiofrequency EMF. Those times are defined somewhat more clearly in ICNIRP 2020 than in ICNIRP 1998, but that is of no further importance. Both guidelines concern short-term exposure.

Only in Appendix B, from p. 37 until the end of the guidelines on p. 43, a few more scientific publications on non-thermal biological long-term effects have been mentioned, discredited and not included in determining the guidelines.

This has ignored virtually all of the thousands of peer-reviewed scientific publications demonstrating such non-thermal biological long-term effects. Some of these effects, which occur at field strengths and radiation intensities below and far below the ICNIRP 2020 guidelines, are harmful to health. The ICNIRP guidelines therefore, contrary to what is claimed, do not protect against harmful health effects.

In view of the great financial interests of the telecom industry and governments, it is obvious to conclude that the orders of magnitude too high ICNIRP 2020 guidelines are only intended to prevent any obstruction to the roll-out of wireless communication applications in general and of 5G in particular.

Preface

In March 2020, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) issued a prepublication of the new guidelines (1) for exposure to electromagnetic fields (EMF) from wireless communications. These guidelines would be intended for:

“the protection of humans exposed to radiofrequency electromagnetic fields (EMFs) in the range 100 kHz to 300 GHz”.

This appendix addresses the question of whether “humans” are actually protected by these guidelines and was added to the summons in the Kort Geding (2) that was sent to the court on 25-02-2020, before the prepublication of the ICNIRP 2020 guidelines. At the end of this appendix, special attention is given to 5G.

ICNIRP 1998

In the Netherlands, the guidelines published by ICNIRP in 1998 have so far been applicable (3). These should guarantee the health of citizens as long as the field strength or radiation density remains below the guidelines. In reality, they only take into account acute harmful thermal (heating) effects caused by short-term exposure to said electromagnetic fields (EMF) and not long-term harmful effects caused by non-thermal biological processes in which heating of our body or parts thereof is negligible . For clarification, we quote from (3):

“Only established effects were used as the basis for the proposed exposure restrictions. Induction of cancer from long-term EMF exposure was not considered to be established, and so these guidelines are based on short-term, immediate health effects such as stimulation of peripheral nerves and muscles, shocks and burns caused by touching conducting objects, and elevated tissue temperatures resulting from absorption of energy during exposure to EMF. In the case of potential long-term effects of exposure, such as an increased risk of cancer,

ICNIRP concluded that available data are insufficient to provide a basis for setting exposure restrictions,... ”

The letter of 16 April 2019 sent to the President of the Dutch House of Representatives and signed on behalf of the Government by the Secretary of State for Economic Affairs MCG Keijzer and the Minister for Medical Care and Sport, BJ Bruins, states (4) that the Dutch exposure guidelines are based on, and we quote,

"scientifically established effects that may occur during or shortly after exposure."

All long-term effects are therefore excluded.

Non-thermal biological effects have now been demonstrated in thousands of peer-reviewed scientific publications, also for EMF exposures below and well below the Dutch (ICNIRP) guidelines. Heating of our body or parts thereof is negligible. Several of those effects are harmful or potentially harmful to our health, especially in the long term. In the subpoena (2), on pp. 38 to 45, references are given to scientific (review) articles in this field.

ICNIRP 2020

The ICNIRP 2020 exposure guidelines are in the frequency range of 10 MHz to 300GHz, which includes all wireless communications, equal to or wider than those in ICNIRP 1998. The main subpoena commentary on the ICNIRP 1998 guidelines - based on the publications mentioned in the subpoena and other scientific studies - was that those ICNIRP guidelines are many orders of magnitude too high. This is due to the fact that the harmful effects of non-thermal biological effects have not been included in the determination of the guidelines.

That comment applies in full and to a greater extent to the new ICNIRP 2020 guidelines, non-thermal biological effects have still not been included, despite the thousands of scientific publications published since 1998, demonstrating the harmfulness or potential harmfulness of those effects . All arguments discussed in the subpoena therefore remain applicable.

In the following we will discuss some specific points regarding ICNIRP 2020.

1. Long-term effects

Page 2 of ICNIRP 2020 starts with the text:

"The main objective of this publication is to establish guidelines for limiting exposure to EMFs that will provide a high level of protection for all people against substantiated adverse health effects from exposures to both short- and long-term, continuous and discontinuous radiofrequency EMFs."

The difference with ICNIRP 1998 is that it gives the impression that long-term effects are now included. However, in the main body of ICNIRP 2020 and in Appendix A, the term “long-term” does not occur once and in Appendix B four times, with in all cases a denial of the existence or the harmfulness of these “long-term” effects. In more detail:

1a . Cognitive functions

Appendix B on 37 of the 43-page text - states:

"In summary, there is no substantiated experimental or epidemiological evidence that exposure to radiofrequency EMFs affects higher cognitive functions relevant to health."

In reality, there are many scientific publications showing that these radiofrequency EMF do influence cognitive functions. First of all, we refer to the TNO report (5) from 2003, in which the influence of GSM and UMTS-like fields on subjects was specifically investigated. From the summary we quote:

"From our research it is concluded that our hypotheses to find no relation between presence of RF-fields and the measured parameters is rejected. We have found statistically significant relationship between UMTS-like fields with a field strength of 1 V/m and an effect on the Well Being. Further, from the cognitive tasks, it is observed that a number of significant effects is found ”.

At a field strength of 1 V/m, a factor of 60 below the ICNIRP 1998 guideline, and thus with a radiation intensity of a factor of 3600 below the ICNIRP guideline, statistically significant effects on well-being and cognitive performance were already found.

In the relevant parts of the first BioInitiative report from 2007 (6) and the update of that part from 2014 (7), an extensive literature review can be found on neurological problems caused by “cell phone radiation”, including cognitive effects. Prof. Lai, the author of these articles, also analyzed the difference between the studies financed by the telecom industry and the studies financed by independent bodies. In (6) reference is made to 23 studies of cognitive effects. Biological effects were identified in 13 of these. Of the 10 no-effect studies, 6 were fully and one partially funded by the telecom industry.

1b. National Toxicology Program and Ramazzini research

Two large-scale studies - from the US National Toxicology Program (NTP) and from the Ramazzini Institute, where the subpoena referred to on pp. 42 and 43 - have been brought down in ICNIRP 2020 without sound arguments. The qualifications used are:

“ inconsistencies”, “important limitations” and “ insufficient statistical methods”.

All this, however, without even a single specification of what these imperfections would consist of. Especially in the case of the NAP study, an external committee of specialists was set up to check all measuring procedures and results on the spot, precisely in view of the

importance of the study. That committee tightened up the final conclusions because, in their opinion, the authors / researchers had formulated the results too cautiously.

The relevant comments in ICNIRP 2020 cannot be otherwise viewed as discrediting investigators and researchers who come up with undesirable scientific results for industry. Such practices are known from other areas where economic interests also play a major role.

EMF Committee of the Dutch Health Council

Professor Kromhout, chair of the EMF committee of the Health Council of the Netherlands, in Telegraaf (8) emphasized that the NTP investigation was '*a breakthrough*'.

"You see that certain groups try to explain that away. But they are well-executed studies. "

Kromhout calls it '*very special*' that the ICNIRP standards '*have received so much say in Europe*'. And he states, very carefully, that just looking at heat is not enough.

"If you see that under the level of 1 degree warming, which ICNIRP maintains, all kinds of effects do occur, you have to go a step further at some point."

1c and 1d. Unspecified long-term studies and auditory nerve cancer

The third reference to "long-term" refers to long-term studies that, according to ICNIRP, would have been too short and would not have given consistent results. None of these studies are specifically mentioned. The relevant paragraph only refers to a study by Martin Rössli, member of the ICNIRP. The fourth reference concerns the only publication in the three bibliographies with a "long-term" in the title. That publication is about the relationship between "acoustic neuroma" (cancer of the auditory nerve) and mobile phone use. On cancer we come back in pp. 6 and 7.

2. Guidelines based on denial of non-thermal biological effects

After introductory chapters on procedures and an explanation of the parameters and units used, intended for readers who are not at home in this area, ICNIRP 2020 starts at p. 5 on substantive topics.

The first mentioned on p. 5 are "nerve stimulation" and "permeability of cell membranes" . The further article shows that these topics did not play a role in establishing the ICNIRP exposure guidelines for the frequencies from 10 MHz to 300 GHz, which includes all wireless communications. We limit ourselves to that frequency range in our comments.

On pages 5 - 9 only temperature effects are discussed: "steady-state temperature rise", "body core temperature", "local temperature" and "rapid temperature rise".

Pages 9 - 21 discuss the drafting of the ICNIRP 2020 guidelines which are laid down in tables (2 - 9). From the text and from the captions of these tables it appears that only temperature increases caused by short (6 or 30 minutes) exposure to radio frequency EMF have been

taken into account for the realization of these guidelines. All harmful long-term effects are again excluded. These non-thermal biological effects, described in thousands of scientific publications, have been ignored or discredited.

Two appendices have been added to the main body of ICNIRP 2020

Appendix A (pp. 21 - 36) provides information on modeling the energy absorption caused by the EMF and the temperature increases caused by it. This modeling does not provide information about the non-thermal biological effects that should be involved in determining the guidelines. As mentioned, the threshold values of the harmful effects caused thereby are many orders of magnitude lower than those caused by thermal effects.

Appendix B (pp. 36 - 43) is entitled: "Health risk assessment literature". In this part, a number of topics are treated very selectively. We will illustrate this selectivity with a few examples.

Cancer

At the end of ICNIRP 2020 (p. 42) it is stated:

"In summary, no effects of radiofrequency EMFs on the induction or development of cancer have been substantiated."

This is in contradiction with the aforementioned NTP and Ramazzini studies and is also in contradiction with the studies by Lerchl et al. (9) and Tillmann et al., mentioned on p. 41, wherein:

"Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans"

has been confirmed according to the above title and the contents of their papers.

WHO and IARC-WHO

In Appendix B, the only reference to the WHO is to a non-scientific "WHO progress report" (10) in which only organizational matters are discussed. There are however three much more relevant scientific IARC-WHO publications, written by a working group of 31 scientists from 14 countries, all specialists in this field. (IARC stands for International Agency for Research on Cancer, the WHO subdivision dealing with everything related to cancer.)

The collaboration in the said working group has led to:

(i) The classification in 2011 of radio frequency EMF of wireless communication as possibly carcinogenic to humans (11) (class 2B), the same class in which DDT, leaded petrol and chloroform are classified.

(ii) A scientific article in The Lancet Oncology (12) which states, among other things, that children are at extra risk from radiofrequency EMF loads.

(iii) A 430-page IARC-WHO monograph (13), published in 2013, concluding in chapter 6:

“There is limited evidence in humans for the carcinogenicity of radiofrequency radiation. Positive associations have been observed between exposure to radiofrequency radiation from wireless phones and glioma, and acoustic neuroma. ”

This confirms the classification in class 2B referred to in point (i).

There is also a leading update from 2018 (14), containing the following “Highlights” :

- Increased risk of brain, vestibular nerve and salivary gland tumors are associated with mobile phone use.
- Nine studies (2011–2017) report increased risk of brain cancer from mobile phone use.
- Four case-control studies (3 in 2013, 1 in 2014) report increased risk of vestibular nerve tumors.
- Concern for other cancers: breast (male & female), testis, leukemia, and thyroid.
- Based on the evidence reviewed it is our opinion that IARC's current categorization of RFR as a possible human carcinogen (Group 2B) should be upgraded to Carcinogenic to Humans (Group 1).

All this information has been completely ignored in ICNIRP 2020. Scientifically speaking, this is not permissible.

In Appendix B, many other topics are discussed in a similar one-sided way. We will discuss one of these, “fertility, reproduction and childhood development” (pp. 40-41). The final ICNIRP conclusion is:

“In summary, no adverse effects of radiofrequency EMF exposure on fertility, reproduction, or development relevant to human health have been substantiated.”

This conclusion completely contradicts what has been reported in the relevant part of the BioInitiative report (15). The “Conclusions” therein:

“Though causal evidence of one or more mechanism (s) are not yet fully refined, it is generally accepted that oxidative stress and free radical action may be responsible for the recorded genotoxic effects of EMFs which may lead to impairments in fertility and reproduction. Free radical action and / or hydrolytic enzymes like DNAase induced by exposure to EMFs may constitute the biochemical actions leading to adverse changes in hormones essential in males and female reproduction, DNA damage, which in turn causes damage to sperm motility, viability, and sperm morphology . Such exposures are now

common in men who use and who wear wireless devices on their body, or use wireless-mode laptop computers. It may also account for damage to ovarian cells and female fertility, and miscarriage in women (ELFEMF at 16 mG intermittent exposure). ”

Such substantive scientific information cannot be found in ICNIRP 2020 and is also completely ignored there. That too is scientifically unacceptable.

5G

The rollout of 5G in the Netherlands was discussed in detail in the subpoena (2). It has been argued that insufficient attention has been paid by the State and research has been done into the adverse health effects of a national 5G network. The correctness of this has been confirmed by Prof. Kromhout, chairman of the EMV committee of the Health Council, who has stated that no research has been conducted into the health effects of 5G for the higher frequencies (3.5 - 3.8 GHz and above). In the USA, it was also confirmed in a “Hearing of the US Congress” by the Federal Communication Commission (FCC), following questions from Senator Blumenthal, that no research has been conducted in this frequency range.

The writ of summons has already substantiated (points 47 - 49) that with the use of 5G the radiation intensity will be increased and that additional health problems can be expected as a result.

There are two other important problems with regard to the radiation intensity and its effect on health. The first is that the range of radiation is considerably reduced at higher frequencies and that the radiation is disturbed and absorbed much faster by obstacles and rain. The increase in the radiation intensity is necessary to extend the range and to partially compensate for disturbance effects.

Also, at higher (5G) frequencies, the depth of penetration of the radiation (EMF) into our body becomes smaller, see table 10 in (1). With the same radiation intensity, the absorption of the radiation in the skin is increased proportionally because this radiation is absorbed in a smaller volume (smaller depth). Together with the already higher 5G intensities this gives a double increase in absorption in the skin and just below it, so that additional problems are to be expected, how serious cannot be predicted given that no research has been done yet. The roll-out of 5G can therefore be seen as a large-scale experiment with uncertain results regarding the extent to which the health problems of the population will be worsened.

A salient detail is that the Dutch House of Representatives sent a request for advice to the Dutch Health Council on 5-11-2019 to issue advice based on current scientific insights about possible health risks in relation to 5G (16). So only in November last year while 5G has been in development for years and huge amounts of money are involved in the rollout. The Government has never even asked the Health Council for such advice, while publications about the harmfulness of the EMF (or radiation) of wireless communication are known for

decades and information has been sent to the Government and the House of Representatives for many years.

Conflict of interest

In several publications, members of the private organization ICNIRP have been accused of conflicts of interest and links with the telecom industry. In one review publication (17), Prof. Hardell - oncologist and member of the IARC-WHO working group responsible for the class B classification of RF radiation - provides inside information about the relationships between ICNIRP, WHO and the telecom industry and about the differences between the WHO and the IARC-WHO, the latter organization being more independent. For further information about the conflict of interest, we also refer to (18).

It should also be noted that the telecom industry works closely with governments and that governments have major financial interests in the telecom industry. Therefore, governments cannot be seen as independent in this area either. Nor does the Dutch EMV Knowledge Platform, which was funded by the government, the telecom industry and energy companies in the years 2014 to 2019.

In six court cases in Italy (19), it has been confirmed by judgment that the brain tumors of employees, who had to make long-term mobile calls because of their work, were caused by that mobile phone use. In their judgments, the judges gave less weight to the studies of the defense, mainly paid by industry, than to the studies of independent researchers. Less weight was also given to studies by members of ICNIRP and SCHENIHR because of “conflicts of interest”. Similar judgments, recognizing cell phone use or other long-term radiation exposure from wireless communications as the cause of brain tumors or other physical complaints, have also been made in Spain, France and Australia.

Other subjects

In the above, we limited ourselves to commenting on the ICNIRP 2020 guidelines. This only provides limited insight into the entire area.

For more information about scientifically proven harmful non-thermal biological effects, i.e. when exposed under the ICNIRP standards, we refer to the summons on pp. 38 - 45 independent investigations. It has shown, among other things: the formation of reactive radicals, single and double breaks in DNA, the formation of micronuclei, the formation of stress hormones and the permeability of the blood-brain barrier, which allows toxic substances to penetrate into the brain.

For information about measures taken in other countries, as in the subpoena, we refer to the Compilation (20) and to a selection of some of the most important items therein with additional information (21). The subpoena gives more information on these measures on

pp. 45 - 50, as well as on the fact that no insurance company insures health damage caused by the EMF of wireless communication.

So far it has been made clear that the ICNIRP 2020 guidelines, as well as those from 1998, are orders of magnitude too high. The question can be asked which standards should then be used. There are the still valid older Russian (Eastern Bloc) standards that were known in the West as early as 1976 (22). With regard to field strength, these standards are a factor 10 stricter than the ICNIRP guidelines, while radiation intensity is a factor 100 stricter.

The difference with the ICNIRP guidelines is that the Russians took into account the long-term effects already known to them at the time. This concerned experiences with radar operators and military research with radio frequency fields. Post-1998 studies found that with pulsed signals, such as those used for wireless communications, the guidelines would need to be revised down by about a factor of 10. But that does not explain the even more than a factor of 1000 stricter SBM guidelines for the radiation intensities, drawn up by construction biologists, doctors and scientists. SBM stands for "Standard der Baubiologisch Messtechnik" .

The latest version of the SBM guidelines dates from 2015 (23). This takes into account the experiences of electro-hypersensitive (EHS) persons, namely that many people have no or little trouble with the radio-frequency EMF for a long time, but then after an sometimes years-long cumulative exposure can become EHS with orders of magnitude increased sensitivity. Such an effect is also known with some allergies.

Finally, for the layman in this area, a few clarifying explanations about misconceptions that are going around:

a) It is claimed that the photons of the RF radiation (EMF) do not have enough energy to cause damage to our body. That is quite correct, but that is not the point. We are not dealing with single photons (wireless communication would not be possible), but with gigantic numbers of photons that vibrate in the same way, with the same frequency, the same phase and the same polarization, and together make the EMF. With an EMF with a field strength of 1 V/m, which occurs regularly, 10^{21} photons pass per second through an area of 1 m². The resulting EMF penetrates into our body and can cause damage. This is the simplest explanation, reality is more complicated.

b) It is said that the sun's radiation is much more intense than that of wireless communication and that the latter therefore cannot cause any damage. In the middle of a sunny day, the intensity (in mW/m²) of the sunlight is indeed a factor of 1000 to 10,000 or more higher than that of the EMF of wireless communication. But that is not the point. The photons of the sun do not work together and do not emit an electric field at all, unlike the EMF of wireless communication. For a further explanation see (24).

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