



EUROPEAN COOPERATION IN THE FIELD OF SCIENTIFIC AND TECHNICAL RESEARCH  
**ACTION 281: POTENTIAL HEALTH IMPLICATIONS FROM MOBILE COMMUNICATION SYSTEMS**

<http://www.cost281.org>

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your letter of  
2003-01-10

your sign

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Lei

date  
2003-01-15

Ref.: CENELEC's Disagreement with COST Action 281's Watchdog Report statement

Dear Mr. Parlevliet,

Peter Wintlev-Jensen forwarded me your comment disagreeing with COST Action 281's Watchdog statement

***"... some CENELEC product standards (e.g. EN 50366 for household appliances) ... are going beyond ICNIRP'S recommendation and misuse public exposure limits for limiting the emissions of single sources ..."***

I would like to comment on your points (which are cited in bold italics) as follows:

***1. "1999/519/EC limits have been copied from ICNIRP general public."***

ICNIRP's recommendations limit the overall EMF (ELF) exposure and by their nature are **not adequate** to be used as limits for emissions of single sources for the following reasons:

- 1999/519/EC (ICNIRP) limits do allow non-neglectable environmental field levels. Therefore, CENELEC's assumption that environmental fields can be neglected (now and in the future) is not justified for uncontrolled situations.
- To allow use of overall exposure tolerance for single sources would impair marketing of other existing devices intended to be used simultaneously with or close to these sources.
- For the future it is expected that both environmental field levels and simultaneous use of electrical appliances will increase. To allow use of overall exposure tolerance for single sources would impair future marketing of additional products and the implementation of new technologies.

Product-related emission limits by their nature should not make full use of 1999/519/EC (ICNIRP) exposure limits but leave tolerance for other sources and future development. Exceptions should be restricted to controlled conditions only, and be based on the analysis of the possible presence and relevance of additional fields and on adequate user information on the restricted conditions.

It does convey the wrong signal to manufacturers to make full use of overall exposure limits for single products or even exceed limits. In contrary, manufacturers should be encouraged to make minimisation of emissions a design criterium, following the advice of COM 2000(1) regarding the precautionary principle and recognising the fact that even weak ELF magnetic fields of only 0,4 $\mu$ T which CENELEC considers as noise level have recently been classified by IARC as possibly carcinogenic to humans.



**2. “It is indeed very adequate to use 1999/517 EC exposure limits as emission limits”**

Apart from the above mentioned general considerations, the **misuse** of overall exposure limits for limiting emissions of single household appliances is even less justified from a scientific point of view because of the following reasons:

- It is one of the characteristics of household appliances (and general electric tools) to be used in an uncontrolled environment and by laypersons.
- The standard does not even include a recommendation to check whether the environmental fields can be neglected or to restrict the use to quasi field-free conditions.
- In fact, there already are cases such as dwellings close to power lines, or situations such as private use of a tool in close vicinity to a power transformer where environmental field levels cannot be neglected.
- In particular, in a household it is common to use more than one electric appliance simultaneously and closely together such as cooking (with **all** heating units active), baking, mixing and having the oven overhead ventilator(s) and several lights close to the working place switched on.
- Many household appliances are (and are allowed to be) used also occupationally, for instance in a kitchen of a restaurant where simultaneous use of other electrical devices is even more pronounced.

**3. “It is indeed very adequate to use 1999/517 EC exposure limits ... on operator distance.”**

The chosen approach can not be considered adequate because of the following reasons:

- COST Action 281 is well aware of the fact that for practical reasons measurements may need to be taken in some distance. However, extrapolation to closer distances or adequate reduction of reference levels would be applicable anyway.
- Providing protection behind a person rather than at its very position is not a good argument neither for risk communication nor for selling products.
- Article 2 of directive 73/23EEC does not restrict protection neither to the operator nor to a certain distance and hence demands protection to any person at any (accessible) distance. Therefore, protection is required in all accessible regions and, for better clarity, irrespective of the duration of exposure.

*For example, for an iron the standard requests compliance with the overall exposure limits only at 50 cm distance. Even in regard to the user this does not represent a worst case scenario (which could be the use by a visually handicapped person holding her/his head close to the iron), and ignores that other persons like a child watching her mother might come (with its head) significantly closer than 50 cm to this appliance. Besides this, it is not uncommon to use hand-held tools at closer distances from the body (or the central nervous system) than 30 cm.*

- Proposed compliance distances are not appropriate for several reasons:
  - they do not account for interpersonal variances both in terms of body size and habits of use;
  - they do not reflect the worst case scenarios - one of the basic principles in safety technology in general and in ICNIRP’s considerations in particular.



**4. “When measuring in average household surroundings ... (CENELEC observes) field levels of 0,4 – 0,6  $\mu$ T at 50 Hz. At other frequencies hardly anything is measurable.”**

This is not a convincing argument because:

- Argumentation using averages is a pitfall: The average temperature in Europe is rather convenient, however, requires protection at certain places and/or certain periods of the year, anyway.
- Protection should not be based neither on (time or spatial) average field levels nor on average situations but on situations that can reasonably be expected to exist or to develop soon. As already mentioned, even now environmental exposure situations with non-neglectable field levels exist, and a further increase can be expected in the future.
- The argument ignores higher field levels in (non-average) positions such as closer to field sources and simultaneous operation of other appliances.

**5. “Levels like this (0,4 – 0,6  $\mu$ T) fall in the average instrument noise band ...”**

CENELEC might not be aware that there are ample devices on the market intended to measure environmental fields in the ELF range with significant better performance and at modest prices.

**6. “There is a large safety factor within ... (ICNIRP’s general public exposure limits) .”**

This argument ignores several things:

- “safety factors” do not justify to exceed given limits at all;
- ICNIRP’s “safety factors” account only for existing uncertainties of knowledge upon which the recommendations are based. They do not at all provide an additional safety margin that allows ignorance of limits.

Although otherwise claimed, the requirements of EN 50366, as they are now, do allow **excess** of 1999/519/EC (ICNIRP) limits by a manifold because of the following reasons:

- Although the nominal frequency range of the standard is claimed to reach up to 300 GHz, requirements extend to 400 kHz only.
- In the frequency range above 400 kHz, appliances are deemed to comply without testing (neither by the manufacturer nor by anybody else), hence any emissions above 400 kHz are considered negligible (§4.2.1). This assumption might be true for appliances which committee had in mind, but not necessarily for all devices presently being on the market. Even if this would be true, it could change very rapidly with new innovative developments being introduced on any given day.
- It is required that market surveillance should allow 25% excess of limits (§ 4.3.2).
- The formula for line spectrum evaluation (§4.2.4.3) allows a considerable excess of limits since it uses the geometric summation of weighted contributions (each less than one). This is a clear **violation** of ICNIRP’s linear summation formula.
- In most cases, measurement conditions are far from worst case thus allowing excess of exposure limits by a manifold.

*For instance, hotplates or hobs are tested with one unit active only; hand-held or hand-guided tools and other appliances are tested under no-load conditions, etc.*

- If reference levels are exceeded in spite of this easements, compliance with basic restrictions may be checked by using a procedure which is neither validated nor is its accuracy



limited or even defined, thus allowing an uncontrolled excess of limits. Examples for this are:

- replacement of the real source by an “equivalent” rotationally symmetric field from a circular coil derived from crude approximation (without any accuracy criterium) to the measured field distribution spatially averaged by use of a 2-cm diameter coil;
- simulation of extended or multiple sources such as heating mats or multi-hotplates by one single circular coil source producing rotational symmetric fields is a very crude approach;
- determination of the radius and distance of the “equivalent” coil source by an ambiguous selection (without any accuracy criterium) based on one approximated parameter (Table C1);
- selecting one's own choice of the “equivalent” coil source distance significantly influences the simulated exposure of the body model thus leading to a possible significant underestimation of intracorporal densities;
- determination of a “coupling factor” uses the recommended conductivity 0,1 S/m which is at least half the value as chosen by ICNIRP; this reduces the reference value by at least a factor 2.
- Determination of a limit-reducing “rescaling factor” to account for the relation of the intracorporal current density (in the CNS) and external magnetic field level is foreseen with a simplistic unverified homogenous model without specifying spatial resolution or accuracy. This can result in considerable underestimation of induced current densities. It is already known that a decrease of spatial resolution (increase of voxel size) can lead to underestimation of more than a factor 2.
- On the one hand, the field distribution which should be simulated by the equivalent coil is measured at the site of the central nervous system (footnote Table A1), on the other hand, the distance of the equivalent coil to this reference is measured from the model surface away from the body (Fig. D4) instead of across the body (in compliance with the situation of use). This results in a significant lower “rescaling factor” allowing also considerable excess of limits.

COST Action 281 recognises the need for regulations amending whole body exposure limits and accounting for exposures to inhomogenous fields, however, the approach made by CENELEC (not only, but in particular in EN 50366) is such that content and spirit of 1999/519/EC (ICNIRP) recommendations are missed.

I hope the given arguments will explain why COST Action 281 still holds the statement made in the Watchdog Report 2002 as cited above.

Yours sincerely,

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*Chairman COST Action 281*