Il portale nazionale per la protezione dagli agenti fisici nei luoghi di lavoro (PAF)
Modena 7-8 marzo 2012

La nuova direttiva europea sui campi elettromagnetici: lo stato dei lavori

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DIRETTIVA 2004/40/CE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO

del 29 aprile 2004

sulle prescrizioni minime di sicurezza e di salute relative all'esposizione dei lavoratori ai rischi derivanti dagli agenti fisici (campi elettromagnetici) (diciottesima direttiva particolare ai sensi dell'articolo 16, paragrafo 1, della direttiva 89/391/CEE)

Articolo 13

Recepimento

1. Gli Stati membri mettono in vigore le disposizioni legislative, regolamentari e amministrative necessarie per conformarsi alla presente direttiva entro il 30 aprile 2008. Essi ne informano immediatamente la Commissione.

Direttiva 2008/46/CE

Articolo 1

All'articolo 13, paragrafo 1, della direttiva 2004/40/CE, il primo comma è sostituito dal seguente:

«1. Gli Stati membri mettono in vigore le disposizioni legislative, regolamentari e amministrative necessarie per conformarsi alla presente direttiva entro il 30 aprile 2012. Essi ne informano immediatamente la Commissione.»

CAMPI MAGNETICI STATICI

GUIDELINES ON LIMITS OF EXPOSURE TO STATIC MAGNETIC FIELDS

International Commission on Non-Ionizing Radiation Protection*

Health Physics April 2009, Volume 96, Number 4

Table 2. Limits of exposure[a] to static magnetic fields.

Exposure characteristics	Magnetic flux density
Occupational[b]	
Exposure of head and of trunk	2 T
Exposure of limbs[c]	8 T
General public[d]	
Exposure of any part of the body	400 mT

[a] ICNIRP recommends that these limits should be viewed operationally as spatial peak exposure limits.

[b] For specific work applications, exposure up to 8 T can be justified, if the environment is controlled and appropriate work practices are implemented to control movement-induced effects.

[c] Not enough information is available on which to base exposure limits beyond 8 T.

[d] Because of potential indirect adverse effects, ICNIRP recognizes that practical policies need to be implemented to prevent inadvertent harmful exposure of persons with implanted electronic medical devices and implants containing ferromagnetic material, and dangers from flying objects, which can lead to much lower restriction levels such as 0.5 mT.

"It is recommended that **occupational exposure** of the head and trunk should not exceed a spatial peak magnetic flux density of **2 T** except for the following circumstance: for work applications for which exposures above 2 T are deemed necessary, **exposure up to 8 T can be permitted** if the environment is controlled and appropriate work practices are implemented to control movement-induced effects. Sensory effects due to the movement in the field can be avoided by complying with basic restrictions set in the ELF guidelines. When restricted to the limbs, maximum exposures of up to 8 T are acceptable."

"ICNIRP considers that there are occupational circumstances where, with appropriate advice and training, it is reasonable for workers **voluntarily and knowingly** to experience possible transient sensory effects such as nausea, since they are not believed to lead to long term or pathological health effects."

"**Guidance is not based on time-averaged exposure** because, in addition to the experience gained with the use of MR and other static field sources world-wide over the last 20 y, mechanistic considerations indicate that any effects are likely to be acute."

Transient symptoms

For certain occupations, e.g., surgeons operating within an open MRI device, acute exposure symptoms such as nausea could affect performance and hence the safety of the patients on whom they are operating. Similarly, these acute symptoms could affect the accident-proneness of a worker. Each such workplace should have a set of work procedures and practices specific to the work situations that will minimize any adverse consequences of exposure.

CAMPI IN RADIOFREQUENZA E MICROONDE

ICNIRP STATEMENT ON THE "GUIDELINES FOR LIMITING EXPOSURE TO TIME-VARYING ELECTRIC, MAGNETIC, AND ELECTROMAGNETIC FIELDS (UP TO 300 GHz)"

The International Commission on Non-Ionizing Radiation Protection*

Health Physics September 2009, Volume 97, Number 3

CAMPI ELETTRICI E MAGNETICI FINO A 100 kHz

GUIDELINES FOR LIMITING EXPOSURE TO TIME-VARYING ELECTRIC AND MAGNETIC FIELDS (1 Hz TO 100 kHz)

International Commission on Non-Ionizing Radiation Protection*

Health Physics December 2010, Volume 99, Number 6

Table 2. Basic restrictions for human exposure to time-varying electric and magnetic fields.

Exposure characteristic	Frequency range	Internal electric field ($V\ m^{-1}$)
Occupational exposure		
CNS tissue of the head	1–10 Hz	0.5/f
	10 Hz–25 Hz	0.05
	25 Hz–400 Hz	2×10^{-3}f
	400 Hz–3 kHz	0.8
	3 kHz–10 MHz	2.7×10^{-4}f
All tissues of head and body	1 Hz–3 kHz	0.8
	3 kHz–10 MHz	2.7×10^{-4}f
General public exposure		
CNS tissue of the head	1–10 Hz	0.1/f
	10 Hz–25 Hz	0.01
	25 Hz–1000 Hz	4×10^{-4}f
	1000 Hz–3 kHz	0.4
	3 kHz–10 MHz	1.35×10^{-4}f
All tissues of head and body	1 Hz–3 kHz	0.4
	3 kHz–10 MHz	1.35×10^{-4}f

ICNIRP Guidelines 2010 (1 Hz – 100 kHz)

Health Physics December 2010, Volume 99, Number 6

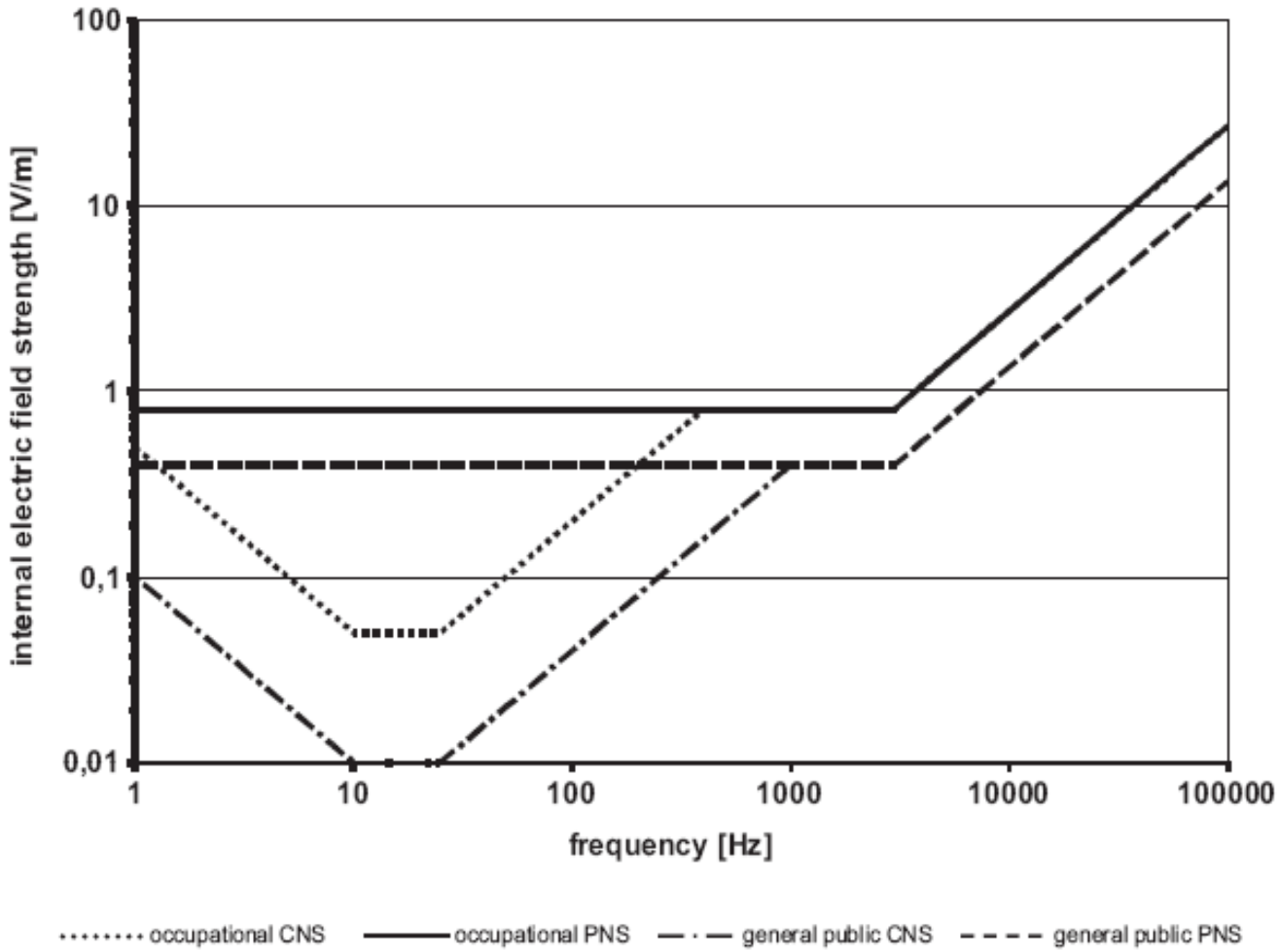


Fig. 1. Basic restrictions for general public and occupational exposure in terms of internal electric field strength concerning CNS and PNS effects.

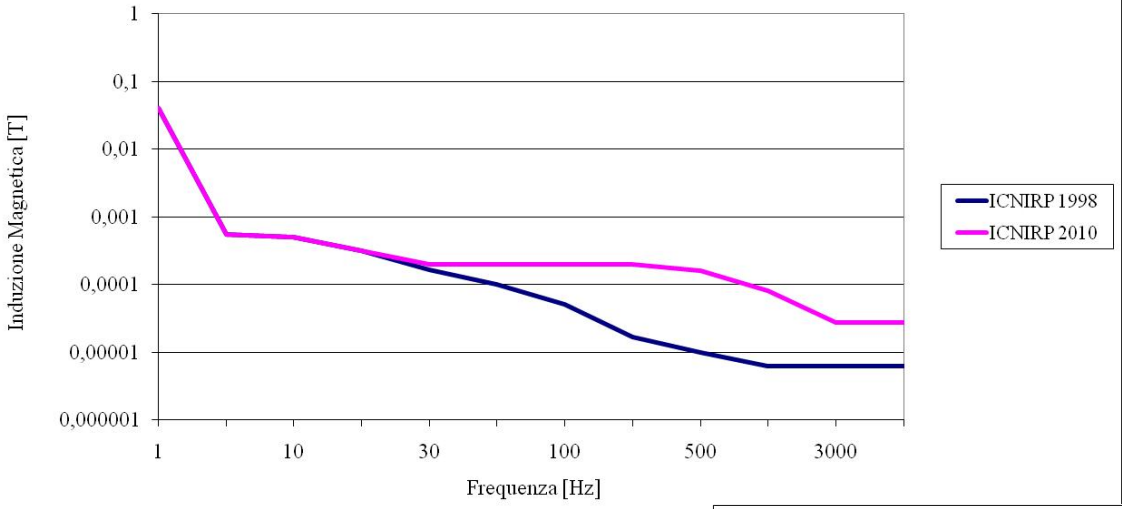
Table 3. Reference levels for occupational exposure to time-varying electric and magnetic fields (unperturbed rms values).

Frequency range	E-field strength E (kV m^{-1})	Magnetic field strength H (A m^{-1})	Magnetic flux density B (T)
1 Hz–8 Hz	20	$1.63 \times 10^5/f^2$	$0.2/f^2$
8 Hz–25 Hz	20	$2 \times 10^4/f$	$2.5 \times 10^{-2}/f$
25 Hz–300 Hz	$5 \times 10^2/f$	8×10^2	1×10^{-3}
300 Hz–3 kHz	$5 \times 10^2/f$	$2.4 \times 10^5/f$	$0.3/f$
3 kHz–10 MHz	1.7×10^{-1}	80	1×10^{-4}

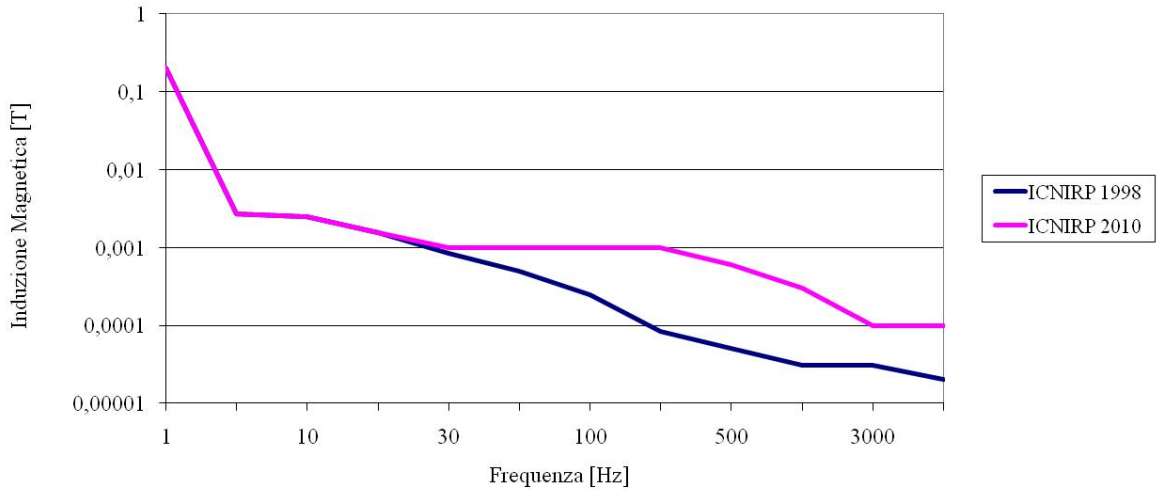
Notes:

- f in Hz.
- See separate sections below for advice on non sinusoidal and multiple frequency exposure.
- To prevent indirect effects especially in high electric fields see chapter on "Protective measures."
- In the frequency range above 100 kHz, RF specific reference levels need to be considered additionally.

Livelli di Induzione Magnetica per la Popolazione (valori RMS):
a)livelli di riferimento ICNIRP 1998
b)livelli di riferimento ICNIRP 2010
1Hz-100kHz



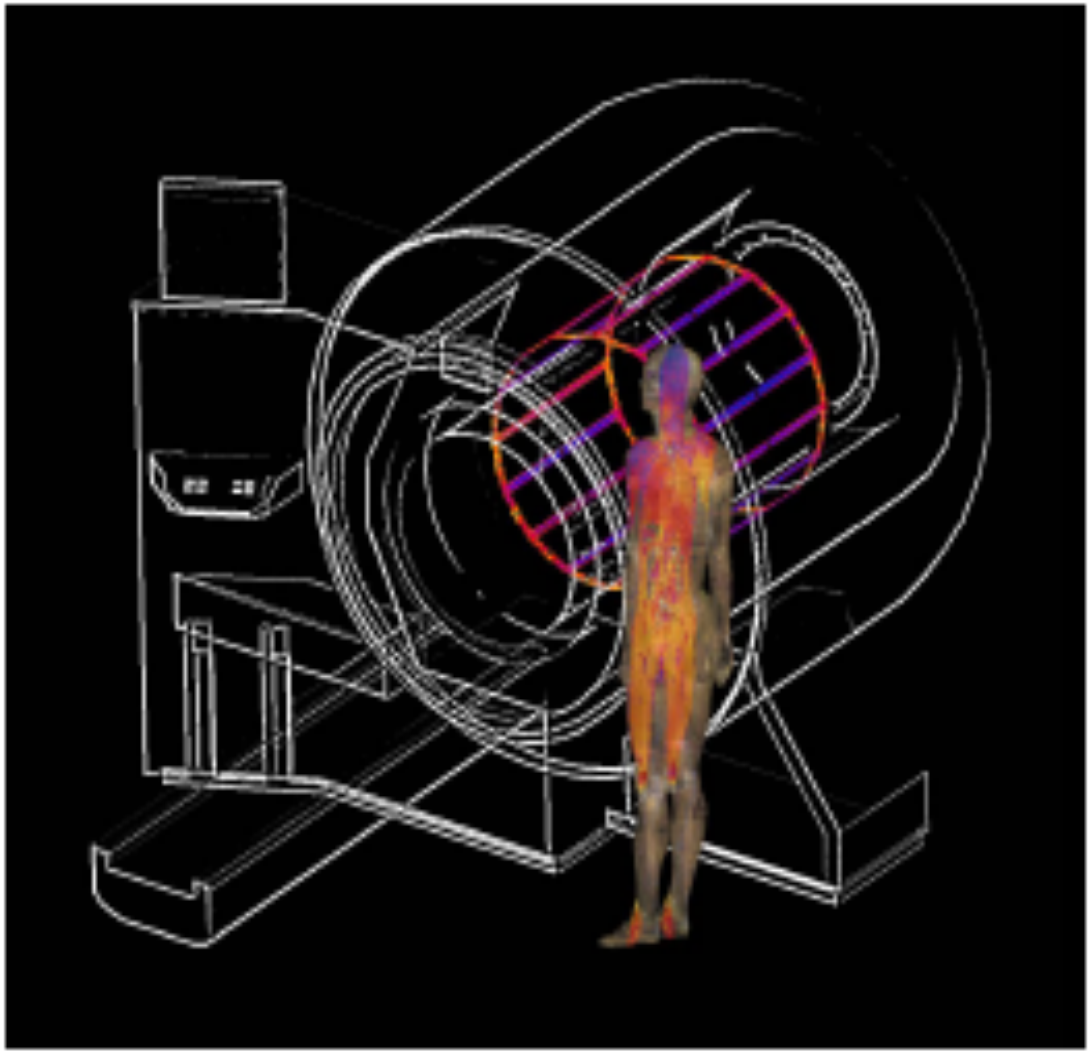
Livelli di Induzione Magnetica per i Lavoratori (valori RMS):
a)livelli di riferimento ICNIRP 1998
b)livelli di riferimento ICNIRP 2010
1Hz-100kHz



Following the recommendations made concerning guidelines on limits of exposure to static magnetic fields (ICNIRP 2009), ICNIRP considers that there are occupational circumstances where, with appropriate advice and training, it is reasonable for workers voluntarily and knowingly to experience transient effects such as retinal phosphenes and possible minor changes in some brain functions, since they are not believed to result in long term or pathological health effects. Exposure of all parts of the body in these circumstances should be limited in order to avoid peripheral and central myelinated nerve stimulation.

Project VT/2007/017

An Investigation into Occupational Exposure to Electromagnetic Fields for Personnel Working With and Around Medical Magnetic Resonance Imaging Equipment



04 April 2008

Sicurezza e tecnologie sanitarie
Capofila Istituto Superiore di Sanità

Programma strategico finanziato dal Ministero della Salute (Bando 2008)

Progetto n.2: *Rischi diretti e indiretti per la salute e la sicurezza di lavoratori e pazienti derivanti dall'utilizzo nelle strutture sanitarie di tecnologie emergenti basate sui campi elettromagnetici.*

Svolto da:

- INAIL Dipartimento di Igiene del Lavoro (coordinamento scientifico)
- ISS
- CNR-IFAC Firenze
- ENEA UTBiorad
- Policlinico S. Matteo - Pavia

se2009.eu

Occupational Exposure to Electromagnetic Fields: paving the way for a future EU initiative

6–8 October 2009
Aula Nordica, Umeå University
Umeå, Sweden

Swedish Work Environment Authority

Umeå University

Bundesministerium
für Arbeit und Soziales

Forschungsbericht

Sozialforschung

400

Elektromagnetische Felder am Arbeitsplatz

(Electromagnetic fields at workplaces)

Abschlussbericht

ISSN 0174-4992

From H. Heinrich, Umea 2009

Potential threats to the health and safety of workers:

- **Interference with** autonomous **heart action**
- **Loss of muscle control**
- Significant **pain**
- Severe form of **vertigo** and **nausea**
- Whole-body **heat stress** and **excessive tissue heating**

The risk of such an occurrence must be controlled!

From H. Heinrich, Umea 2009

Other effects like

- **Phosphenes**
- Minor **tactile sensations** at threshold level
- **Metallic taste**

may or may not pose a potential threat, depending on the working environment and the duty of the worker!

EUROPEAN COMMISSION

Brussels, XXX
[…](2011) XXX draft

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (XXth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)

Safety limits of exposure → Orientation Values
(limiti di base CNS testa) (livelli di riferimento)

di fatto non vincolanti

Health limits of exposure → Action values
(limiti di base "all the body") (ricalcolati ex novo)

vincolanti ma derogabili

- deroga completa per tutte le attività RM e per le forze armate

- possibilità di deroga universale per qualsiasi tipo di attività

- delega alla Commissione per modificare gli orientation e gli action values

ingiustificato rilassamento dei valori massimi di esposizione

- ingiustificato rilassamento dei livelli di riferimento / valori di azione raccomandati dall'ICNIRP nel 2010

(esempio: il valore di azione per l'induzione magnetica a 50 Hz è pari a 13.6 mT !!)

- proposta di un sistema di deroghe dal rispetto dei limiti di esposizione eccessivamente ampio e non compensato da adeguate misure alternative di protezione dei lavoratori

Campo Elettrico (valori RMS):

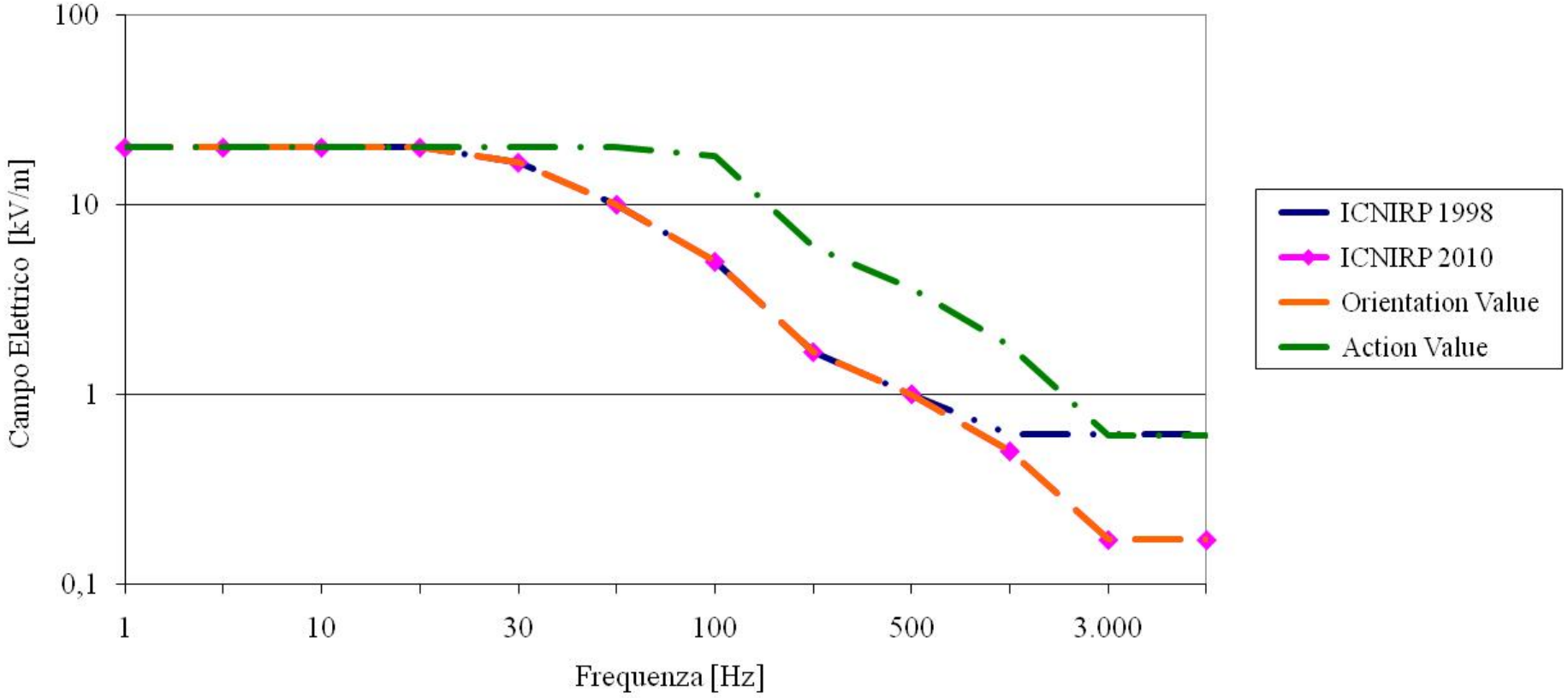
a)livelli di riferimento ICNIRP 1998

b)livelli di riferimento ICNIRP 2010

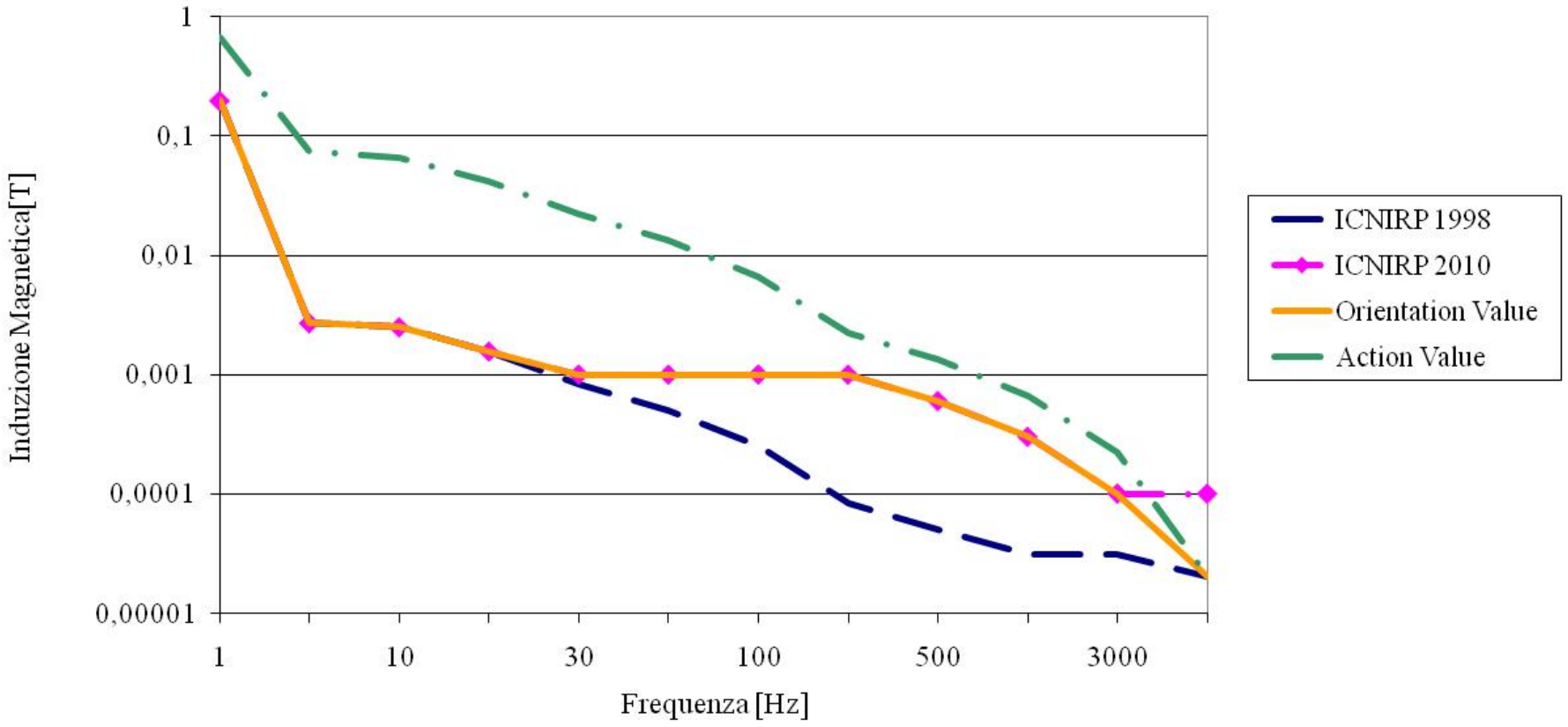
c)orientation values (proposta direttiva 2011)

d)action values (proposta direttiva 2011)

1Hz -100 kHz



Induzione Magnetica lavoratori (valori RMS):
a)livelli di riferimento ICNIRP 1998
b)livelli di riferimento ICNIRP 2010
c)orientation values (proposta direttiva 2011)
d)action values (proposta direttiva 2011)
1Hz-100kHz



Parliamentary Assembly
Assemblée parlementaire

COUNCIL OF EUROPE CONSEIL DE L'EUROPE

Parliamentary **Assembly**
Assemblée parlementaire

Provisional edition

The potential dangers of electromagnetic fields and their effect on the environment

Resolution 1815 (2011)[1]

8. In light of the above considerations, the Assembly recommends that the member states of the Council of Europe:

8.1. in general terms:

8.1.1. take all reasonable measures to reduce exposure to electromagnetic fields, especially to radio frequencies from mobile phones, and particularly the exposure to children and young people who seem to be most at risk from head tumours;

8.1.2. reconsider the scientific basis for the present electromagnetic fields exposure standards set by the International Commission on Non-Ionising Radiation Protection, which have serious limitations and apply "as low as reasonably achievable" (ALARA) principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation;

8.1.3. put in place information and awareness-raising campaigns on the risks of potentially harmful long-term biological effects on the environment and on human health, especially targeting children, teenagers and young people of reproductive age;

8.1.4. pay particular attention to "electrosensitive" persons suffering from a syndrome of intolerance to electromagnetic fields and introduce special measures to protect them, including the creation of wave-free areas not covered by the wireless network;

8.1.5. in order to reduce costs, save energy, and protect the environment and human health, step up research on new types of antennas and mobile phone and DECT-type devices, and encourage research to develop telecommunication based on other technologies which are just as efficient but have less negative effects on the environment and health;

8.2. concerning the private use of mobile phones, DECT phones, WiFi, WLAN

For any expert, an equal and opposite expert exists.

Arthur Clarke