



# **Review of Directive 2004/40/EC**

## **The way forward from the viewpoint of the German Federal Ministry of Labour and Social Affairs**

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

# Electromagnetic fields at workplaces

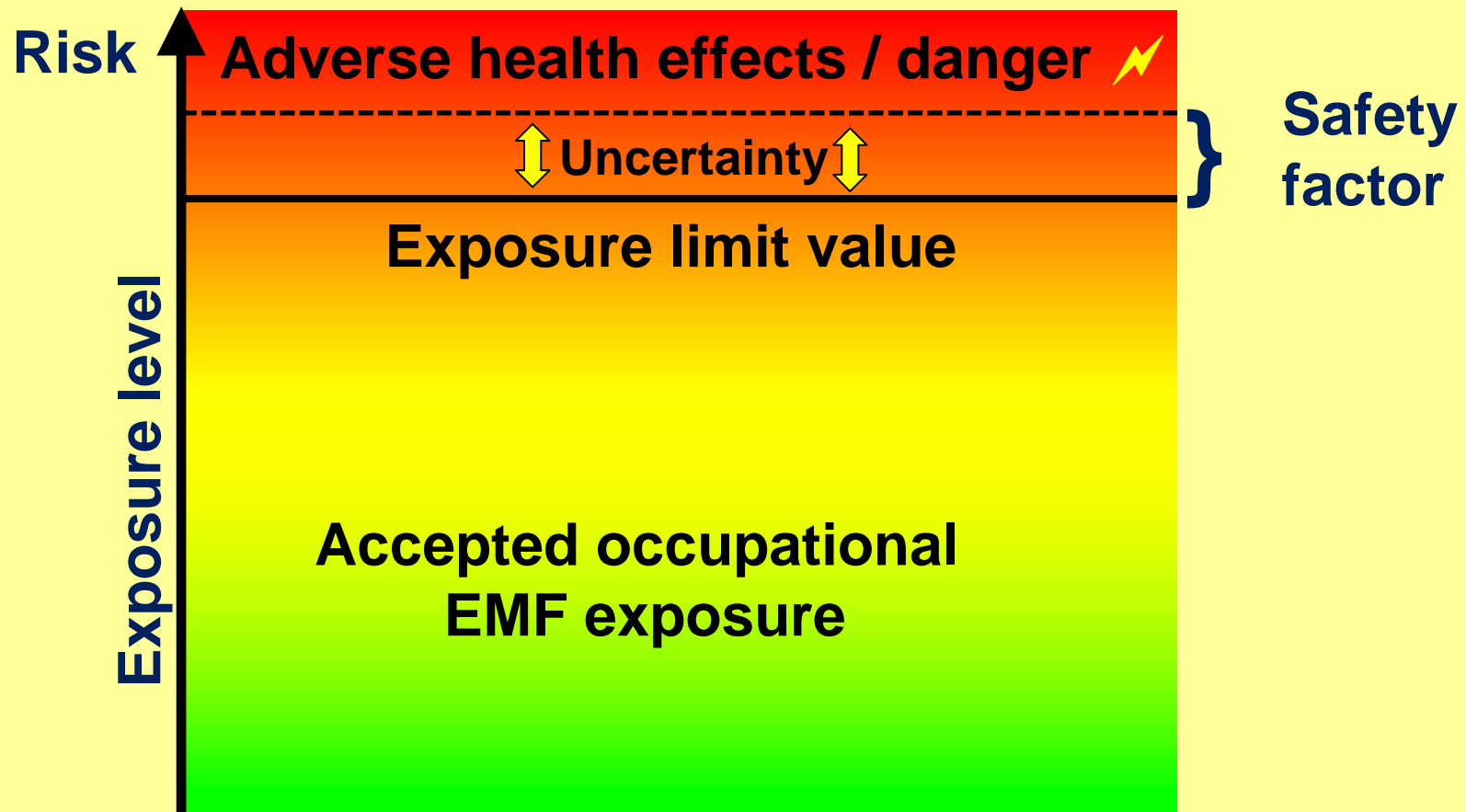
## A new scientific approach to occupational health and safety

- preliminary report available (see [www.bmas.de](http://www.bmas.de))
- Elaborated by a governmental German expert group
- Provides an in-depth analysis of physical and physiological background
- Based on scientific and technical knowledge
- Can serve as a sound basis for a review of the risk related provision of 2004/40/EG

## Framework of the EMF approach

- Protection against all known health and safety effects
- Only occupational exposure
- Static and time varying electric and magnetic fields up to 100 kHz
- Non-sinusoidal and pulsed EMF
- Limit values are linked to physiological relevant quantities
- No long-term health effects
- Special exposure situations
  - Partial exposure
  - Movement in the static magnetic fields
  - Projectile risk
  - Interference with active implanted medical devices

## Exposure to EMF



## Main Findings of the approach

- Physiological relevant parameter is the **electric field strength** in the tissue;
- The threshold for the electric field strength in the tissue regarding **peripheral nerve stimulation (PNS)** is at **6 to 7 V/m** in the LF area;
- **Thresholds in the high frequency range increase**; for frequencies exceeding 100 kHz threshold exceeds 200 V/m;
- Thresholds for **CNS tissue stimulation** is lower than those for PNS by a factor in the **order of 20 . . . 40**;
- **Usage of peak values** for measurement and calculation purposes in the low frequency range the is highly recommended;
- A **safety factor of 3** is justified for the LF area by current knowledge. This is also in line with the **safety factor of  $\sqrt{10}$**  for the high HF area;
- Different **spectral components are not additive**;

## Risk assessment

**Risk assessment**



**risk identification**



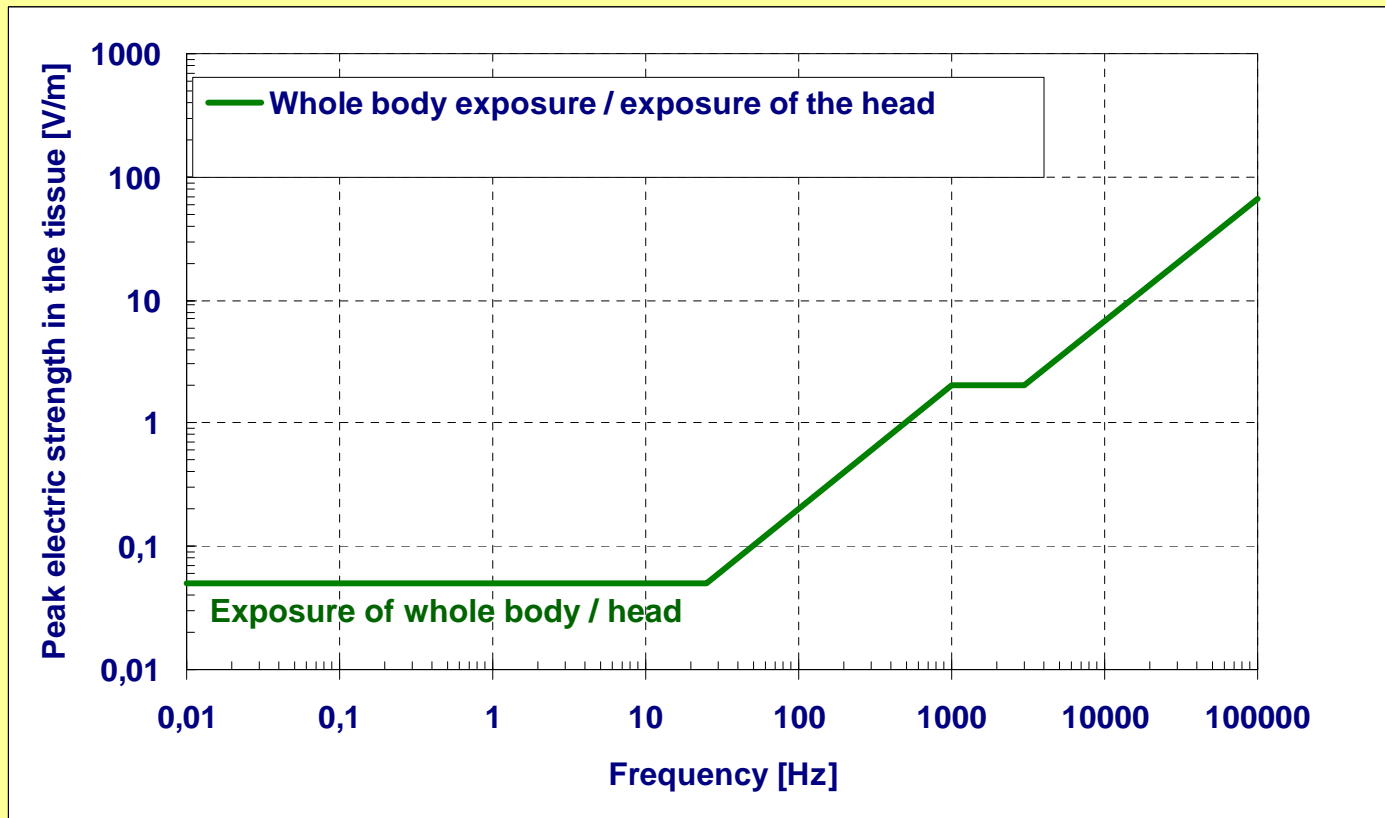
**Whole body exposure,  
exposure of the head**



**High protection  
level**



# Exposure limit values





## Controlled use / controlled environment

**Risk assessment**



**risk identification**



**Whole body exposure  
exposure of the head**



**High protection  
level**



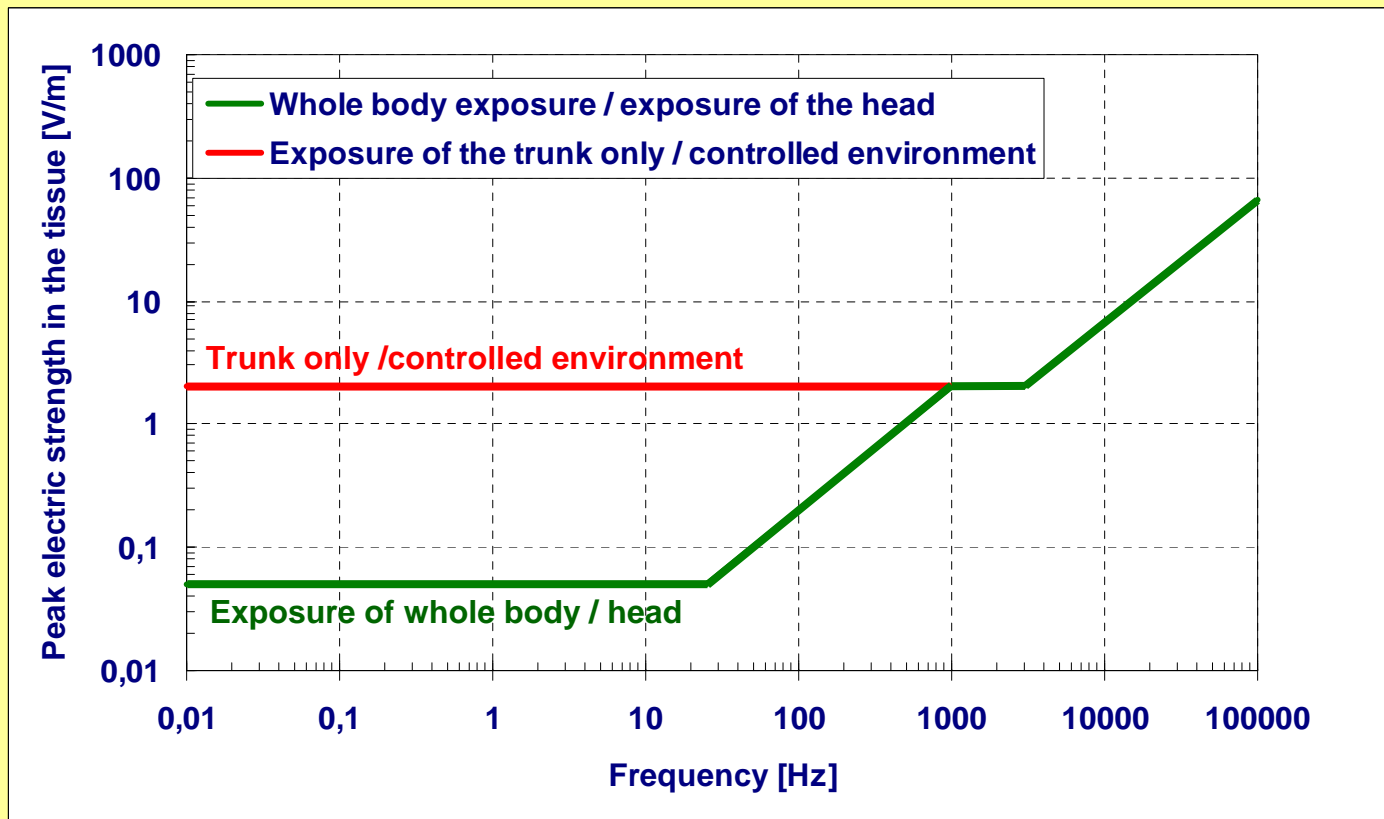
**Exposure of trunk  
and limbs only**



**Controlled use /  
controlled environment**

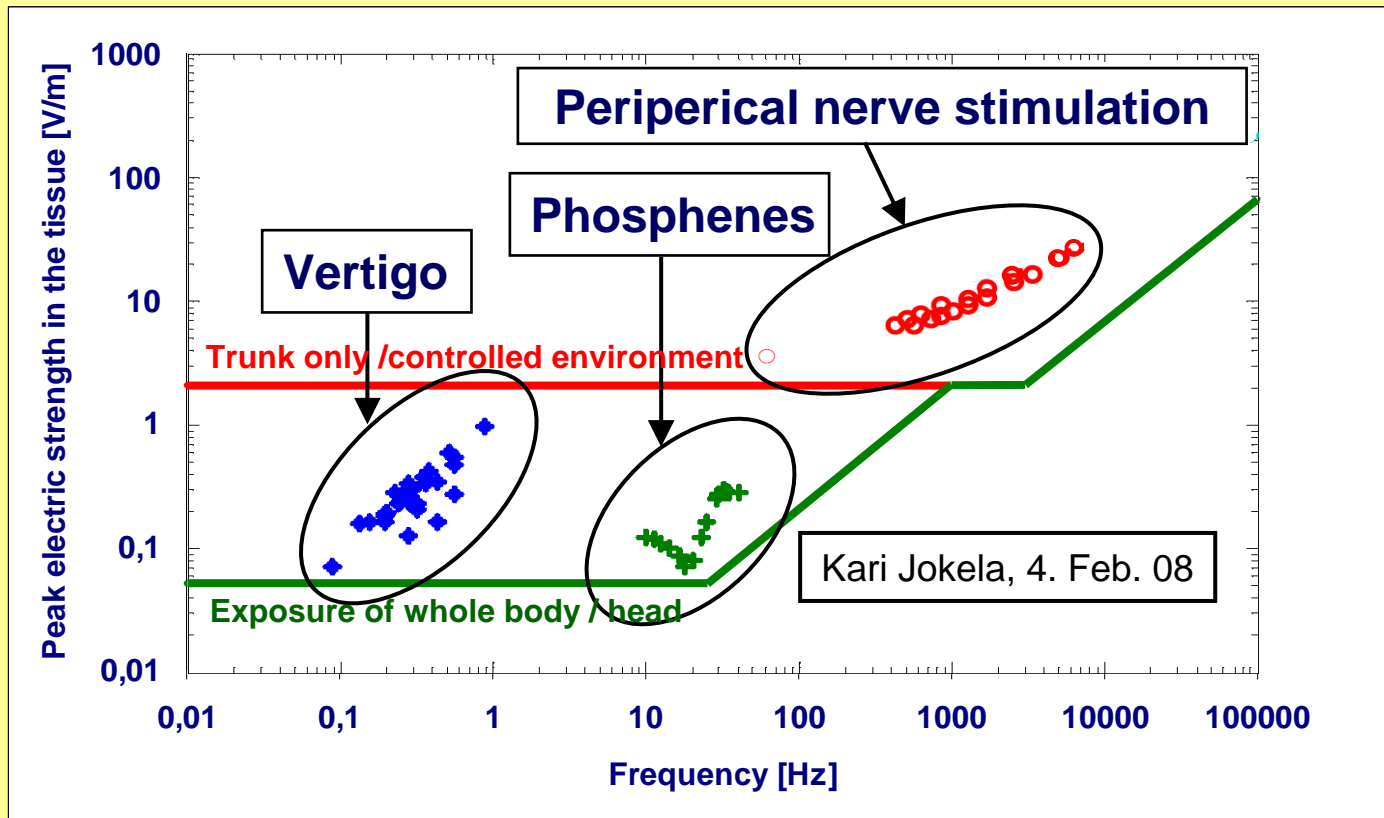


## Exposure limit values for controlled environment

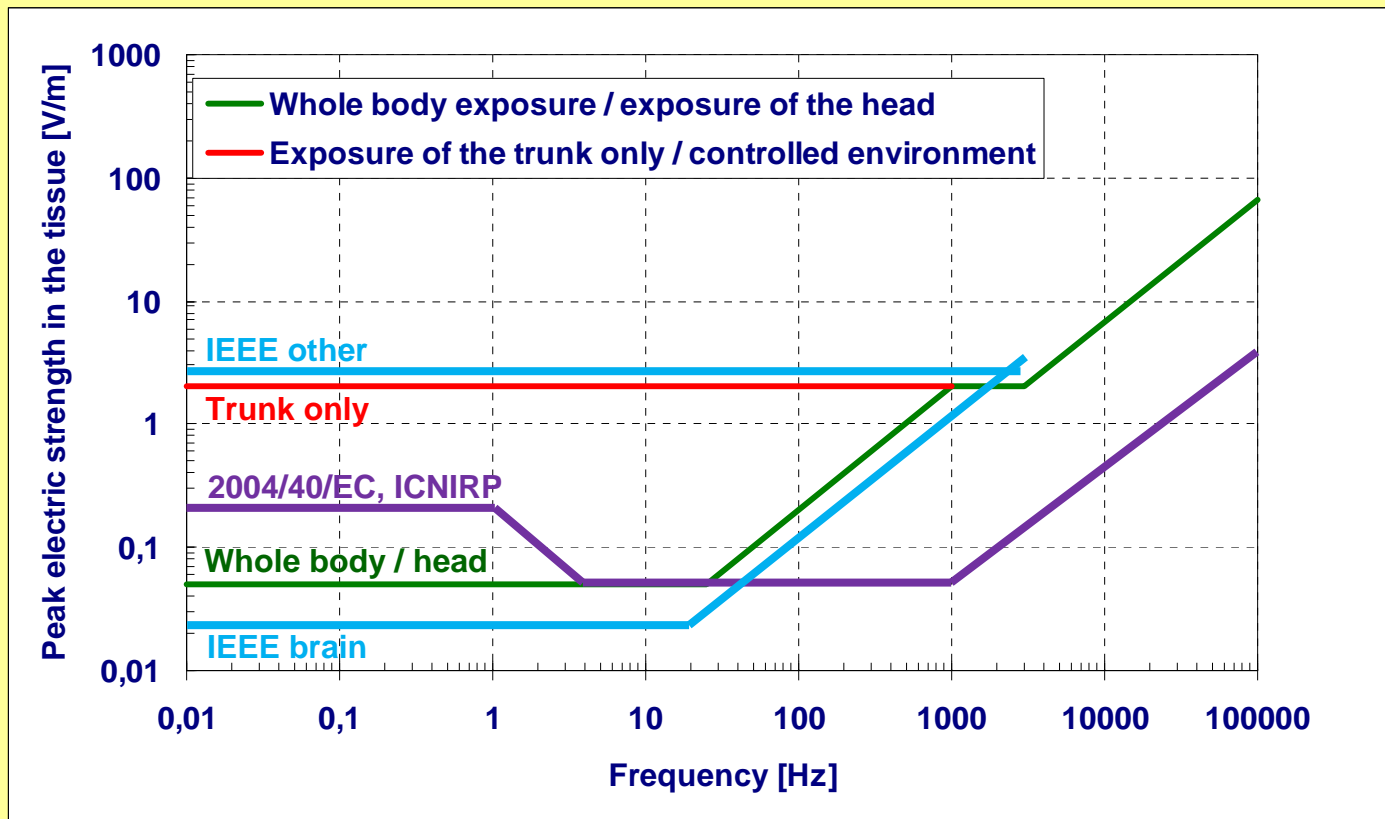




## Exposure limit values – comparison with exp. data

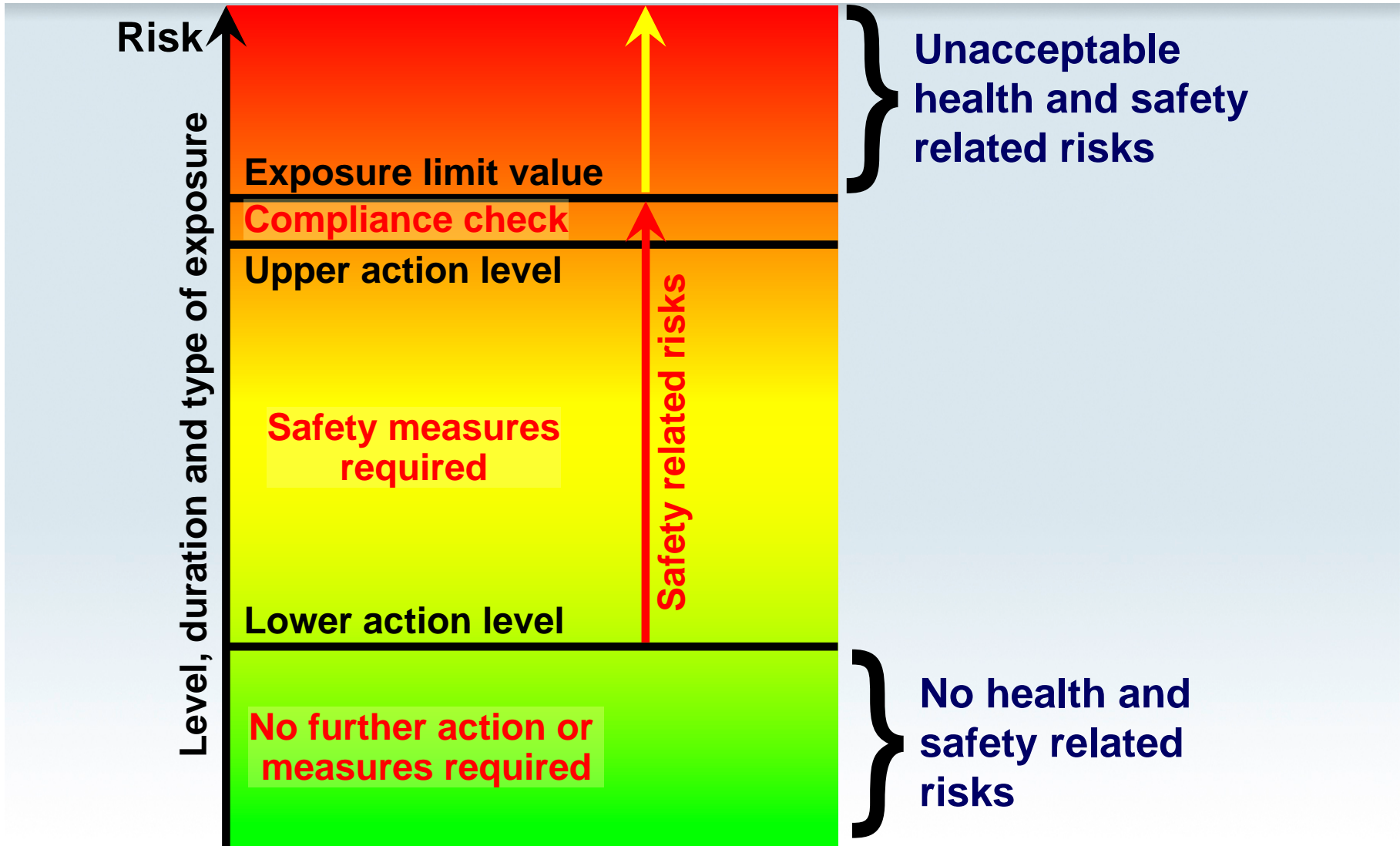


## Exposure limit values – comparison with 2004/40/EC



## Upper and lower action level

- **Physiological quantities linked to the exposure limit values in the tissue (ELV) are not directly measurable**
- => Need for two sets of action levels that are linked to directly measurable external physical quantities**
- **Upper action level (UAL)**
  - Derived from the internal exposure limit values, assuming worst case exposure conditions
  - Compliance with UAL => compliance with ELV
- **Lower action level (LAL)**
  - Compliance with LAL no further measure



## Summary

- Concept takes into account the **relevant physiological quantities**
- New concept of limit and action values is **based on the current scientific knowledge**
- Concept **addresses all risks** of workers
- Concept provides solutions on how to handle
  - **movement and projectile risk** in static magnetic fields
  - **pulsed electric and magnetic fields**
  - **multi frequency electric and magnetic fields**
  - **contact currents**
  - **localised exposure**
  - **time and spatial averaging**



## Conclusions for a review of the Directive

- Risks of exposure to EMF have to be dealt adequately
- Directive has to guarantee health and safety of workers without imposing unnecessary burden
- With the presented concept there is a sound basis for a review of the directive as regards the state of the art
- No sectoral exemption from the provisions of the Directive needed
- The approach of controlled environment is compatible within the concept of risk assessment

## Conclusions for a review of the Directive

- There are answers to the concerns being raised by stakeholders
- There is still need for good guidance that addresses especially the needs of SME



# Thank you for your attention

**Thank you also to the work of the expert group!**

EMF report available on:

[http://www.bmas.de/portal/38286/2009\\_\\_10\\_\\_05\\_\\_bericht\\_\\_elektromagnetische\\_\\_felder.html](http://www.bmas.de/portal/38286/2009__10__05__bericht__elektromagnetische__felder.html)  
or search for "www.BMAS.de, EMF"

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