

EMC in safety related products

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Kristian Voetmann, kbv@delta.dk
Product manager, EMC

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SAFETY

Safety is the state of being "safe"



the condition of being protected against

- failure
- Damage
- Error
- Accidents
- Harm

or any other event which could be considered non-desirable

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SAFETY



Reliable

Immune

Robust

Acoustic noise

Vibrations

ElectroMagnetic Fields - EMF

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EU directives

Free movement of goods inside the European Community

Protection of radiocommunications,
electrical supply networks
telecommunications networks

Safety in the use of electrical equipment
Securing that it does not endanger the safety of
persons, domestic animals or property

Safety: Ensuring the health and safety of persons, in particular of workers
and consumers and, where appropriate, of domestic animals and goods

Safety and health protection of patients, users and, where appropriate,
other persons, with regard to the use of medical devices

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All relevant directives

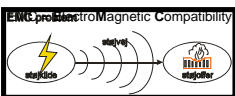
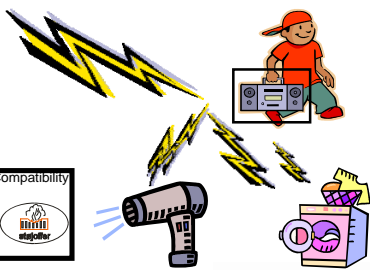


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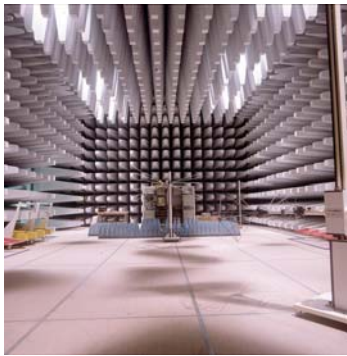
EMC directive 2004/108/EC



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EMC directive 2004/108/EC

Link to EMC directive 2004/108/EC

UK: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0108:EN:HTML>

Guide EMC directive 2004/108/EC:

http://ec.europa.eu/enterprise/electr_equipment/emc/guides/emcguide_may2007.pdf

20 July 2009

(10) This Directive should not deal with the safety of equipment, since that is dealt with by separate Community or national legislation.



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2004/108/EC - ESSENTIAL REQUIREMENTS

1. Protection requirements

Equipment shall be so designed and manufactured, having regard to the state of the art, as to ensure that:

- (a) the electromagnetic disturbance generated does not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended;
- (b) it has a level of immunity to the electromagnetic disturbance to be expected in its intended use which allows it to operate without unacceptable degradation of its intended use.

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Safety directives – some requirements - LVD

2. Protection against hazards arising from the electrical equipment

ElectroMagnetic Fields – EMF

Vibration – Acoustic noise emission

3. Protection against hazards which may be caused by external influences on the electrical equipment

Vibration – Highly Accelerated Life Test - HALT

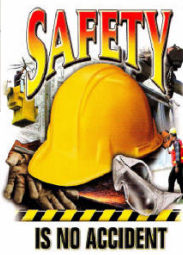
ElectroMagnetic Compatibility – EMC

Reliability – vibration – dust – salt mist etc.

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Safety directives – some requirements - Machine



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Safety directives – some requirements – Medical - MED



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EMC – product standards

Safety - Product Standards

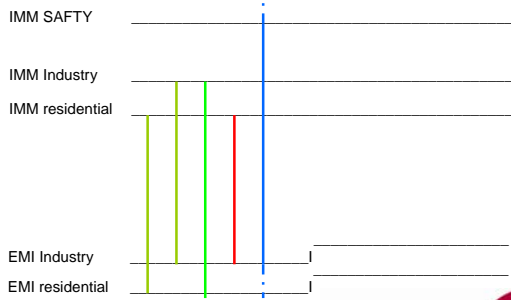
- Higher EMC immunity requirements
- Test function modes are defined
- Performance criterion

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EMC margin



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Risk Assessment - EMC

- EMC phenomena in the user environment – potential hazards
- Evaluate if the product standard immunity levels are sufficient
- Consider finding the outer limit – EMC HALT on selected phenomena
- Which function mode(s) must be EMC tested?
 - Standby?
 - Running mode – battery supplied?
 - Running mode – power supplied?
 - Safemode?
- Performance criterion

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www.DELTA.dk/EMC - Approval management

EMC specification and test plan

an overview of relevant EMC requirements

EMC target

EMC requirements in the future

Product Development

Successful EMC design - a team effort

All have the same EMC targets



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Safety - Design

MEDICAL 93/42/EEC (2007/47/EC)

ANNEX I
ESSENTIAL REQUIREMENTS I. GENERAL REQUIREMENTS

1. The devices must be **designed ...**

and manufactured in such a way that, when used under the conditions and for the purposes intended, they will not compromise the clinical condition or the safety of patients, or the safety and health of users or, where applicable, other persons....

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Medical Machines

2007/47/EC Article 3

Where a relevant hazard exists, devices which are also machinery within the meaning of Article 2(a) of **Directive 2006/42/EC** of the European Parliament and of the Council of 17 May 2006 on machinery

shall also meet the essential health and safety requirements set out in Annex I to that Directive to the extent to which those essential health and safety requirements are more specific than the essential requirements set out in Annex 1 to this Directive.

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EMC directive - design



2004/108/EC Essential Requirements

1. Protection requirements

Equipment shall be so **designed** and manufactured, having regard to the state of the art, as to ensure that....

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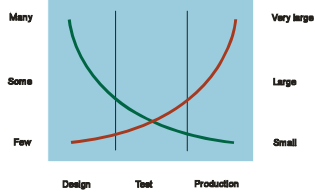
www.DELTA.dk/EMC - EMC consultancy and design

EMC Design Review

- adds decades of EMC experience to your product

Technical alternatives
for EMC solutions

Costs for implementation
of EMC solutions



Cost-effective EMC design
On schedule with limited cost
Identify weaknesses
Robustness

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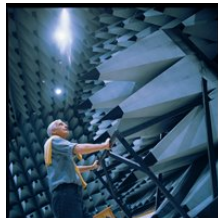


www.DELTA.dk/EMC - EMC test - design phase

EMC test - design phase

- are you ready for compliance test?

- Tailored service
- Selecting the relevant tests
- EMC fine tuning
- EMC Quick check
- EMC Pre testing
- Identify weaknesses
- Save on costs
- Modification



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www.DELTA.dk/EMC - EMC test - design phase

EMC HALT

EMC High Amplitude Limit Test

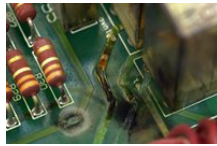
Test your product to breakdown

The aim – reliable & robust products

EMC HALT provides an insight

EMC HALT and extreme EMC testing

The aim - find the product's weakest link



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www.DELTA.dk/EMC - Accredited EMC Compliance test

EMC compliance testing

Tests according to international standards

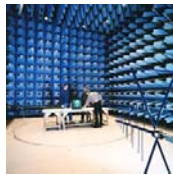
- Supporting the risk assessment

- industry and automation
- automotive
- agricultural
- Construction
- marine
- offshore
- military
- space
- medical
- telecommunication
- lighting
- household equipment

The test report is the key

Select an accredited EMC test

EMC Approval Strategy saves on costs

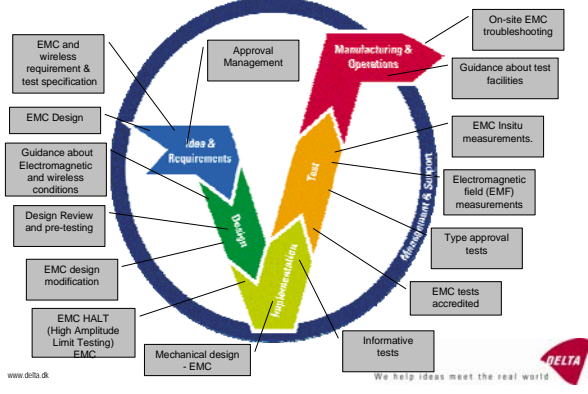


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Intelligent EMC - DELTA



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We also bring you our latest case stories for your inspiration.

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