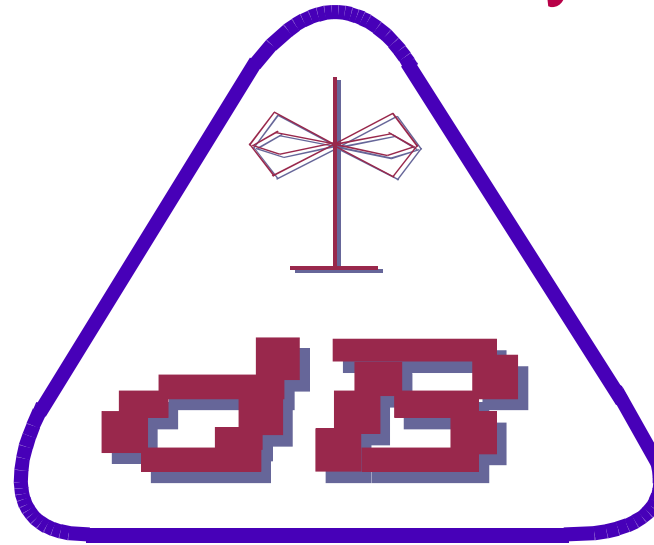


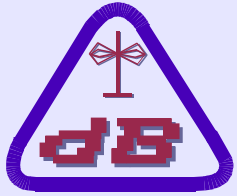


## Consultancy



## Testing

## Remedial



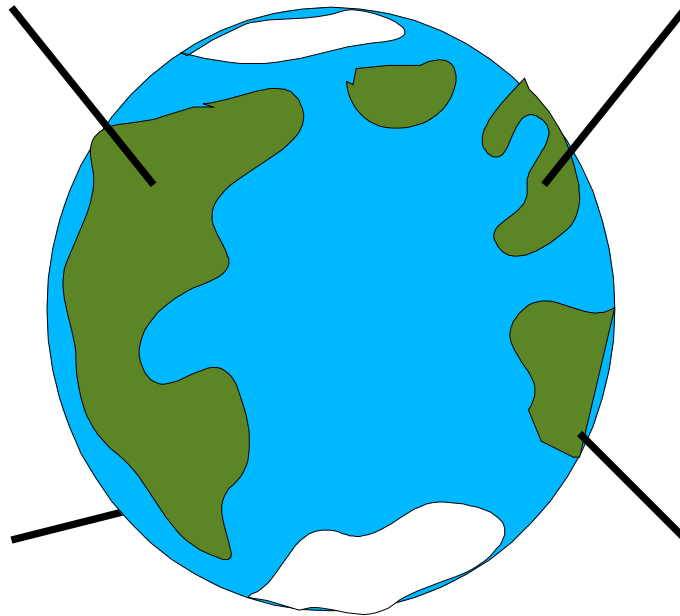
# EMC Regulations Worldwide

There are different regulations for different parts of the world

Some similarities exist – but beware the differences!

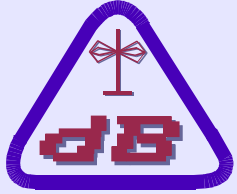
North America

Europe



Australia and  
New Zealand

Other  
Countries



# Focus on Europe

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- EMC Directive

- 1989 Directive (89/336/EEC). Current until 20<sup>th</sup> July 2007

- 2004 Directive (2004/108/EC). Two year transition period to July 2009

- CE Marking

- EMC is one directive that should be complied with in order to apply the CE mark. Beware that other directives may also apply e.g. :-

- Low Voltage Directive (LVD) – electrical safety.

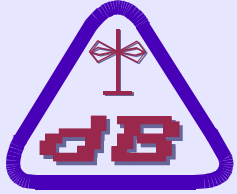
- Radio and Telecommunications Terminal Equipment Directive (RTTE)

- Automotive Directive (strictly speaking E-marking for vehicles)

- A list of all applicable directives can be found in the Official Journal of the European Communities (OJ)

- <http://europe.eu.int/comm/enterprise/newapproach/standardization/harmstds/reflist.html>

- Do not assume that CE compliance implies world-wide compliance!



# EMC Directive

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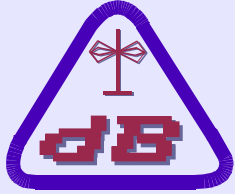
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- The Directive states the basic EMC protection requirements
  - Equipment must not unduly interfere with other equipment / systems.
  - Equipment must not be unduly susceptible to external interference.
  - It provides two routes for declaring compliance:-

**Harmonised  
Standards**

**Technical  
Construction  
File**

**Declaration  
of Conformity**



# The Standards Route

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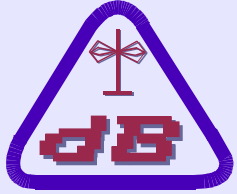


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- The OJ provides a list of the Harmonised Standards

<http://europe.eu.int/comm/enterprise/newapproach/standardization/harmstds/reflist/emc.html>

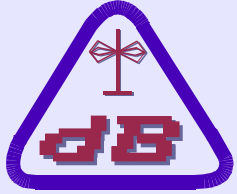
- Compliance with the harmonised standards provides “presumption of conformity” with the directive.
- There are many “Product Specific Standards” which should be applied for particular classifications of product :-
  - EN55022 - Information Technology Emissions
  - EN55024 - Information Technology Immunity
  - EN61326 - Measurement / Control / Laboratory Emissions & Immunity
  - EN55014 - Domestic Appliances Emissions & Immunity
- There is also a Generic specification (EN61000-6-1/2/3/4) for Emissions and Immunity of Domestic / Industrial Equipment. This is supposed to cover equipment for which product specific standards do not exist.
- Beware! Perversely, product specific standards may not provide full compliance with the directive according to a court of law!



# Technical Construction File



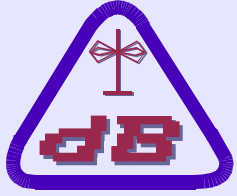
- When it is not possible to apply the Harmonised Standards or it is only possible to apply them in part then the Technical Construction Route may be applied.
- This would involve the production of a Technical Construction File containing detailed information about the design of the product, its operating environment and any testing that has been performed (generally under the guidance of a Competent Body).
- This must then be vetted and approved by a Competent Body.
- The product may then be CE marked without necessarily having been tested to Harmonised Standards.



# CE Marking for EMC



- Application of the CE mark to a product is a self declaration process.
- The manufacturer / importer into the EU is making his own statement that the product complies with all of the appropriate directives.
- As well as placing a CE mark on the product the responsible body must also produce a Declaration of Conformity which lists the directives with which the product conforms and the standards used to prove compliance.
- This information must be kept on file for a period of 10 years after the last sale of the product and must be made available to the authorities upon request. Many manufacturers provide a copy of this document to their customers, generally in the user manual.
- Strictly speaking, there is no explicit need for testing by an external body. Many manufacturers do not have the facilities for testing. Many use the independence of an external body as evidence of due diligence.



# Declaration of Conformity

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## Example EC Declaration of Conformity

### Directive 89/336/EEC on Electromagnetic Compatibility (as amended)

We .....  
(name and address of manufacturer)

Certify that the product described is in conformity with Directive(s) above

.....  
(name, type or model, lot, batch or serial number etc.)

.....  
(description)

The product has been assessed by application of the following standards:

EN55013:2001

Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement

EN55020:2002

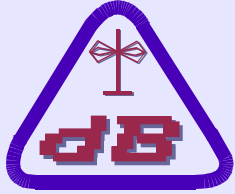
Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement

.....  
(place and date of issue e.g. UK)

.....  
(signature of responsible person)

.....  
(print name)





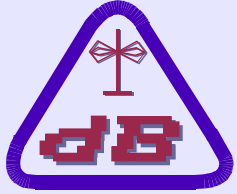
# CE Marking for EMC

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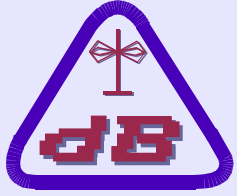
Top Level Standard	Top Level EN Number	Calls up Emissions harm/flick	Calls up Emissions conducted	Calls up Emissions radiated	Calls up Immunity ESD	Calls up Immunity RF Imm	Calls up Immunity EFT	Calls up Immunity Surges	Calls up Immunity Cond RF	Calls up Immunity Power Mag	Calls up Immunity Dips
Generics Dom	61000-6-3/1	61000-3-2/3	CISPR22(B) CISPR14	CISPR22(B)	IEC61000-4-2 4kV / 8kV	IEC61000-4-3 3V/m	IEC61000-4-4 1kV / 0.5kV	IEC61000-4-5 2kV / 1kV	IEC61000-4-6 3V	IEC61000-4-8 30A/m	IEC61000-4-11 30% 10ms, 60% 100ms...
Generics Ind	61000-6-4/2		CISPR11(A) CISPR14	CISPR11(A)	IEC61000-4-2 4kV / 8kV	IEC61000-4-3 10V/m	IEC61000-4-4 2kV / 1kV	IEC61000-4-5 2kV / 1kV	IEC61000-4-6 10V	IEC61000-4-8 30A/m	IEC61000-4-11 30% 10ms, 60% 100ms...
Meas & Control	61326-Light	61000-3-2/3	CISPR11/22 CISPR14	CISPR11/22 Class B	IEC61000-4-2 4kV / 4kV	IEC61000-4-3 3V/m	IEC61000-4-4 1kV / 0.5kV	IEC61000-4-5 1kV / 0.5kV	IEC61000-4-6 3V	IEC61000-4-8	IEC61000-4-11 100% 20ms
Meas & Control	61326-Heavy		CISPR11/22 Class A	CISPR11/22 Class A	IEC61000-4-2 4kV / 8kV	IEC61000-4-3 10V/m	IEC61000-4-4 2kV / 1kV	IEC61000-4-5 2kV / 1kV	IEC61000-4-6 3V	IEC61000-4-8 30A/m	IEC61000-4-11 100% 10ms
ITE Class B	55022/24		EN55022(B)	EN55022(B)	IEC61000-4-2 4kV / 8kV	IEC61000-4-3 3V/m	IEC61000-4-4 1kV / 0.5kV	IEC61000-4-5 2kV / 1kV	IEC61000-4-6 3V	IEC61000-4-8 1A/m	IEC61000-4-11 30% 500ms, 100% 10ms..
ITE Class A	55022/24		EN55022(A)	EN55022(A)	IEC61000-4-2 4kV / 8kV	IEC61000-4-3 3V/m	IEC61000-4-4 1kV / 0.5kV	IEC61000-4-5 2kV / 1kV	IEC61000-4-6 3V	IEC61000-4-8 1A/m	IEC61000-4-11 30% 500ms, 100% 10ms..
Domestic Appl	55014		EN55014	EN55014 !! EN55022(B)	IEC1000-4-2 4kV / 8kV	IEC1000-4-3 3V/m	IEC1000-4-4 1kV / 0.5kV	IEC1000-4-5 2kV / 1kV	IEC1000-4-6 3V/1V	IEC1000-4-8	IEC1000-4-11 60% 200ms, 30% 1s



# New EMC Directive



- Is very similar to the existing directive – but :-
  - All manufacturers will be required to perform an EMC Assessment and produce technical documentation proving conformity, which must include:-
    - A general description of the equipment.
    - Evidence of compliance with Harmonised Standards (if applied), usually in the form of a test report.
    - An explanation of the steps taken to ensure compliance if Harmonised Standards have not been applied.
    - A statement from a Notified Body should be included, if one has been used, to verify the technical documentation (not mandatory).
  - There is no longer a need for a TCF approved by a Competent Body as currently required if not using Harmonised Standards..
  - CE marking and Declaration of Conformity are produced as currently, with the exception that the standards listed on DoC must now be dated.



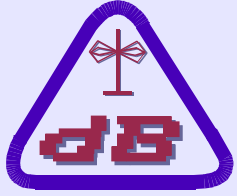
# Fixed Installations

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- These are not mentioned in the current version of the Directive, but they are now covered :-
  - Fixed installations do not have to be CE marked and do not have to meet the general requirements.
  - An assessment must be made of the environment into which it is to be installed and of the suitability of components for use in the fixed installation.
  - When there are concerns about the compliance of a fixed installation the onus is on the operators of the fixed installation to prove compliance and provide remedies if required.
  - Components of a fixed installation that have more general use in other situations must be fully compliant with the EMC and CE marking requirements.



# Guidelines

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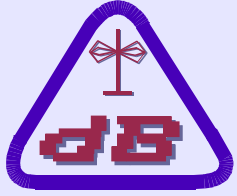
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- The European Commission has produced some guidelines to the current directive :-

[europa.eu.int/comm/enterprise/electr\\_equipment/emc/guidelines/english.pdf](http://europa.eu.int/comm/enterprise/electr_equipment/emc/guidelines/english.pdf)

There are, as yet, no guidelines for the new directive.

- A new declaration of conformity will need to be produced for ALL products by the end of the transition period (20<sup>th</sup> July 2009)
- New declarations will be valid from 20<sup>th</sup> July 2007

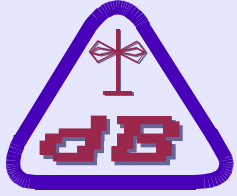


# North America - 1



## • The USA :-

- The Federal Communications Commission controls EMC and Radio matters in the USA.
- Code of Federal Regulations 47 Part 15 (Part 18 for ISM)
- FCC CFR47 Part 15 subpart B Unintentional Radiators  
subpart C Intentional Radiators
- Class A Computers and most other non-intentional radiators – Verification
- Class B Computers - DoC or Certification (Technical Certification Body)
- Practically all Intentional Radiators – Certification (TCB)
- Limits are simple : Domestic – Class B, Industrial or Commercial – Class A
- USA has no immunity requirements (except where safety is involved).
- We are FCC Listed. We are able to operate to the Verification and Certification requirements.



## North America - 2

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### ● Canada :-

- Industry Canada controls EMC and Radio matters in Canada.
- Similar to FCC and will accept FCC compliance reports
- Category I equipment (Intentional Radiators) requires a Technical Acceptance Certificate (TAC) which is similar to the FCC Certification route.
- Category II equipment (Unintentional radiators of all types (including Domestic and Industrial computers) do not require a TAC. Self verification applies.
- We are Industry Canada Listed. We are able to operate to the Verification and TAC requirements.

<http://strategis.ic.gc.ca/spectrum>



# Australia and New Zealand

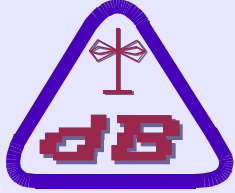
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- Australia and New Zealand have a co-ordinated approach to EMC.
- Only emissions requirements are applied.
- Apply standards that equate to the European emissions requirements but have their own standards to reflect the requirements (based on the CISPR standards where there is a CISPR equivalent to the European standards).
- Class II ISM equipment must be tested at a Certified test site.
- Equipment classes may change – check to be sure.
- All other unintentional radiator test reports may be from non-accredited sites and may be from overseas test sites.
- Need to follow the correct “C-tick” procedures even though no further testing required if already CE compliant.

[http://www.aca.gov.au/aca\\_home/publications/reports/industry/manuals/emcbook.pdf](http://www.aca.gov.au/aca_home/publications/reports/industry/manuals/emcbook.pdf)



# The Rest of the World



- Most other countries also adopt the CISPR and IEC recommendations but authorisation procedures can differ widely.
- Some countries will insist on testing at their own test sites.
- Some countries will insist on some relevant accreditation.
- Some countries will allow self declaration.
- Some countries have no requirements.
- It is a massive task to identify ALL national requirements. We do not have sufficient resources to cover the whole world in detail.
- Many manufacturers make use of their agents / representatives in the country concerned.
- BSI can offer a very wide service at a cost.





# With a little help from my friends!

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