

The Importance of being Earnest!

Or the need to keep up to date with EMC regulations and guidelines

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The last 12 months or so have been very fruitful in terms of EMC regulations and guidelines, so manufacturers have to be very earnest about keeping abreast with these developments. For instance, the new generic EMC directive (2004/108/EC)¹ made its long awaited appearance on the last day of 2004. It seeks to complete, reinforce and clarify the framework established by the current generic EMC directive (89/336/EEC). One of these clarifications is in article 1 (4) where it refers to more specific EMC directives which cover some or all EMC phenomena. It explains that only for those phenomena covered in the more specific directive, 2004/108/EC ceases to apply. For example, if a specific directive refers only to radiated immunity, then products covered by this specific directive have to comply with the generic EMC directive for all other phenomena. Declarations of conformity against 2004/108/EC are valid from 20 July 2007.

A little earlier, in October 2004, the EU published the new automotive EMC directive 2004/104/EC². It adapts 72/245/EEC to the technical progress by including a decision tree to indicate when to apply this directive. Another aspect is the increase in test work, especially for electric/electronic sub-assemblies (ESA). 2004/104/EC extends the frequency range for the radiated immunity test to 2 GHz and includes tests for conducted emissions and immunity for ESAs.

But this is not all! There has been also an update to the UK regulations transposing the existing generic EMC directive (89/336/EEC) into law. The UK has consolidated the current generic EMC directives and its amendments into *The Electromagnetic Compatibility Regulations 2005*³.

Changes, probably not widely known, have been made to the EU guidelines for the current generic EMC directive 89/336/EEC⁴ (according to the webpage last updated in 2005). Of course they are “not binding in the sense of legal acts adopted by the Community. The legally binding provisions are those transposing the EMC Directive” but they aim to harmonize the interpretation of 89/336/EEC.⁵

What is the impact of these changes to the EU guidelines on 89/336/EEC? Is it really worth keeping an eye on them? What are some possible reasons for these changes? Do they harmonize with the UK regulations? This article tries to highlight how one change in understanding may affect manufacturers of products for the automotive aftermarket, which are intended to be fitted in passenger cars.

Although every care has been taken that the statements in this article are correct and conclusions drawn are accurate, they cannot be taken as final because interpretation of rules and regulations may change, and a binding interpretation can only be made by a court of law.

For a manufacturer of ESAs, as described above, the main question in this context is: Do I apply the current version of the automotive EMC directive 72/245/EEC (usually referred to as 95/54/EC), or the generic EMC directive (currently 89/336/EEC), or both?

1. The Generic EMC Directive (89/336/EEC)

The current generic EMC directive (89/336/EEC) “applies to apparatus liable to cause electromagnetic disturbance or the performance of which is liable to be affected by such disturbance”⁶. Of the exemptions mentioned in 89/336/EEC the one of interest here is in article 2 (2). It says there: “In so far as protection requirements specified in this Directive are harmonized, in the case of certain apparatus, by a specific Directive, this Directive shall not apply...”.

If 89/336/EEC applies to a product, then it has to fulfil its protection requirements⁷, which can be summarized as, ‘the product shall not interfere with other equipment and it shall be sufficiently immune to EM radiation of other equipment’. *The Electromagnetic Compatibility Regulations 2005* (Schedule 2) lists the following phenomena as relevant to EMC:

- Conducted low frequency phenomena
- Radiated low frequency phenomena
- Conducted high frequency phenomena
- Radiated high frequency phenomena
- Electrostatic discharge phenomena (ESD)

89/336/EEC is a new approach directive, which means the manufacturer (or appointed representative/importer) has to ensure that he fulfils the protection requirements, self-certifies and puts a CE mark on his product (or accompanying paperwork or packaging).

2. The Automotive EMC Directive (72/245/EEC)

The automotive EMC directive is the Council Directive 72/245/EEC relating to the radio interference (EMC) of vehicles⁸. It applies to vehicles “and to components or separate technical units intended for fitment in vehicles.”⁹

In the introductory “Whereas” section, 95/54/EC says: “Whereas the technical requirements relating to the radio interference (electromagnetic compatibility) of vehicles, their components and systems should be governed from 1 January 1996 solely by the provisions of Directive 72/245/EEC”¹⁰. Then it goes on to explain that it is a “specific Directive” in the sense of 89/336/EEC¹¹.

72/245/EEC as amended by 95/54/EC contains specific tests for:

- Radiated narrowband/broadband emissions (30 MHz – 1000 MHz)
- Radiated immunity (20 MHz – 1000 MHz) (only certain products¹²)

As mentioned earlier, the automotive EMC directive has recently been amended by 2004/104/EC. This directive has not been transposed into UK law yet. However, it is still interesting to see which phenomena are covered by 2004/104/EC:

- Radiated broadband/narrowband emissions
- Radiated immunity (not for “no immunity related functions”¹³)
- Conducted emissions (not if not switched or has no switches or inductive load¹⁴)
- Conducted immunity

Unlike 89/336/EEC, the automotive EMC directive is a type approval directive. This means that paperwork defining the product together with a test report from an appropriate test house has to be submitted to the relevant approval authority. This authority will issue a certificate with a unique approval number, which is to be repeated on the type approved product.

3. CE-mark or e-mark – which?

One might be forgiven for taking a rather simple view regarding CE and e-marking such as 72/245/EEC for passenger cars, 89/336/EEC for most other equipment. What are some possible reasons for such a simple outlook? Here are a few:

- 1) The directives: 89/336/EEC makes the provision that there might be more specific directives and 72/245/EEC (as amended by 95/54/EC) claims to be such a directive insisting that components for vehicles should be solely governed by 72/245/EEC.
- 2) EU guidance notes (1997): These discuss specific cases of in-car entertainment products where not only 72/245/EEC (amended by 95/54/EC) but also 89/336/EEC may apply. The guidance notes explain that a product “which is intended for fitment in both vehicles and other applications (such as boats or caravans) may be CE marked in respect of that other application”¹⁵ implying that when fitted to a passenger car e-marking should suffice.
- 3) *The Electromagnetic Compatibility Regulations 2005*: These state: “These Regulations do not

apply to vehicle, componentsⁱ or separate technical units”¹⁶. By the way, this regulation (regulation 23) mentions only 95/54/EC as the amendment to the automotive EMC directive.

That this view was held as the correct interpretation for a long time can be seen by the fact that a 2001 lecture hand-out¹⁷ by Terry Beadman, MIRA, said on page 2: “Any device, original fit or aftermarket, which is within the above definitionⁱⁱ, is within the scope of 95/54/EC and consequently is outside the scope of 89/336/EEC.” Even in January 2003 the same view was put forward by a DfT guidance document, which said: “when the automotive EMC Directive comes into force it will take motor vehicles and their components and systems outside the scope of 89/336.”¹⁸ By the way, this is still on the Vehicle Certification Agency’s (VCA) webpage as their current advice¹⁹.

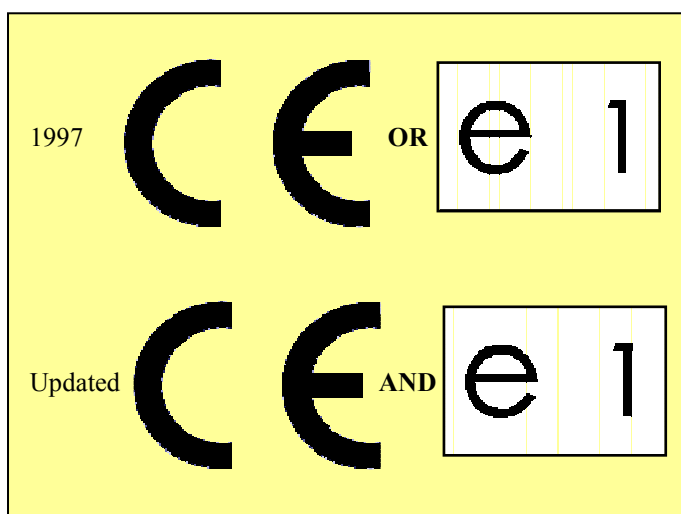


Figure 1: Comparing different editions of EU guidance notes of 89/336/EEC for automotive aftermarket products

4. However!!!

However, things are seldom as simple as they seem! The new guidelines provided by the EU changed the first paragraph of 15.3 that defines the scope and deletes the rest. It now reads: “For **new types** of vehicles placed on the EEA market after 1.01.1996, **new types** of components and **new types** of separate technical units intended to be fitted into motor vehicles and placed on the EEA market after 1.01.1996, the specific Directive 95/54/EC **is mandatory**. These products must bear the 'e' marking that confers free movement throughout the EEA area. Directive 89/336/EEC continues to apply for EMC phenomena not covered by this Directive and thus, should also continue to carry the CE marking”²⁰. The wording of the new definition is quite interesting. It seems to imply that this wording was in place when 95/54/EC became mandatory and that it was always necessary to comply with the

ⁱ According to 70/156/EEC, article 2, a component is a device that may be type-approved independently of a vehicle, e.g. automotive aftermarket products.

ⁱⁱ This refers to the definition of components and separate technical units which were specified in the preceding paragraph in this hand-out

automotive and generic EMC directive (for phenomena not covered by 95/54/EC).

What may have been the reason for this clarification? ESAs are only tested for radiated immunity and emissions. If they pass this, there is still no guarantee that emissions along the supply lines may not interfere with other automotive equipment. By the same token, being immune to radiated EM fields does not guarantee immunity to EM fields conducted along supply lines. This approach is also evident in the new automotive and new generic EMC directives as they cover more than the radiated aspect of EMC. The new generic EMC directive stipulates, more clearly than in its predecessor that, if an EMC phenomenon is not covered by a more specific directive, then the generic one covers it.

Phenomenon	89/336	2004/108	95/54	2004/104
Conducted emission	✓	✓		✓
Conducted immunity	✓	✓		✓
Radiated emission	✓	✓	✓	✓
Radiated immunity	✓	✓	✓	✓
EDS	✓	✓		

Figure 2: Phenomena covered by different EMC directives

5. Conclusions

The play *The Importance of Being Ernest* by Oscar Wilde is described as: “A trivial comedy for serious people”²¹. After having discussed the difference of understanding of a serious piece of legislation, one can’t help but wonder whether there are any common points between Oscar Wilde’s play and the interpretation of EU directives such as the generic EMC directive.

EU directives were introduced to create and safeguard the single market in Europe, i.e. doing away with national rules and regulations. However, as this article has shown, there are still anomalies and country specific interpretations which make an interested bystander pause and wonder.

This article used an aftermarket automotive ESA as an example to highlight the difficulty of keeping up-to-date with EU directives on EMC and how to apply them. It showed that the change to paragraph 15.3 of the EU Guidelines on the application of the Directive 89/336/EEC can have a big impact on the application of a piece of unchanged legislation.

For a long time it was understood that if a manufacturer type approves a product to the automotive EMC directive, then he doesn’t have to bother with the generic EMC directive (This still seems to be the advice of the VCA). The change in interpretation by the EU disagrees with this interpretation – particularly for automotive aftermarket products.

That this makes good engineering sense can be seen by the fact that:

- a) The new automotive EMC directive is more stringent and includes more EMC phenomena (but not ESD)
- b) The new generic EMC directive is more explicit in requiring all EMC phenomena to be covered

Comparing this stricter interpretation of the current generic EMC directive with the UK law, which transposes this directive, one is (perhaps) surprised to find an apparent discrepancy. The UK regulations seem to explicitly exclude vehicle components (which include automotive aftermarket products) from the scope of the generic UK EMC regulations.

This may leave manufacturers of automotive aftermarket and other producers or importers of electric/electronic goods to consider questions like these: How do I make sure that I comply with the different interpretations of EU directives and regulations in different countries? What about the new EMC directives which will take affect in the not so distance future? How can I keep up-to-date with any changes of interpretation of unchanged directives? Does it really matter?

One has to be very dedicated to keep up-to-date with so many different EU directives and regulations. If an EU directive changes, then consulting the *Official Journal of the European Union* can help. The same publication may alert one to changes in the applicable standards. But it is hard to keep up-to-date with any changes to EU guidelines - let alone applying them in the time frame the directive and the market demands. Probably only Ernest can do it anyway?!!!

¹ http://europa.eu.int/eur-lex/lex/LexUriServ/site/en/oj2004/l_390/l_39020041231en00240037.pdf

² http://europa.eu.int/eur-lex/lex/LexUriServ/site/en/oj/2004/l_337/l_33720041113en00130058.pdf

³ <http://www.opsi.gov.uk/si/si2005/20050281.htm>

⁴ http://www.europa.eu.int/comm/enterprise/electr_equipment/emc/guides/index.htm

⁵ http://www.europa.eu.int/comm/enterprise/electr_equipment/emc/guides/note.htm, ¶ 3 and ¶ 1

⁶ *Official Journal of the European communities*, No L139, page 20, Article 2 (1), ¶1

⁷ *Official Journal of the European communities*, No L139 page 21, Article 4

⁸ *Official Journal of the European Communities*, L266, page 2, Article 1, ¶1

⁹ *Official Journal of the European Communities*, L266, page 5, Annex I, ¶1

¹⁰ *Official Journal of the European Communities*, L266, page 1, right column, last paragraph

¹¹ *Official Journal of the European Communities*, L266, page 2, Article 1, ¶4

¹² *Official Journal of the European Communities*, L266, page 11, Annex 1, ¶8.3

¹³ *Official Journal of the European Union*, L337, page 26, Annex 1, ¶8.2 and ¶8.3

¹⁴ *Official Journal of the European Union*, L337, page 26, Annex 1, ¶8.5

¹⁵ European Communities, *Guidelines on the Application of Council Directive 89/336/EEC*, edition 1997, page 32, Article 15.3, right column, last paragraph

¹⁶ S.I., *The Electromagnetic Compatibility Regulations 2005*, regulation 23 (1)

¹⁷ University of York, *Core Module: EMC Management, Appendix F, Automotive Directive, Radio Approvals*

¹⁸ DfT, *Guidance on the Automotive EMC Directive 95/54/EC*, revision 6, January 2003

¹⁹ <http://www.vca.gov.uk/downloads/files/vca045.pdf>. (visited 22/08/05)

²⁰ European Communities, *EU Guidelines on the application of the Directive 89/336/EEC*, last updated 03/12/2004, ¶15.3

²¹ <http://www.hoboes.com/html/FireBlade/Wilde/earnest/>

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