Another EMC resource
from EMC Standards

Purchasing for compliance and reduced financial risk

Helping you solve your EMC problems

9 Bracken View, Brocton, Stafford ST17 0TF T:+44 (0) 1785 660247 E:info@emcstandards.co.uk

Purchasing for compliance and reduced financial risk

Keith Armstrong explains why it is very important indeed not to rely on CE marking when purchasing units, and to install them in accordance with their manufacturer's EMC instructions and good EMC practices

Recent work with customers in Australia, USA and the UK have reminded me that many, if not all, panel builders and systems integrators are running huge financial risks by not being careful enough in the units they buy to incorporate in what they provide, and neither are they being careful enough with their installation.

The plain fact is that modern electronic technologies with sophisticated software are used in almost everything we buy these days, however low-cost, and they are either very prone to emitting a great deal of electromagnetic interference (EMI), or are very susceptible to EMI, sometimes both at once.

Every year that goes by this situation gets worse, so even if you believe you have never had a problem with EMI before, you probably will in the future. You could have a very expensive EMI problem on your next project! See [1] for 500 examples of EMI, some of which were very expensive indeed. I know of many more examples of such problems that are not in that book, but can't discuss because of commercial confidentiality.

Customers rely on us to do at least a competent job - which includes preventing EMI problems. But since they usually have no clue about EMI they usually just include meaningless line items in the contract such as "Must comply with all EU Directives" or "Must comply with all IEC/EN 61000-4 series standards". Sometimes they list specific EMC standards, which are usually either incorrect or years (even decades!) out of date.

Not that many of us pay much attention to such line items - because many customers are so unaware of the potential for EMI problems, and their legal obligations on EMC, that they are often satisfied by CE marking and EU Declarations of Conformity.

Where the correct operation of electronics (e.g. software) has implications for safety risks, some customers (and their independent safety assessors) will be satisfied by pass results to EMC tests in a laboratory or on-site, not realising that you can't prove safety risks are low enough simply by testing [2].

My very recent experience includes:

i) A prestigious scientific research site where results were contaminated by EMI from variable speed drives installed in the plant room without following their manufacturer's EMC installation instructions. The site's owner is considering suing the installer for a lot of money.
ii) Oil/gas installations using MW variable-speed motor drives without mains filters because "it saves cost and we never had any EMI problems" had a new site that could not be used for several months, at a huge daily cost, because the drives interfered with the control gear.
iii) A manufacturer who uses the cheapest far-eastern manufactured mains power supplies in his product, without applying any QC to batches received (to save cost), now has to do a worldwide product recall because the power supplies are causing the products to catch fire.
iv) A manufacturer who sells a CE marked product, confident in its EMC compliance because (after a lot of time and effort) the first one passed its EMC tests, discovered that a change to its wiring to save cost had made it non-compliant. No idea how many they had sold like that.

I've seen many, many incidents like those above over the 20 years since I started Cherry Clough, and they all had serious financial risk implications for someone.

EMI problems are actually quite common, but

Cherry Clough Consultants was started by Keith Armstrong in 1990 to help manufacturers reduce costs, time-scales and warranty costs whilst complying with the EMC Directive and other regulations.

Keith has a great deal of experience with the EMC of control panels, systems and installations, of all types and sizes, and with Tim Williams, wrote the only textbook on the subject: "EMC for Systems and Installations" (Newnes, 2000, ISBN 0-7506-4167-3, www.bh.com/newnes, RS Components P/No. 377-6463).

The 'Publications & Downloads' pages at www.cherryclough.com contain a great deal of helpful and practical information on EMC.

often aren't understood to be caused by EMI. Often suppliers just replace units until the problem seems to have disappeared (the way garages fix many problems with cars these days) with no idea of what was the cause or whether it will reappear. Here are some EMI and EMC issues that you may not be aware of:

a) CE Marking and EU Declarations of Conformity only have legal relevance for customs officers at national borders. Under UK law they prove nothing.
b) "Buying in good faith" is not a defence under UK law.
c) Doing what your competitors do is not a defence under UK law.
d) Official figures show that about one-third of the CE marked products available in the EU do not comply with Directives [3].
e) Units that really do have good EMC performance, but are not installed exactly in accordance with their manufacturers' EMC instructions and good EMC engineering practices, will not have good EMI performance.

Item d) corresponds with my own experience with assessing industrial control components for EMC and Safety compliance - about one one-third were OK, one-third so-so, and the remaining one-third clearly had never had any EMC or safety design or testing done on them at all. They all had CE marks and Declarations of Conformity.

So if you bought three or more units to put in a panel or a system - in good faith, on the basis of their CE marks and Declarations of Conformity - you should expect the result to be non-compliant and expose you to all sorts of financial risks.

I have written about how to cost-effectively deal with these issues before, in PSB [4] [5], and also written a great deal on good EMC practices for installation [6] [7]. But few people seem to have paid much attention, most are instead running uncontrolled financial risks, possibly even threatening the viability of their entire company.

And yes, I do know that unit suppliers often don't provide any EMC (or safety) information other than CE marking and Declarations of Conformity; that customers choose the lowest-price bid; and that some insist on specifying the models of units or the way they are to be installed; and that panels are often sold without their builder knowing how they will be programmed or whether their application is safety-related. There are ways of dealing cost-effectively with all of these, but I am only allowed 800 words in these articles and am already over the limit by 60%.

Of course, very few panel builders or system integrators are worried about complying with the EMC Directive - they see little enforcement - but the real issues are:

1) Late delivery of working products/systems, hence excessive unplanned costs, penalty charges, grossly delayed final stage payments, and customers who may never buy from you again.
2) Senior staff tied up for weeks or months fixing problems in the field, with excessive unplanned costs, and customers who may never buy from you again.
3) Legal action to recover lost production, under the Product Liability Directive (Note: unlimited liability; no need for the plaintiff to prove it was your product or work that actually caused the loss, and lawyers who work on a "no win, no fee" basis). Very worrying where lost production is measured in millions - you can get a lot of lawyer for that kind of money.

Your managing director and financial director probably don't read PSB, and may be unaware of the risks they are taking - so copy this article and give it to them.

[1] *"The First 500 'Banana Skins'"*, Nutwood UK, 2007. Read it at www.theemcjournal.com, or buy (£10 plus P&P) from www.emcacademy.org/books.asp. Banana Skins numbered 501 and above are printed in 'The EMC Journal', free from www.theemcjournal.com

[2] *"Guide on EMC for Functional Safety"*, the IET, August 2008, ISBN 978-0-9555118-2-0, free from www.theiet.org/factfiles/emc/index.cfm or as printed book (£27 plus p&p) from www.emcacademy.org/books.asp.

[3] *"The Future of Market Surveillance for Technical Products in Europe"*, Ivan Hendrikx, Conformity, Apr 1, 2007, http://www.conformity.com/artman/publish/printer_158.shtml or www.conformity.com/PDFs/0704/0704_F01.pdf

[4] *"CE + CE does not equal CE"*, PSB June 2008, from www.psbonthenet.net/company.aspx?CompanyID=12242.

[5] *"Good EMC practices help reduce financial risk"* September 2007, from www.psbonthenet.net/company.aspx?CompanyID=12242.

[6] *"EMC for Systems and Installations"*, Tim Williams and Keith Armstrong, Newnes, 2000, ISBN: 0-7506-4167-3, www.bh.com/newnes, RS Components P/No. 377-6463

[7] *"Good EMC Engineering Practices in the Design and Construction of Fixed Installation"*, 2009, www.reo.co.uk/knowledgebase

For more about good EMC engineering practices, download the free REO Guide: "Good EMC Engineering Practices in the Design and Construction of Industrial Cabinets" from http://www.reo.co.uk/knowledgebase or read "EMC for Systems and Installations" (Newnes, 2000, ISBN 0-7506-4167-3, RS Components P/No. 377-6463).