

## **EMC Standards The challenge of keeping up to date.**

Nick Wainwright  
Operations Director  
York EMC Services Ltd

### **Summary**

For many manufacturers the question of applicable EMC standards is one which remains unclear and one on which they rely upon external organisations such as test laboratories for guidance and advice, primarily at the time of test. However, a continuing challenge is to keep abreast of developments in EMC standards, identify how they affect the manufacturer's products and ensure that Declarations of Conformity that were issued at the time of the original testing remain valid.

This paper identifies the mechanisms by which changes to standards occur in general, and highlighting specific changes that are currently underway and of which manufacturers need to be aware.

### **Introduction**

For many companies, their first introduction to EMC Standards came with the implementation of the EMC directive in 1996. In practice, however, a number of EMC Standards existed well before that date including the emission standards EN55022 (1987), EN55011 (1991) and EN55013 (1990).

Some immunity standards were originally published in the 1980s including the IEC 801 series.

<b>Standard</b>	<b>Immunity aspect</b>
IEC 801-2:1984	Electrostatic discharge
IEC 801-3:1984	Radiated immunity
IEC 801-4:1988	Electrical fast transient/burst

*Table 1 – Original IEC series of standards*

These standards detailed the immunity requirements specifically for industrial process measurement and control equipment but were subsequently referenced in early product specific and generic standards.

In the mid-nineties, the IEC 801 series was absorbed into the EN61000-4 series of standards, with modifications ranging from the minor to the comprehensive.

Test	IEC	EN
ESD	IEC 801-2:1984	EN 61000-4-2:1995
Radiated	IEC 801-3:1984	EN 61000-4-3:1996
EFT/B	IEC 801-4:1988	EN 61000-4-4:1995
Surge	N/A	EN 61000-4-5:1995
Conducted RF	N/A	EN 61000-4-6:1996
Magnetic field	N/A	EN 61000-4-8:1993
Voltage dips	N/A	EN 61000-4-11:1993

**Table 2 – IEC and EN equivalent standards**

The adoption of the EN61000-4-x standards into *basic* standards heralded a much wider change in the way standards were organised. Standards were categorised as follows:

- Basic standards
- Product (specific/family) standards
- Generic standards

A small number of product standards also fulfil a role as basic standards.

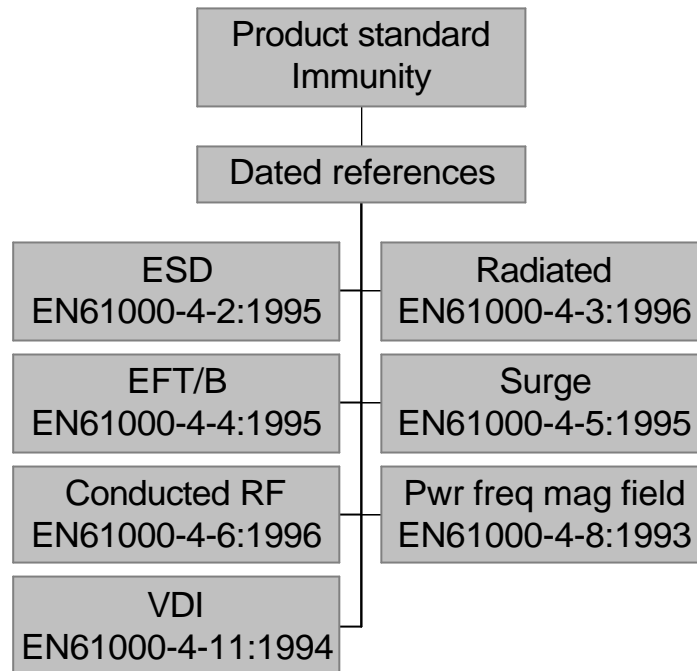
### **Updating standards - the importance of dated and undated references**

Every generic and product specific standards contains a series of normative references, including those to the basic standards. The references fall into two categories; those that are *dated* and those that are *undated*.

Whether a standard has dated or undated references can significantly affect the testing that is carried out on a product and it is important to fully understand what can seem a complex system.

When testing requirements are given directly in a product standard, for example a set of emissions limits, it is clear that the implementation dates of that product standard apply to those requirements, as well as the date of cessation (DOC) of conformity of the corresponding superseded standard.

Many of the standards listed in the Official Journal (OJ) specify requirements indirectly by reference to basic standards. When the referenced standard is a generic, product, or product-family standard that has been listed in the OJ, the date of cessation of presumption of conformity associated with the referenced standard applies.



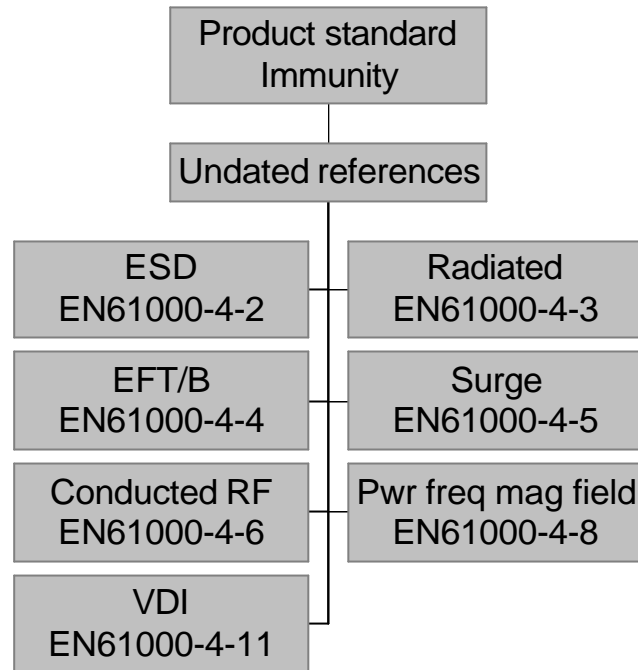
*Figure 1 – Example of a product standard with dated references*

When the referenced standard is a basic standard, it will not have been listed in the OJ and no date of cessation of presumption of conformity of the superseded standard will have been specified. However, the basic standard will have been allocated a "date of withdrawal of conflicting standards" by the standards body that published it. In such a case, this is the applicable date.

In practice, this means that when there is a dated reference to a generic, product, or product-family standard that has been listed in the OJ, then either the edition indicated in the standard should be applied or if the date of cessation of presumption of conformity associated with this edition has not expired, the superseded edition may be applied. After the date of cessation of presumption of conformity, the indicated edition shall be applied.

When there is a dated reference to a basic standard, then either the indicated edition should be applied or if the date of withdrawal of conflicting standards associated with the indicated edition has not expired, the superseded edition may be applied. After the date of withdrawal, the indicated edition shall be applied. In cases where it is clear that the indicated standard is obsolete or is withdrawn, a later edition may be used.

When there is an undated reference to a generic, product or product-family standard that has been listed in the OJ, then either the latest edition should be applied, or if the date of cessation of presumption of conformity associated with the latest edition has not expired, the superseded edition may be applied. After the date of cessation of presumption of conformity, the latest edition shall be applied.



*Figure 2 – Example of a product standard with undated references*

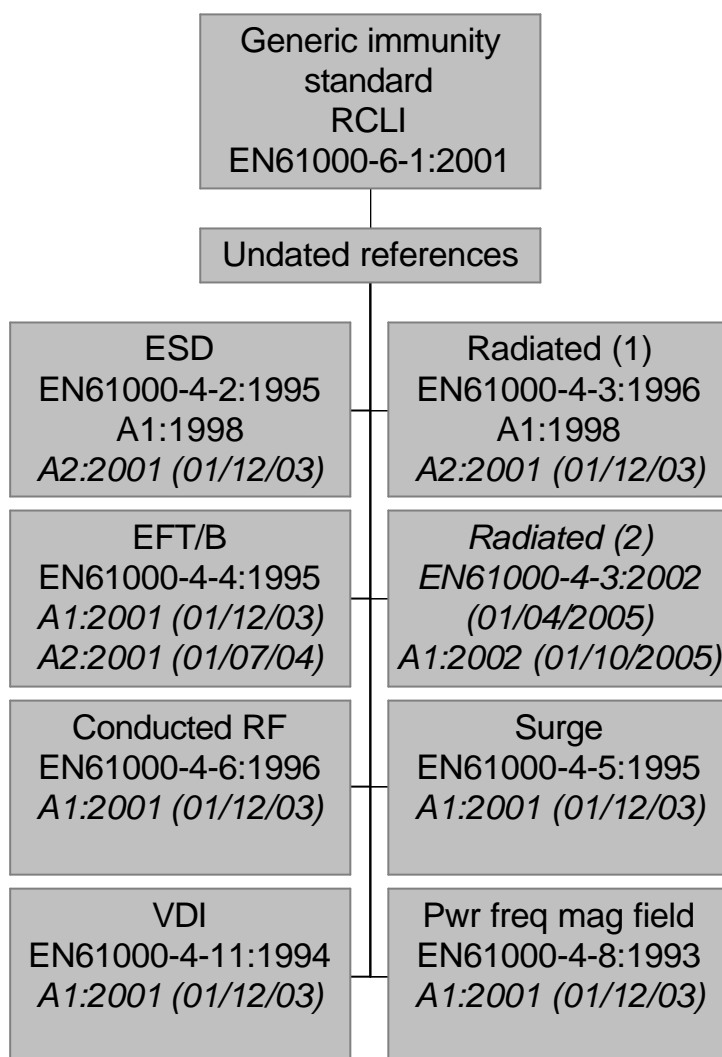
When there is an undated reference to a basic standard, then either the latest edition may be applied or if the date of withdrawal of conflicting standards associated with the latest edition has not expired, the superseded edition may be applied. After the date of withdrawal, the latest edition shall be applied.

In principle, the concept of undated references appears to be a sound one in that testing will be carried out to the most recent version of the standard including any amendments, which may provide guidance on the application of the standard.

However, whilst the EMC standard may contain undated references, the test plan issued by the laboratory must be specific in identifying exactly which standards and amendments are to be used. It is necessary, therefore, for the undated references to be transformed into dated references, either by the customer or more commonly by the test laboratory.

In practice, EMC test laboratories do not all implement new versions of standards or amendments to standards at the same time. Consequently a manufacturer requiring testing to a generic or product standard that contains undated references may not receive precisely the same tests if the product was tested at more than one laboratory.

Figure 3 shows the basic standards and associated amendments which are referenced from the generic standard, EN61000-6-1:2001. The standards and amendments where the DOW has not yet passed (as of June 2003) are shown in italics.



**Figure 3 – Example of the practical application of a standard with undated references**

Essentially, testing carried out to this standard may or may not include the standards and amendments in italics, depending upon the laboratory used.

### Updating generic standards

Four generic standards were originally published, representing the emissions and immunity aspects for both the residential, commercial and light industrial environment as well as the industrial environment. The standards were published in the EN5008x-x series between 1992 and 1997.

As much of the work on developing the basic immunity standards was also going on at this time, the two generic immunity standards either referenced the IEC 801 or a limited subset of the EN61000-4 series of standards.

The generic immunity standard for the residential, commercial and light industrial environment, EN50082-1 was updated in 1997 to fully reflect the available basic immunity standards.

The publication of the second edition of the industrial immunity standard in 1999 heralded the commencement of the renumbering of the generic standards into the EN61000-6-x series.

Standard	Title	New number	DOC
EN50081-1:1992	Emission requirements for the RCLI environment	EN61000-6-3:2001	01/04/04
EN50081-2:1993	Emission requirements for the I environment	EN61000-6-4:2001	01/04/04
EN50082-1:1997	Immunity requirements for the RCLI environment	EN61000-6-1:2001	01/04/04
EN50082-2:1995	Immunity requirements for the I environment	EN61000-6-2:1999	01/04/02
EN61000-6-2:1999	Immunity requirements for the I environment	EN61000-6-2:2001	01/04/04

**Table 4 – Renumbering of the generic standards**

It should be noted that the DOC of EN50082-2:1995 has already passed and this is no longer a valid standard. It has been superseded by EN61000-6-2:1999 which has itself been updated and published as EN61000-6-2:2001.

In general, the test requirements of the re-numbered standards are the same as the original ones, with the exception of EN61000-6-2:1999 which has been updated to include an extended range of EN61000-4-x basic standards; notably the addition of the surge and voltage dips and interruption tests.

#### **Further delays to EN55022:1998**

EN55022 is one of the most commonly used standards, either directly as a product specific standard for Information Technology Equipment (ITE) or indirectly as a basic standard referenced from other product and generic standards.

EN55022 was first published in 1987 with further editions following in 1994 and 1998; all being based upon the CISPR 22 equivalent standards.

The basic requirements of the 1987 and 1994 versions were largely similar, but EN55022:1998 for the first time introduced the requirement for conducted emissions on ports other than the ac power port; primarily telecommunications ports. The standard specified a

number of alternative test methods including the use of Impedance Stabilisations Networks (ISNs) and current probes.

However, a number of problems with the test method and particularly the specification of the ISNs forced CENELEC to postpone the DOW from 01/08/2001 to 01/08/2003. The standards list in the current version of the OJ listing (as of June 2003) shows both EN 55022 (1998) and Amendment 1 (2000) to have a DOW of 1/8/2003.

Whilst the problems highlighted with the telecom port test method have largely been resolved, recent votes in CENELEC committee TC 210 together with the approval of the CENELEC Technical Board have resulted in the DOW being pushed back a further 2 years to 01/08/2005. The Commission is to release a new OJ standards list to show the DOW as 01/08/2005 and consequently EN55022:1994 and its two amendments will remain the applicable harmonised standard until 2005.

### **Updating the Declaration of Conformity**

The development of standards is a continual process and one that is often described as a moving target by manufacturers. The challenge faced is to “remain up to date” both in terms of the testing of the products and the Declarations of Conformity that are issued.

Amendments to standards do not necessarily change the technical requirements, neither do they always require re-testing, but they do need to be reflected in the Declarations of Conformity.

In all cases, the dates associated with transition periods are crucial in distinguishing between when a particular version of a standard or amendment *can* be used as opposed to when it *must* be used.

The experience of the laboratories operated by York EMC Services Ltd, indicates that in many instances Declarations of Conformity that were valid when originally produced are no longer valid, not due to changes in the product for which it was issued, but due to changes in standards. The re-numbering of the generic standards provides an opportunity for this number to increase further.