

Important standard for EM immunity testing for electronic equipment

Electrical fast transients/BURST (EFT/B) testing according to IEC 61000-4-4, Ed.2 (2004-07)

There has a new edition of IEC 61000-4-4 on EFT/BURST testing being published a couple of weeks ago. The IEC 61000-4 series on basic EMC testing techniques contains several of the best sellers of IEC standards work. IEC 61000-4-4 itself is one of these best selling standards which shows the international acceptance and importance of the document and the work done in IEC TC77 on EMC and IEC SC77B on EMC High Frequency Phenomena. Therefore the interested public should be informed on the latest edition of the document on time.

It is publicly understood that EFT/BURST are unavoidable, that widely inductive loads such as relays, transformers, contactors, motors, etc. are distributed. Modern electronics became more and more sophisticated over the last 20 years. Digital electronics, in particular, became much more vulnerable regarding EFT/BURST. The reason for this situation is the EFT/BURST wave shape, which is detected by modern products and therefore creates very severe disturbances. With other words: Even if the disturbance signal is low-amplitude and of short duration (what means it does not contain too much electrical energy), it looks like a real signal to many modern electronic products and therefore such electronic products will easily be disturbed. Yet as for all impulsive phenomena, the effect of a transient on digital electronics is statistical. This means that identical pulses will produce different effects according to the moment they occur or are applied. This is the reason why the testing procedure for the EFT/BURST test as it is given in IEC 61000-4-4 is a really important instrument for achieving EMC in modern electrical equipment.

The immunity of electrical and electronic equipment to EFT/BURST is a big concern for such equipment and therefore it has been addressed for nearly 15 years by the IEC.

Developed by IEC SC 77B (High frequency phenomena), IEC 61000-4-4, now available in its second edition, is destined to design and test engineers in the electrical and electronic industry, and more generally to any engineer who needs to specify equipment with regard to transient electromagnetic phenomena (e.g. in fixed installations).

The standard establishes a common reference for evaluating the functional immunity of electrical and electronic equipment when subjected to EFT/BURST disturbances – for which the energy is transferred through one or more conductors. It describes a consistent method to assess the immunity of an equipment or system against the defined phenomenon.

The main changes compared to Edition 1 are the following:

- repetition rate: 5 or 100 kHz;
- common mode (asymmetric) injection;
- all the tests carried out at 0,1 m above the ground reference plane;
- all the cables to the EUT shall be placed on the insulation support 0,1 m above the ground reference plane.

An electromagnetic disturbance can be defined as any EM phenomenon that may degrade the performance of a device, equipment or system, or adversely affect living or inert matter. Any EM

emission, natural or 'man-made', is potentially a disturbance to any other susceptible device in the environment. It may either put it out of action or, in many cases a worse problem, cause it to malfunction.

There are two sides of the EMC equation:

- source equipment whose controllable emissions must be limited; and
- equipment that needs to have adequate immunity to those disturbances in its environment to which it is exposed.

Typical sources include, for example, power lines, switches, relays, contactors, electronic circuits of any kind, electric motors, radio and radar transmitters. Equipment that is disturbed, often called 'victim' equipment by EMC specialists, can include virtually anything that uses or can detect EM energy, such as radio receivers, domestic appliances, industrial installations or again electronic circuits of any kind.

For more information on EMC, please consult the EMC zone on the IEC website which. The access web page for this www.iec.ch. Here you also can order the new standard.

IEC 61000-4-4 Ed. 2.0 (2004-07)

Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

ICS code: 33.100.20 – SC 77B – 63 pages – CHF 112,-

Diethard E.C. Moehr
Siemens AG, I&S CTF EMC
Secretary IEC TC77 EMC
Diethard.moehr@siemens.com