

EMC and On-site Testing

Introduction

Electromagnetic Compatibility (EMC) measurements are usually performed in accordance with international standards within the controlled environment of an EMC Test Laboratory. The European EMC Directive, which applies to all electrical and electronic equipment, requires EMC conformity for physically large equipment, installed systems and distributed and complex systems as well as for smaller items such as consumer electronics. This means that strategies have had to be developed to demonstrate that large systems do conform with the protection requirements of the EMC Directive and also with market driven EMC requirements. An essential part of these strategies is the provision of test data and hence the need to carry out testing 'on-site' or 'in-situ'.

Standards

There are few standards that specifically detail EMC testing of large equipment, examples are: EN 55011 - a product standard concerned with Industrial, Scientific and Medical (ISM) equipment. This details radiated emission measurement techniques based on moving the receiving antenna around the equipment and measurements that can be made from the outside wall of a building housing the equipment.

EN 50121-3-1 - is the product standard describing emission measurement techniques for railway rolling stock. Tests are included for both a static vehicle and the vehicle in motion.

Conformity for large equipment has mainly been achieved using the Technical Construction File (TCF) route and adapting the tests called up by the Generic standards to be suitable for a) the operating environment and b) the Equipment Under Test (EUT) and (c) the on-site conditions.

HOW CAN WE HELP

York EMC Services Ltd has built a reputation as a leading supplier of EMC services in the UK. We can provide both testing and consultancy services to companies operating in a wide range of industry sectors. Specifically we can offer:

- ◆ Guidance to manufacturers of large electrical/electronic equipment on how to comply with EMC regulations and how to meet client's specifications in a cost effective manner.
- ◆ On-site testing.
- ◆ Practical advice to minimise EMC problems.
- ◆ TCFs and provide guidance on TCF compilation.
- ◆ The services of a European Competent Body appointed by the DTI for the assessment of TCFs.

Above all you can TRUST York EMC Services Ltd to perform all projects with COMPETENCE and INTEGRITY.



Emissions Tests / Requirements

Emission requirements are generally based on EN 55011, which is referenced from EN 50081-2 and EN 50121-3-1.

In many locations the level of ambient signals present is high and special measures may need to be taken to reduce these to a minimum during the testing period to increase the validity of the measurements taken. For example this may involve measurements being performed overnight when the bulk of the adjacent plant is idle.

Conducted emissions may be performed using a Line Impedance Stabilisation Network (LISN) where the current capacity of the EUT can be accommodated. Alternatively, the voltage probe method may be used.

Radiated emissions measurements are often made at distances less than the 10m specified in the standards due to restrictions on the available space. As the EUT cannot be rotated to find the position for maximum emissions, these measurements are made at a number of points around the equipment.

Immunity Tests / Requirements

The immunity requirements are based on the EN 61000-4-X series of standards called up by EN 50082-2.

EN 61000-4-3 details the radiated immunity test and requires the EUT to be illuminated with an appropriate electromagnetic field. This simulates signals present in the environment such as unwanted broadband emissions present in many industrial locations, broadcast services and mobile communications. A radiated immunity test, because of its nature, must be performed in a shielded enclosure to prevent interference to broadcast services during the

test and therefore cannot be carried out on-site. However tests can be carried out at prescribed frequencies using RF current injection techniques based on those described in EN 61000-4-6. Frequencies associated with known transmitters eg site walkie-talkies and mobile phones can be investigated individually.

Tests to determine the EUT's immunity to electrical fast transient/burst (EFT/B) interference, surge and electrostatic discharge (ESD) may also be made on-site. In the case of ESD, the manufacturer will need to consider the potentially damaging nature of the test and also its long-term effect as an ESD may cause latent damage to semi-conductor devices.

The Technical Construction File (TCF)

The TCF provides manufacturers of large equipment with the most appropriate route to compliance with the European EMC Directive. The results from on-site testing, along with supporting design details and sub-system test results, will form the basis of the TCF. A carefully compiled TCF may well be generic in nature and able to cover a range of similar equipment with little or no additional work.



For further information or advice contact:

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