European Metrology Research Programme

Delivering Impact

Mains adapter boosts competitiveness

The European electrical industry produces 700 billion euros worth of goods annually and employs four million people, making it one the EU's largest industries. This sector has an excellent reputation for high quality and reliable products underpinned by compliance with the EU's Electromagnetic Compatibility Directive. An accreditation scheme enables labs to demonstrate compliance with the directive's requirements but validating their testing requires improved methods to reliably confirm performance.

Europe's National Measurement Institutes working together

The European Metrology Research Programme (EMRP) brings together National Measurement Institutes in 23 countries to address key measurement challenges at a European level. It supports collaborative research to ensure that measurement science meets the future needs of industry and wider society.

Challenge

The electrical and electronic engineering industry is a major contributor to the EU economy and directly supports over 4 million manufacturing jobs. All mains-operated electrical devices made or used in Europe must comply with the EU's Electromagnetic Compatibility (EMC) Directive. This requires that electrical items or components do not cause interference that might damage or compromise performance in products, or other devices nearby. From initial product design to commercial production, quality assessments ensure products comply with the directive. EMC testing must be undertaken by laboratories that are members of accreditation schemes. These require that member labs can demonstrate robust links to the SI and that international quality standards for measurement procedures are rigorously applied. However, EMC testing is complex and there are few recognised measurement standards so accredited labs work to the general quality standard ISO17025.

Conductive EMC testing assesses interference in the form of electricity spikes or frequency changes induced in the appliance under test via its power cable, which can cause loss of performance in other devices on the supply system. Many devices are available for performing EMC testing, but individual test set-ups can radically affect results. Ensuring appliances are isolated from any mains interference during testing is essential for determining their compatibility with other electrical items. Greater standardisation of test methods and increased testing reliability is needed to ensure European electrical goods remain competitive in this global market.

Solution

The EMRP project, *Improved EMC test methods in industrial environments,* investigated the properties required for mains isolation test devices used in EMC testing, then designed, developed and characterised a new mains isolation adapter to improve the accuracy and reliability of conductive EMC measurements.

The characteristics of the new adapter were fully modelled using the properties of the materials used to ensure that the assembled device would meet EMC test requirements. Its performance was then confirmed by extensive testing with robust links to the International System of Units (SI).

Based on the project's results, AFNOR the French national standards organisation has submitted a Green paper on conductive EMC testing to the relevant committee on radio interference of the International Electromechanical Commission (IEC) – a first step towards a new international documentary standard in this area.

Impact

Trescal, a Danish accredited lab with customers across Europe, were one of the first to use the Project's mains adapter in customer EMC compliance testing. The new adapters well characterised performance and rigorously determined correction factors mean that Trescal have increased confidence in meeting their customers' expectations for rigorous EMC testing with good traceability to the SI system underpinned by robust quality assurance procedures.

The ability to perform EMC testing with greater accuracy underpinned by documentary standards and greater testing harmonisation will help industry, especially SMEs, to more reliably evaluate their products during the design stage. This will ultimately allow companies to have confidence that their prototypes and new products conform to the EMC directive and can successfully enter the marketplace. Improved standards for EMC testing support the competitiveness of EU industries in a global market where quality is key.

Ensuring electromagnetic compatibility

The EMPR project, *Improved EMC test methods in industrial environments* developed equipment, methods and improved accuracy for different types of testing performed to demonstrate compliance to the EU's Electromagnetic Compliance (EMC) Directive. A key aspect of the project was developing EMC testing methods and introducing them via on-site demonstrations to industrial users. The project's test device and mains isolation adapter are assisting accreditation schemes and member labs to demonstrate that test results are comparable, performed to ISO 17025 requirements and compliant with the EMC Directive

The EU supplies 21 % of the world's electrical engineering production, and has a reputation for quality underpinned by rigorous component and product test results that demonstrate compliance with the EMC Directive has been achieved.

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