

Title: Improved EMC test methods in industrial environments

Abstract

In Europe, achieving EMC compliance for electrical and electronic products is almost mandatory before entering the market, so EMC measurement and validation is necessary during the development of products. However, the development and maintenance of the EMC measurement facilities that meet the requirements of current standards require significant investment from industry.

Research on the performance of alternative test methods and the development of new alternative approaches is needed to decrease the costs for industry and to improve the comparability of the test results.

Conformity with the Work Programme

This Call for JRP's conforms to the EMRP Outline 2008, section on "Grand Challenges" related to Industry & Fundamental Metrology on pages 10 and 11.

Keywords

Electromagnetic Compatibility, Electromagnetic Interference, Electromagnetic Susceptibility, Electromagnetic Emission, Conducted Emission, Radiated Emission, alternative method

Background to the Metrological Challenges

Research on the performance of alternative EMC test methods and the development of new alternative methods is crucial for European industry. Techniques to determine the uncertainty of measurements have to be developed to demonstrate compliance with requirements on the reproducibility of measurements.

Test results from different EMC facilities are often not comparable, because:

- There are too many factors influencing the measurement result. To reduce the measurement time substantially, only a subset of the configurations is used in the measurement. For instance, limiting to only a few heights of the antenna to do a measurement. For different facilities, the sampling subsets are not consistent.
- The influence of the test units is not negligible for some large size test units.
- Uncertainty evaluation is based on empirical methods and not calculable.

This SRT calls for an investigation of the techniques that could be used to improve this situation. IEC CISPR and IEC TC77 do not agree upon how to treat diverse results of EMC measurements. The result of this research should provide information that could be used to eliminate the discrepancy between different methods that often leads to legal disputes.

Scientific and Technological Objectives

Proposers should address the objectives stated below, which are based on the PRT submissions. Proposers may identify amendments to the objectives or choose to address a subset of them in order to maximise the overall impact, or address budgetary or scientific / technical constraints, but the reasons for this should be clearly stated in the JRP-Protocol.

The JRP shall focus on the development of the connection between several alternative EMC test methods used by industry and test methods defined in standards.

The specific objectives are:

1. To develop new alternative test approaches, their traceability and to establish a link to the test methods defined in standards.
2. To estimate the uncertainty of the alternative test methods, and to provide guidance documentation for their implementation and use.
3. To model and develop a few different prototypes, calculable or reference Equipment Under Test (EUTs), covering relevant parts of the tests most commonly used in industry.
4. To test the prototypes in order to quantify the differences between different testing methods
5. To develop user guides for running inter-laboratory comparisons including evaluation methods and proposed tolerances

Proposers shall give priority to work that meets documented industrial needs and include measures to support transfer into industry by cooperation and by standardisation. An active involvement of industrial stakeholders is expected in order to align the project with their needs.

Proposers should establish the current state of the art, and explain how their proposed project goes beyond this.

The total eligible cost of any proposal received for this SRT is expected to be around the 2.7 M€ guideline for proposals in this call. The available budget for integral Research Excellence Grants is 42 months of effort.

Potential Impact

Proposals must demonstrate adequate and appropriate participation/links to the “end user” community. This may be through the inclusion of unfunded JRP partners or collaborators, or by including links to industrial/policy advisory committees, standards committees or other bodies. Evidence of support from the “end user” community (e.g. letters of support) is encouraged.

You should detail how your JRP results are going to:

- feed into the development of urgent documentary standards through appropriate standards bodies
- transfer knowledge to the electronics sector.

You should detail other impacts of your proposed JRP as detailed in the document “Guide 4: Writing a Joint Research Project”

You should also detail how your approach to realising the objectives will further the aim of the EMRP to develop a coherent approach at the European level in the field of metrology and includes the best available contributions from across the metrology community. Specifically the opportunities for:

- improvement of the efficiency of use of available resources to better meet metrological needs and to assure the traceability of national standards
- the metrology capacity of Member States and countries associated with the Seventh Framework Programme whose metrology programmes are at an early stage of development to be increased
- outside researchers & research organisations other than NMIs and DIs to be involved in the work

Time-scale

The project should be of up to 3 years duration.