



Sept, 1st, 2014

2015 Student EMC Hardware Design Competition

Call for proposals

Competition Coordinators:

Prof. **Arturo Mediano**
*Education and Student Activities
Committee (ESAC) Representative*
Dept. Electronics Engineering and Comms.
UNIVERSITY OF ZARAGOZA
María de Luna 1. E50018. Zaragoza. SPAIN.
Phone: +34 976 76 2382 Fax: +34 976 76 21 11
Email: a.mediano@ieee.org

Prof. **Stefan Dickmann**
Dept. Electrical Engineering
HELMUT SCHMIDT UNIVERSITY
Holstenhofweg 85
D-22043 Hamburg, GERMANY
Phone: +49 40 65413019
Fax: +49 40 65412018
Email: Stefan.Dickmann@ieee.org

EMC 2015, the Joint IEEE International Symposium on Electromagnetic Compatibility and EMC EUROPE will be held in the City of Dresden, Germany, on August 16-22, 2015.

As in the past years, the **Student Design Competition** presents an opportunity for the students to demonstrate mastery of EMC principles in meeting predetermined design requirements for a typical application in the electronic design world.

The Design Competition (sponsored by the *Education and Student Activities Committee* (ESAC) of the IEEE EMC Society (www.emcs.org/committees/education/), is designed by the competition coordinators to provide an opportunity for student competitors to showcase their creative skills on an EMC problem.

WE ARE NOW ACCEPTING SUBMISSIONS by students in this Design Competition.

A. GENERAL COMPETITION RULES.

1. The contest is open to teams comprised entirely of students enrolled during the time the work was performed a college or university at either the graduate or undergraduate level.
2. Previous year contest winners are not eligible.
3. The team must include a mentor (i.e. academic advisor, industry professional, etc). Entries are limited to one team per mentor.
4. Student groups are expected to complete the project largely on their own. The mentor advising the students must prepare a letter verifying that the design is the original work of the students, with only effort of that students. The letter will be submitted to the contest coordinators (read section " B. COMPETITION INSTRUCTIONS").

Note: Advisors should limit their help to answering basic EMC questions from the students once the project has begun. For example, it is perfectly acceptable to answer a basic question about the importance of controlling the current return path. Suggesting how components might be placed in the contest design problem to better control the current return path, however, might give an unfair advantage. A design review by an advisor or someone outside the group would certainly go too far.



5. The student(s) should use the email address issued by their respective institutions for all communication regarding the competitions, rather than their personal emails (e.g., Gmail, Hotmail).
6. The design entries will be judged by ESAC Committee Members or designated people. The designs submitted by the teams will be tested at Dept. Electrical Engineering EMC test facilities at Helmut Schmidt University in Hamburg, Germany.
7. The winning entries will be announced by June 15th, 2015 and recognized at the Awards Luncheon of EMC 2015, on August 21th, 2015 (www.emc2015.org).
8. The winning team will receive a prize of **700EUR** plus a travel grant of a maximum of **1500EUR** to cover the cost for one team member to attend the conference.
9. The winning design team will be invited to submit an article to IEEE EMC Magazine in order to share their design techniques and experience with the greater EMC community.

B. COMPETITION INSTRUCTIONS

Step 1. Fill the **Entry Form** included at the end of this document. Submit it via email to both Student Design Competition Coordinators Arturo Mediano (a.mediano@ieee.org) and Stefan Dickmann (Stefan.Dickmann@ieee.org). A confirmation email will be received to confirm reception. They will confirm registration and will submit detailed technical information of the problem to be solved through a "TECHNICAL SPECIFICATIONS DOCUMENT". Note that you can submit the form starting at September 15th, 2014 without limit until **March 30th, 2015**. Submit your Entry Form as soon as possible to receive the "TECHNICAL SPECIFICATIONS DOCUMENT" and approval of your enrolment.

Step 2. Prepare your design, the prototype and a written report to describe the work as explained in "C. SPECIFIC COMPETITION RULES" and in the "TECHNICAL SPECIFICATIONS DOCUMENT". Prepare the letter from the mentor verifying that the design is the original work of the students. That letter is mandatory.

Step 3. Submit the material from Step 2 (documents and prototypes) to the Student Design Competition Chair:

Prof. Stefan Dickmann
Dept. Electrical Engineering
HELMUT SCHMIDT UNIVERSITY, Holstenhofweg 85
D-22043 Hamburg, Germany

A confirmation email will be received to confirm reception. Deadline for reception of the materials is **April 30th, 2015**.

IMPORTANT DATES

September 15, 2014. Enrolment period is open.
March 30th, 2015. Enrolment period is closed.
April 30th, 2015. Deadline for reception of proposals including hardware prototypes.
June 15th, 2015. Winning entries will be announced.
August 21, 2015. Winning entries will be recognized at the EMC 2015 Awards Luncheon.



C. SPECIFIC COMPETITION RULES (ABSTRACT)

- The competitors are required to design, construct and test a 6-12V to 3,3V step-down switch-mode power supply (DC/DC converter) with as low conducted emissions from the proposed prototype as possible in the range of 150kHz to 30MHz, and as low ripple as possible in the output voltage.
- The details of the converter including partial schematic will be provided by the Student Design Competition Coordinators after reception of the **Entry Form** (read section " B. COMPETITION INSTRUCTIONS") and approval of registration.
- The work must be original from the students and not previously published.
- The use of commercially built DC/DC converter boards is not permitted.
- A written report will be required in Word and/or PDF format with a maximum extension of 25 pages including general description, schematics, pictures, measurements and bill of materials. The report will include the schematic of the completed design including all EMI/EMC elements used (e.g. filters). The report should also address the theory of the design by highlighting the EMC design concepts that were used in formulating it. The students should clearly indicate performance goals on that report.

All the main components need to be identified by manufacturer and part number. Files including simulation files, datasheets, calculation files, or any other additional information is not mandatory but can be submitted if students consider valuable for the evaluation process.

- Evaluations Criteria: the winner will be the solution obtaining the higher final score. That final score will be calculated considering: conducted emissions and ripple results (70%), report quality (20%), mechanical and aesthetic prototype - size, layout, etc. (10%).

IMPORTANT INFORMATION TO BE SUBMITTED

Prototype

Letter from the mentor (verifying that the design original)

Written report and other files in electronic format



"Where Baroque meets High Tech ..."

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ENTRY FORM

Academic Institution: _____

Name of Mentor (Academic Advisor, Industry Professional, etc): _____

Mentor Email address _____

Names of Student Team Members: _____

Team Leader Name (student): _____

Mailing address of team leader: _____

___ By placing an X in the space to the left of this sentence, the entrants acknowledge that they have read and understand the competition rules.

Signature of Team Leader

Signature of Mentor

This entry form must be completed and returned via email to the Student Design Competition Chairs Arturo Mediano (a.mediano@ieee.org) and Stefan Dickmann (Stefan.Dickmann@ieee.org).

A confirmation email will be received to confirm reception.