

## **ISM Band Phase shifter**

The objective of the competition is to design and realize an analog phase shifter in planar technology which will be tested at EuMW2014. The device must demonstrate flat phase shifting capabilities in the frequency band 2.4GHz-2.5 GHz.

The design must satisfy the following specification in the bandwidth 2.4-2.5 GHz:

**Input port reflection loss RL11, >15 dB**

**Output port reflection loss RL22 >15 dB**

**Phase range 0-360° for tuning voltage 0-5V**

**Phase error <3°**

**Insertion loss from input port to output port TL12<6 dB**

Needed test equipment and computer-aided design software will be provided to the participants. All doctoral, master and bachelor students registered in any one of the EuMW2014 Conferences are welcome to participate. The competition is open to all students and young engineers. The designers must be present to assist with the evaluation.

The Figure of merit (FOM) of the project will be calculated as follows.

- In case of specifications given in a design bandwidth, for each given specification a figure 1 will be assigned if it is valid for all the design bandwidth. In case of design not satisfying specifications in the entire bandwidth a weighting factor equal to the percentage bandwidth for each satisfied specification will be measured. The FOM of the design will be calculated as the sum of the weighting factor for all the specifications.
- In case of single value specification the weighting factor will be assigned as the square of the ratio between specification and achieved result.

**Awards:** The winner, as judged by the technical committee (based on the figure of merit), will be recognized during the closing session and will receive the EuMW2014 Student Design Prize with a value of €?????. In addition, students with the winning designs will be given the opportunity to submit an article to the EuMA International Journal of Microwave and Wireless Technologies.