UMR CNRS 9007

Master Internship

4 to 6 months starting March/April 2020

Antenna Radar Cross Section Measurement In Reverberation Chamber

Context

The Radar Cross Section (RCS) of a target defines its ability to reflect waves in particular directions. RCS measurements are usually performed within an anechoic chamber in order to mitigate reflections on the target (in particular from the room walls). Recently, an alternative approach has been proposed to measure the RCS within a Reverberation Chamber (RC) [1], [2], in order to avoid the use of a costly anechoic chamber. The method relies on the extraction of the ballistic wave backscattered by the target among the reflections due to the RC itself, based on an appropriate calibration and post-processing techniques. During this internship, we aim at extending such approach to the passive characterization of antennas; indeed, the RCS of a loaded antenna is an indicator of its radiation properties.

Objectives

This internship aims at measuring the RCS of some canonical antennas in L, S and C frequency bands (1-8 GHz) using the existing setup in RC (Figure 1). First, the intern will optimize various measurement parameters in order to enhance the overall accuracy. Then, post-processing codes (Matlab) will be developed in order to retrieve antenna parameters such as gain and impedance [3].

Figure 1 – ESYCOM Reverberation Chamber.

Profile

- Enrolled in a Master degree or equivalent
- Background in electromagnetics and antennas
- Interested for high frequency measurement
- Autonomous and highly motivated

Application deadline: ***March 30, 2020***

Resume, cover letter and last transcripts of grades to be sent at

- Élodie RICHALOT (Full Professor) : elodie.richalot@u-pem.fr
- François SARRAZIN (Associate Professor) : francois.sarrazin@u-pem.fr

Work environment

This internship will take place at the ESYCOM laboratory, Unité Mixte de Recherche CNRS (UMR 9007), on the University Gustave Eiffel campus in Champs sur Marne. The ESYCOM laboratory has a great expertise both in RC measurement and statistical properties evaluation. Also, the laboratory owns numerous measurement platforms and tools including three anechoic chambers and an RC.

References

[1] P. Besnier, J. Sol and S. Méric, "Estimating radar cross-section of canonical targets in reverberation chamber," 2017 International Symposium on Electromagnetic Compatibility - EMC EUROPE, Angers, 2017.

[2] A. Reis, F. Sarrazin, E. Richalot and P. Pouliguen, "Mode-Stirring Impact in Radar Cross Section Evaluation in Reverberation Chamber," 2018 International Symposium on Electromagnetic Compatibility (EMC EUROPE), Amsterdam, 2018.

[3] W. Wiebeck and E. Heidrich, "Wide-Band Multiport Antenna Characterization by Polarimetric RCS Measurements", IEEE Trans. Antennas. Propag., 2014.