

Modern Automotive Antenna Measurement Systems

Abstract

This course provides practical and theoretical aspects for automotive antenna measurements. It covers the steps an engineer needs to design, develop, place, and use antennas and antenna systems in automotive applications, focusing on some of the most advanced topics in this area, including OTA measurements for vehicle to everything (V2X) applications, emulation of virtual drive testing, and specific topics for measurements of automotive radar systems. The attendant will understand the various measurement techniques specifically for automotive antennas, including chamber design, absorbers, near-to-far field transformation, and some of the newest techniques such as the use of drones. .

Graphical abstract



Recommended prerequisites

The course requires a basic knowledge on antenna and electromagnetics

Learning objectives

- To know the different antenna measurement techniques for automotive domain.
- To know the main challenges for near and far field measurements.
- To know the specifications of the anechoic chambers for automotive measurements.
- To know the techniques for OTA measurements.
- To know new techniques using drones.
- To know the post-processing techniques for automotive measurements.
- To understand the virtual drive test testing.

Course outline

Topic 1: Introduction to automotive antenna measurements.

Topic 2: Antenna measurement techniques for automotive measurements.

Topic 3: Post-processing techniques in automotive antenna measurements.

Topic 4: hot topics: measurements using drones, virtual drive testing, OTA measurements.

The format of the course will be mainly theoretical. The instructors will talk about the different students interacting with them for questions.

The participants won't need to use a laptop if they are in the classroom, but we propose to have the course in an on-line format. In this case, they would need a laptop or equivalent to follow the course.

Instructor 1 – biography



Lars Jacob Foged was born in Denmark in 1966. He received his M.S. in Electrical Engineering from California Institute of Technology, USA in 1990. He is currently Scientific Director of the Microwave Vision Group. Since 2004, he was secretary and now vice-chair of the IEEE Antenna Standards Committee. He was vice chair of the APS/SC IEEE std 149 working group and currently the chair of the APS/SC IEEE std1720 working group. In 2016/2017 he led the Industry Initiatives Committee (IIC) of IEEE APS. He is involved in the evolution of IEC standards on Human Exposure to Electromagnetic Fields since 2010. He was member of the EURAAP Delegate Assembly and responsible for the Working Group on Antenna Measurements from 2009 to 2012. He was Vice-Chair of the EUCAP conference in both 2011 and 2022, Industrial Chair in 2012, 2014, 2017, and Technical Program Chair in 2016 and 2021. He is Board

Member and course organizer in the European School of Antennas (ESOA) since 2006.

He is Board Member, Fellow and Distinguished Achievement Award recipient of AMTA. He has authored or co-authored more than 300 journal and conference papers on antenna design and measurement topics and received the “Best Technical Paper Award” at the 2012 AMTA symposium and the “Best Measurement Paper Award” at the EUCAP 2021 conference.

Instructor 2 – biography



Manuel Sierra Castañer was born in 1970 in Zaragoza (Spain). He obtained the degree of Telecommunication Engineering in 1994 and the PhD in 2000, both from Technical University of Madrid (UPM). He worked for the cellular company Airtel since 1995 to 1997, since 1997 to 1998 for the University "Alfonso X". Since 1998 he is at Technical University of Madrid, getting the Full Professor in 2017. He has been visitor researcher in Tokyo Tech and EPFL at different times.

His current research interests are in planar antennas and antenna measurement techniques. Prof. Sierra-Castañer obtained, among other awards, the IEEE APS 2007 Schelkunoff Prize paper Award for “Dual-Polarization Dual-Coverage Reflectarray for Space Applications”. Currently, he is Senior member of the IEEE and Fellow of AMTA Society for his contributions to Antenna Measurement Theory.

He has been member of the EurAAP board of directors since 2016 to 2021, becoming vice-chair during the last three years. He is also member of the Board of European School of Antennas, organizing courses in Madrid, Paris, Shanghai and Beijing, and teaching courses in Aalto University. Manuel Sierra has been involved in the organization of European Conferences on Antennas and Propagation, being the general chair of EuCAP2022, in 2022 edition in Madrid. He is the dean of the UPM Telecommunication Engineering School, the eldest school in Spain in this area, since May 2021. Manuel Sierra is also the leader of the UPM Radiation Group (antenna area) since 2019.

Key bibliography

“Modern automotive antenna measurements”, L. J. Foged & M. Sierra-Castaner, Artech house, Boston 2022, ISBN: 9781630818494C