Abstract of full day Short course at the 2006 APS Symposium

Title:
Reverberation Chamber for Characterizing Antennas and Mobile Terminals under Rayleigh Fading: Efficiency, TRP, TIS, AFS, diversity, MIMO, UWB.

Organizer:
Prof Per-Simon Kildal, Antenna Group, Department of Electromagnetics, Chalmers University of Technology, S-41296 GOTHENBURG, SWEDEN

Contact address: per-simon.kildal@chalmers.se

Abstract:
The reverberation chamber has for many years found application in the EMC area. Recently, we have shown that it with great advantage can be used also for antenna measurements as it simulates effectively a uniform multi-path propagation environment. The course will give the basic theory of reverberation chambers, and show how the chamber can used to measure radiation efficiency, free space radiation impedance, and diversity gain of antennas; total radiated power and receiver sensitivity of mobile phones and other wireless or mobile terminals (GSM, CDMA, DECT, Bluetooth, UMTS); and channel capacity of MIMO antenna systems. The chamber is the only known measurement instrument for measuring diversity gain and channel capacity; the alternative being to drive measurement instruments around in an actual urban environment. A major advantage with this new measurement method is that the measurements fast and easily can be performed when the antenna or phone is located in different talk positions relative to a head phantom or other environments. Special emphasis will be directed towards fast and accurate measurements of static and dynamic receiver sensitivities, known as Total Isotropic Sensitivity (TIS) and Average Fading Sensitivity (AFS), respectively. Reverberation chambers for EMC applications are normally very large, but we will show that for measurements at 900 MHz and above it is possible to use a small chamber that can pass through a 80 cm wide door.

The course is based on recent both published and unpublished material related to extensive measurements in both large and small reverberation chambers. The course will include discussion of results measured on actual mobile phones and Bluetooth modules.

Copies of slide presentations and journal articles will be provided in electronic format.

The reverberation chamber with antenna measurement procedures have been commercialized by the company Bluetest AB (www.bluetest.se).

The most lectures in the course will be given by Professor Kildal, and Charlie Orlenius from Bluetest AB. After lunch there will also be invited presentations by others working in the field.