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**Dr. Zhong Chen**

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**“Advanced Antenna Measurement Techniques  
Using  
Time Domain Transformation”**

**Datum:** 17.09.2019  
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**Ort:** **Hamburg University of Technology (TUHH)**  
Am Schwarzenberg-Campus 1,  
21073 Hamburg  
Room A1.16, Building A (SBC1)

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## EMC Distinguished Lecture by Dr. Zhong Chen

### Advanced Antenna Measurement Techniques Using Time Domain Transformation

Time domain gating is an effective technique to remove reflections in antenna measurements. The vector frequency response is transformed to time domain via inverse Fourier transforms, and a time domain gate can be applied. This function is included in commercial vector network analyzers. Although its applications seem straightforward, the implementations and limitations can feel like a “black-box”. We provide an “under-the-hood” review of this popular function, and explain the nuances in the time domain gating applications which can affect the measurement uncertainties. This presentation strives to provide an in-depth understanding of the time domain gating algorithm. Topics discussed include aliases, resolution, typical EMC antenna time signatures, window functions, and time domain gate shapes, etc. We then discuss the gating band edge errors (or “edge effects”), mitigation techniques and the limitations of the post-gate renormalization method used in a VNA. We introduce an alternative edge mitigation method, which improves the accuracy for many antenna measurement applications.

**Zhong Chen** is the Director of RF Engineering at ETS-Lindgren, located in Cedar Park, Texas. He has over 25 years of experience in RF testing, anechoic chamber design, as well as EMC antenna and field probe design and measurements. He is an active member of the ANSI ASC C63® committee and Chairman of Subcommittee 1 which is responsible for the antenna calibration and chamber/test site validation standards. He is chairman of the IEEE Standard 1309 committee responsible for developing calibration standards for field probes, and IEEE Standard 1128 for absorber measurements. His research interests include measurement uncertainty, antenna measurements, time domain measurements for site validation and antenna calibration, and development of novel RF absorber materials. Zhong Chen received his M.S.E.E. degree in electromagnetics from the Ohio State University at Columbus.

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