香港城市大學 City University of Hong Kong

Department of Electronic Engineering

毫米波 State Key Laboratory of Millimeter Waves 國家重點實驗室（香港）

IEEE (HK) Section AP/MTT

# Workshop on

## Back to Basic Workshop VNA SA ZA with Advanced Applications

by

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**Abstract**

Three days' workshop is to enhance education and industry for RF/MW/MWW measurements basics and techniques of Vector Network Analysis (VNA), Spectrum/Signal Analysis (SA) and ZA (Impedance Analyzer).

First day: Fundamentals of VNA are to learn the principles of measuring high-frequency electrical networks with network analyzers and how the characterization of linear and nonlinear device behavior can be done. We will cover RF fundamentals and the concepts of reflection, transmission, S-parameters, and X-parameters and review the major components of network analyzers, followed by measurement calibration basics and various calibration techniques for accuracy enhancements. Applications and demonstrations are signal integrity for PCB design verifications, antenna test and MMW 1.1THz.

Second day: Fundamentals of SA are to learn why spectrum analysis is important for a variety of applications and how to measure system and device performance using a spectrum analyzer. We begin with an introduction to spectrum analyzers and discuss theory of operation. We will examine the instrument's major components and their significance as well as the spectrum analyzer specifications that are important for your application. Digital modulation concepts and analysis tools will be introduced. Applications and demonstrations are 3GPP base station transmitter verifications, signal monitoring, digital receiver test and 3GPP LTE amplifier test.

Third day: Fundamentals of ZA are whether your application is in R&D, production, quality assurance, or incoming inspection, Agilent Technologies has the right impedance measurement solution for you. This training will compare different impedance analyzers including auto-balancing bridge, I-V, RF I-V and network analysis. Key parameters, conditions, fixtures and compensation techniques will be discussed. Accurate measurements of material dielectric properties will also be introduced including coaxial probe, coaxial/waveguide transmission line techniques and parallel plate. Applications and demonstrations are accurate impedance measurements of low dissipation factor below 1mU, accurate bio-medical impedance measurements with probe station, touch-screen dielectric properties measurements and comparison of single-ended and differential probe impedance measurements.

**Biography**

**Andrew Ko** has been working as the Expert Application Consultant in Agilent Technologies since 1999. He has been supporting the Electronic Industries and R&D Education Institutes in Hong Kong and Southern China with strong technical expertise in RF/MW/MMW (up to 1.1THz) and assisting key accounts to achieve signal integrity compliance requirements from business partners such as Apple, HP, CISCO and IBM. He has been actively supporting Nano-Technology material R&D as well as university patent assessments. He is one of the advisory committee members of the HK PolyU EIE Department.

He joined HP/Agilent in 1989 and held different positions including the Senior Regional Sales Support Engineer with product championship in RF/MW design and component measurements and the Market Development Manager for promotion and channel programs in industries such as Wireless Manufacturing, Electronic Manufacturing, Aerospace/Defense, and General Purpose Instruments. Prior to joining HP/Agilent, he was Application Engineer with B&K for acoustics product support.

Andrew received his BEng (Elec) and MEngSc (Elec) degree from the University of Melbourne, Victoria, Australia, in 1987 and 1989 specializing in MMW CAD and experimental verification. He also received the MBA PT Degree from The Hong Kong University of Science and Technology with concentration in Information Technology Management in 1999.

**Date : 08 – 10 Jan., 2014 (Wednesday – Friday)**
**Time : 09:00am – 12:00noon (Presentations) &**
**01:30pm – 05:00pm (Applications/Demonstrations)**
**Venue : 15-202, meeting room, 15/F, Academic 3,**
**City University of Hong Kong**

***** FREE-OF-CHARGE & ALL ARE WELCOME *****

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