



State Key Laboratory of
Terahertz and Millimeter Waves
(City University of Hong Kong)



Seminar On

A Phenomenon of Resonant Frequency Shift in Microwave Measurement Using Linear Resonator Technique and Its Compensation Formulas

By

Dr Keren Li

National Institute of Information and Communications Technology (NICT), Japan

Date : 20 November 2018 (Tuesday)

Time : 09:30 am – 10:30 am

Venue : Room 15-202, 15/F, State Key Laboratory of Terahertz and Millimeter Waves,
Lau Ming Wai Academic Building, City University of Hong Kong

Abstract

Linear resonator technique is widely used in microwave measurement of dielectric substrate and transmission line, particularly at high microwave frequencies, such as millimeter-wave or THz-wave. Two main parameters: the resonant frequency and the Q-factor of a unloaded resonator are going to be obtained from the measured results, with which the dielectric constant of the substrate and loss to be calculated. There is a phenomenon of resonant frequency shift from that of unloaded resonator in the real-world measurement, however. This is caused by the small fraction coupling of the energy stored in the resonator to the measurement system, and the shift is an essential issue of the measurement, while no one worked it out, to the author's best knowledge. We have discovered a fact in recent years that the shift is related to the S-parameter measured on a vector network, and it can be compensated directly by using the S-parameter. We have also succeeded to derive simple formulas for the compensation. In this talk, we will present such formulas, taking linear resonator of microstrip line as an example, for the compensation of the resonant frequency shift, as well as the Q-factor. Numerical results will be given to show the effectiveness for the compensation with the derived formulas. The microstrip lines used in this work were fabricated on a 50um-thick liquid crystal polymer (LCP) substrate. Some measured results of transmission line characteristics such as effective dielectric constant, attenuation constant and Q-factor, from low frequency up to 70 GHz and from 220 GHz to 330 GHz, will be also presented.

Biography

Dr. Keren Li received the Ph.D. degree in optical communications from the University of Tokyo, Tokyo, Japan, in March 1991. He joined the University of Electro-communications (UEC) as a Research Associate from April 1991, and became a Lecturer in April 1994, and an Associate Professor in February 1997. Since April 1997, he joined National Institute of Information and Communications Technology (NICT, former Communications Research Laboratory: CRL), Tokyo, Japan, in April 1997, and became a senior researcher. His research interests include electromagnetic theory, microwave engineering, wireless communications (mobile system including 5G, UWB radio system and millimeter-wave system), optical communications and photonic devices such as optical modulators and photodetectors for high-speed optical communications, microwave photonics, antennas, and high-speed wireless communication systems using millimeter-wave and THz-wave.

Dr. Li is a member of the Institute of Electrical and Electronics Engineers (IEEE), a member of the Institute of Electronics, Information and Communication Engineers (IEICE) of Japan, a member of the Institute of Electrical Engineers (IEE) of Japan. He was an editorial board member of IEICE Journal since May 1999 to May 2001, and is a councilor of the Institute of Electronics, Information and Communication Engineers (IEICE) since May 2001 to April 2005. He serves as IEEE MTT-S Japan Chapter Secretary, since May 2005 to April 2009.

*** ALL ARE WELCOME ***

Enquiries:

Professor Chi Hou Chan, State Key Laboratory of Terahertz and Millimeter Waves
Tel.: (852) 3442 9360 Fax: (852) 3442 0353 Email: eechic@cityu.edu.hk