Title: Lightwave-Assisted Estimation of RF Signal Parameters

Abstract: RF signal processing via lightwave and its technique is known as "microwave- and millimeter-wave photonics (MWP)". This approach possesses some advantages such as avoidance from electromagnetic noises, and wide-bandwidth operation originating from the frequency range of lightwave higher than that of an RF signal with the degree of 4-5 orders. Now various functions have been demonstrated by adopting MWP: RF signal generation in high-frequency region, frequency upconversion and ultra-narrowband RF notch filters.

In this invited talk, we describe recent progress of RF signal measurement based on MWP [1-3]. This scheme utilizes a beat signal between two lightwaves whose phases are independently modulated by a reference RF signal and the RF signal under the test [1]. Into the beat signal, parameters of the RF signal under the test are reflected so that these parameters such as its amplitude and phase can be estimated [1]. Broadband frequency response is not required in the electronic circuit for the RF parameter estimation. In addition to these RF parameter evaluation, increase of frequency range under the test [2] and RF frequency evaluation [3] will be also described.