

Invited Overview Session

Session: FP1-1.3
Time: Friday, December 18, 15:00 - 15:30
Place: Room Y301
Chair: Daniel P.K. Lun, The Hong Kong Polytechnic University (Hong Kong)

A MIMO-OFDM System for High-Quality Video Communication

Speaker: Yoshikazu Miyanaga, Hokkaido University, Japan

Abstract

Currently sophisticated wireless technologies have enabled high-speed data transmission in home and personal networks. As a wireless communication standard, IEEE802.11ac based wireless LAN supports the maximum throughput of 1.5 Gbps at a 40-MHz frequency band width (BW), 3.0 Gbps at 80-MHz BW and 6.0 Gbps at 160-MHz BW by using a multiple-input and multiple-out (MIMO) stream technique with orthogonal frequency division multiplexing (OFDM).

This high throughput can be in particular expected for the use of high quality video wireless communications. In this talk, new wireless systems “over 1G” bps throughput, “over 80MHz” bandwidth and “less than 6GHz” carrier are introduced. In addition, some results in the field experiments are introduced when such high speed wireless systems are applied for high quality video transmission.

Our developed system has achieved the data rate of 3 Gbps by use of an 80-MHz baseband bandwidth and a 8 x 8 MIMO scheme. This talk describes the VLSI implementation of the 8 x 8 MIMO-OFDM system. A low-latency and the optimum pipelined architecture are employed for all processing blocks to provide the real-time operations on OFDM modulation and MIMO detection. The proposed architecture also realizes low power consumption. This system has been applied for High-Quality Video communication. With some of results on field experiments, the system performance for video communications is described.

Biography

Yoshikazu Miyanaga is the dean and a professor of Graduate School of Information Science and Technology, Hokkaido University. His research interests are in the areas of speech signal processing, wireless communications and low-power consumption VLSI design. He is an associate editor of Journal of Signal Processing, RISP Japan (2005-present). He was President-elect, IEICE Engineering Science (ES) Society (2014-2015) and currently President (2015-present). He is a fellow member of IEICE. He was a vice-President (2009-2013), Asia-Pacific Signal and Information Processing Association (APSIPA) and now a member of the APSIPA advisory committee. He was a distinguished lecture (DL) of IEEE CAS Society (2010-2011), an associate editor of IEEE CAS Transaction on TCAS-II (2011-2013) and he was a Board of Governor (BoG) of IEEE CAS Society (2011-2013).