

Multi-Gigabit Millimeter-Wave Wireless Communications

► ZHANG Yueping



ZHANG Yueping is a professor of electronic engineering at Nanyang Technological University, Singapore. His current research interests include the development of antenna-on-chip technology and characterization of chip-scale radio propagation channels at terahertz for wireless chip area network. Prof. ZHANG is a member of the Field Award Committee of the IEEE Antennas and Propagation Society (AP - S). He received the Sino - British

Technical Collaboration Award in 1990 for his contribution to sub-surface radio. He received the William Mong Fellowship from the University of Hong Kong in 2005. He received the IEEE AP - S Schelkunoff Prize in 2012. He was selected in 2012 by the Recruitment Program of Global Experts of China as a Qianren Scholar at Shanghai Jiao Tong University. Prof. ZHANG was elevated to IEEE Fellow in 2009 for contributions to integrated antennas and sub-surface radio.

► GUAN Ke



GUAN Ke received BE and PhD degrees from Beijing Jiaotong University, China in 2006 and 2014, respectively. He is an associate professor in State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University. In 2015, he has been awarded a Humboldt Research Fellowship. He was the recipient of 2014 International Union of Radio Science (URSI) Young Scientist Award. His paper received the honorable mention in

the third International URSI student prize paper competition in 2014 URSI GASS. From 2011 to 2013, he has been a research scholar at the Institut für Nachrichtentechnik (IN) at Technische Universität Braunschweig, Germany. From September 2013 to January 2014, he was invited to conduct joint research in Universidad Politécnica de Madrid, Spain. His current research interests are in the fields of measurement and modeling of wireless propagation channels, high-speed railway communications, and channel characterization for future millimeter wave and terahertz communication systems. He has authored/co-authored over 100 research papers in international journals and conferences.

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WANG Junjun received the BE degree from Shandong University of Technology, China, in 1999, ME degree from Shanghai University, China, in 2002, and PhD degree from School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, in 2006, all in electronic engineering. From 2005 to 2008, she worked at Sony Electronics (Singapore) as a senior R&D engineer. Since

2009, she has been an associate professor with the School of Electronic and Information Engineering, Beihang University, China. Her research interests include design of integrated in-package and on-chip antennas, electromagnetic compatibility, wireless energy harvesting and radio frequency circuits.

The exponential growth of using wireless devices in recent years has motivated the exploration of the millimeter-wave (mmWave) frequency spectrum for multi-gigabit wireless communications. Recent advances in antenna technology, radio-frequency complementary metal-oxide semi-conductor (RF CMOS) process and high-speed baseband signal processing algorithms have promised the feasibility of millimeter-wave wireless communications. The multi-gigabit-per-second data rate of millimeter-wave wireless communication systems is leading to applications in many important scenarios, such as wireless personal area networks (WPAN), wireless personal area networks (WLAN), back-haul for cellular systems. The frequency bands include 28 GHz, 38 GHz, 45 GHz, 60 GHz, E-BAND, and even beyond 100 GHz.

The special issue aims to present some major achievements of the research and development in multi-gigabit millimeter-wave wireless communications. It includes four technical contributions from leading researchers in mmWave communications. The first paper entitled “Substrate-Integrated Waveguide-Based Monopulse Slot Antenna Arrays for 60 GHz Applications”, co-authored by ZHU, XUE and LIAO, presents the substrate-integrated waveguide (SIW)-based monopulse slot antenna arrays for the application of 60 GHz monopulse tracking systems. The second paper entitled “Millimeter Wave and THz Propagation Channel Modeling for High-Data Rate Railway Connectivity — Status and Open Challenges” is co-authored by Kürner, GUAN, Molisch, AI, HE, LI, TIAN, DOU and ZHONG. In this paper, the authors provide elementary discussions on bandwidth requirements of high-data rate railway connectivity, and highlight the open challenges in terms of wave propagation, static channel, and dynamic channel.

Co-authored by XU, MENG, MA and YEO, the third paper entitled “State of the Art in Passive Bandpass Filter Solutions for 60-GHz Communications”, reviews the state-of-the-art filter designs for 60-GHz applications. Design methodology, design technology, key performance parameters, similarities and differences, advantages and drawbacks, and future trends are explored and studied. The last (but not least) paper “Low-Power High-Efficiency Multi-Gigabit 60 GHz Transceiver Systems Routing in Vehicular Environments” is co-authored by Byeon and Park. It proposes low-power high-efficiency multi-gigabit 60 GHz transceiver systems for short-range communications. The antenna-in-package module with the transceiver demonstrates mobile-to-display 1080p Full-HD video transmission over a distance of 60 cm.

We would like to thank all the authors for choosing this special issue to publish their new research results and insights, all the reviewers for their valuable review comments which help to improve the technical quality and presentation of this special issue, and the editorial official of *ZTE Communications* for all the support and help during the editorial process of this special issue. We are sure this special issue will again be quite informative and a pleasure for you to browse through and read in depth.