

Integration challenges for low-cost mm-wave phased arrays

Abstract

The continuously growing need for higher data rates and, therefore, more signal bandwidth in wireless applications, drives new applications into the mm-wave frequency domain. This requires medium to large-scale array antenna systems with tens or hundreds of active antenna elements. The fact that RF power generation is distributed over a large number of active antenna elements allows to use highly-integrated and cost-effective semiconductor technologies. The aim of the workshop is to chart current challenges and discuss what innovations are needed from the point of view of the co-design methodology (e.g. design to build), materials, manufacturing processes and system requirements to make highly-integrated mm-wave phased arrays a competitive technology.

Workshop

outline

The workshop will cover half a day: 2hrs for 4 presentations from speakers from industry and research institutions and 1hr 20min panel discussion.

Domine Leenaerts is with NXP Semiconductors, where he leads innovation in RF and mmwave front-end integrated circuits (ICs). He is a part-time Professor of RF-Transceiver Integration for Satellite Communication and Wireless Infrastructure at Eindhoven University of Technology (TU/e). His research focus is on key building blocks of wired and wireless communication transceivers at RF and mm-wave frequencies. The challenge is to achieve the required RF/mm-wave performance with minimum power dissipation for a given IC technology. Domine Leenaerts is a Fellow IEEE, holds over 30 patents, published over 250 papers in scientific journals and conference proceedings. He has coauthored several books, including Circuit Design for RF Transceivers (Boston, MA: Kluwer, 2001).

Yue Ping Zhang is Professor of Electronic engineering with the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. He has broad interests in radio science and technology and published widely in the field with current emphasis on MMIC and RFIC design for wireless chip area network and antenna-in-package (AiP) technology for single-chip radio devices. He received the Sino-British Technical Collaboration Award in 1990, the Best Paper Award from the IEEE International Symposium on Communication Systems, Networks and Digital Signal Processing in 2000, the Best Paper Prize from the IEEE International Workshop on Antenna Technology in 2007, the Schelkunoff Prize in 2012 from the IEEE Antennas and Propagation Society. He is a Fellow of IEEE.

Jean-Philippe Fraysse is currently with Thales Toulouse, France, where he works on advanced studies on space antennas. He received the Ph.D from the University of Limoges in 1999. His research interests include power combiners, failure analysis, microwave and millimetre wave power amplifiers, flip-chip devices, heterojunction bipolar and high electron mobility transistors, active antennas, millimetre wave field effect transistors, semiconductor device models.

Speaker from IMST GmbH, Department of Antennas & EM Modelling, speaker name TBC by IMST

Conference Topic

Applicable Tracks: T02 Millimetre wave 5G; T06 Aircraft (incl. UAV, UAS, RPAS) and automotive; T07 Defence and security

Topics: A17 Array antennas, antenna systems and architectures (incl. radomes), A14 Active and integrated antennas.