

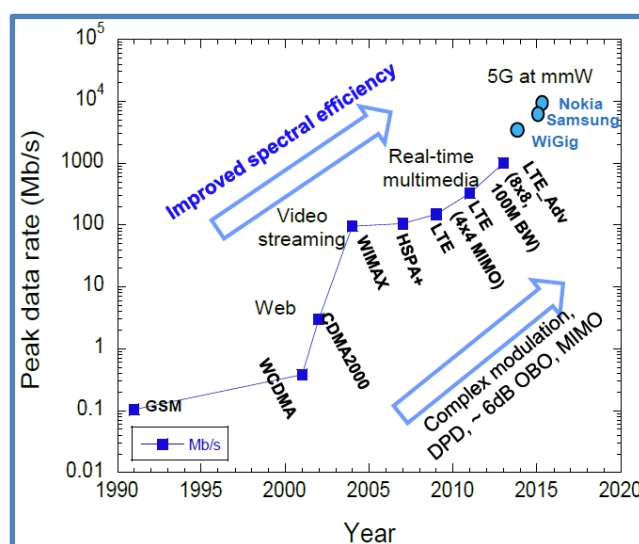
Can GaN RF and Millimeter-Wave Technology Be Linear and Efficient?

Speaker: *Dr. Jeong-Sun Moon, HRL Laboratories, LLC*

July 23, 2019 at 6:30 PM

Location: Skyworks Solutions, Newbury Park, CA

RF communications utilizes complex modulation schemes that require amplifier linearity. As amplifier operating frequency moves into the millimeter wave (mm-wave) range, the power added efficiency becomes also important to save the system prime power. As for 5G applications, high efficiency and linearity of amplifiers are required to support complex waveforms with high peak-to-average ratio (PAPR) and large instantaneous bandwidth. Recently, CMOS-based 28 GHz power amplifiers demonstrated 40% peak power-added efficiency (PAE) at 18.9 dBm saturated output power using 45 nm n-type CMOS SOI technology.



GaN HEMTs have a high breakdown voltage that offers high output impedance and power density per input capacitance over GaAs PHEMTs or CMOS. Thus, over the last decade, various GaN RF amplifiers are utilized for both commercial and defense applications. In this talk, we will present recent change in GaN RF and mm-wave technology for linearity and efficiency.



Dr. Jeong-Sun Moon is a Fellow of IEEE and Senior Scientist at HRL Laboratories, Malibu, CA, currently serving as an Editor of a top-notch IEEE journal, *Electron Device Letters*. He has been with HRL since 2000 and has been a PI for numerous contracts from DARPA, ONR, NRO, JPL and NASA. He received 2014 George Abraham Outstanding Paper Award from Government Microcircuit Applications and Critical Technology Conference (GOMACTech), and NASA SPACE ACT Board Award in 2009. He received his Ph.D. in physics from Michigan State University, East Lansing, MI, in 1995 in the area of nano/quantum devices and digital signal processing (DSP). With nanoscale devices, he studied electron and spin quantum transport and its $1/f$ noise in nanoscale. Using DSP, he developed a complete software-defined programmable digital transceiver/spectrum analyzer in

C/Assembly in 1992. Before HRL, he worked at Sandia National Laboratories, where he worked on III-V semiconductor nanoscale devices such as first 2D-2D resonant tunneling transistors. At HRL, his research focuses on emerging materials, novel high-speed devices, and applications toward RF circuits, using GaN, InP, GaSb, SiGe, Graphene, and phase-change material, as well as optical devices. He has published two book chapters and has authored or co-authored more than 100 papers and holds 20 patents. He also gave numerous invited conference and workshop presentations and tutorials/ short courses. His work was featured in various magazines including *IEEE Spectrum*, *Compound Semiconductor*, *NASA Tech Briefs*, *Microwave Journal*, and *MIT Technology Review*. He served on the Program Committee for the Device Research Conference. He is a member of Technical Program Committee in Microwave Theory and Techniques Society (MTT-S).

Location

Skyworks Solutions

649 Lawrence Drive, Newbury Park, CA 91320

Intersection of West Hillcrest Drive and Lawrence Drive

(NOT the main building, please use link below to arrow that pinpoints building)

<http://maps.google.com/maps?q=34.187542,-118.930994&num=1&t=h&vpsrc=0&ie=UTF8&z=18&iwloc=A>

Directions

From Los Angeles

Highway 101 North

Take exit 47A for Rancho Conejo Blvd

Use the left lane to turn right onto Rancho Conejo Blvd

Turn left onto W Hillcrest Dr.

Destination will be on the right

From Ventura

Highway 101 South

Take exit 47B for Wendy Dr. toward Newbury Park

Turn right onto N Wendy Drive

Continue onto Camino Dos Rios

Turn right onto W Hillcrest Drive

Destination will be on the left.

