



## San Diego Joint Chapters of ACerS & IMAPS

Sponsored by EMD Performance Materials

Tuesday, September 24th, 2019 at 12:00

### High Efficiency RF / Microwave Power Amplifiers and Transmitters for 5G Communication

Presented by: Ophir RF, Ramon Beltran, PhD

#### Abstract

The high data rates introduced by the fifth-generation (5G) cellular wireless represents unprecedented challenges for the transmit chain in a cellular-phone transceiver embedded in a cellular handset or base station. In fact, the high data rates create complex amplitude modulated signals with peak-to-average power ratios exceeding those from previous wireless generations. This causes any transmitter to operate under a very linear amplification range consuming a huge amount of electrical energy. In practical terms, this means the cellular handset or base station operates under very low efficiency conditions leading to a problematic heat dissipation, reliability issues, high operation cost and packaging challenges. In this talk, we will explore several different modulated signal amplification techniques currently used in the industry as well as techniques that have been regarded as research curiosities and are being resurrected from the past in order to increase the transmitter efficiency preserving the linearity requirements for modern communications systems.

#### Biography

Ramon A. Beltran obtained his PhD degree in High-frequency Electronics from CICESE Research Center in 2009 where he first demonstrated the use of class-E amplifiers on outphasing transmitters as a part of his thesis work. He has worked on product development and advanced research and development of RF HBT power amplifiers and transmitter architectures for industry leading companies such as RFMD (now Qorvo), Skyworks Solutions and Qualcomm Technologies. He is now with Ophir RF, a Los Angeles based company, working on RF, microwave and millimeter-wave power amplifiers with discrete transistors as well as designing MMIC amplifiers. Dr. Beltran is a member of the Microwave Theory and Techniques society chapter 17 (MTT-17) committee for HF, VHF and UHF technologies. He holds nine US patents on high-efficiency and linear RF power amplifiers and is an author of several papers on high-efficiency amplifier techniques presented at the International Microwave Symposium.

#### Logistics:

Tuesday, September 24<sup>th</sup>, 2019 at 12:00 – 1:00 PM. Lunch will be provided.

Location: EMD Performance Materials, @ 6555 Nancy Ridge Drive, Suite #200, San Diego, CA 92123

**RSVP required. Space is limited to 30 registrants due to room size; please sign up quickly.**

\$20.00 for members. \$25.00 for non-members. \$10 for students with an ID. Please advise if you are non-U.S. citizen when you register. [Register here](#) , questions please contact Bill Ishii ----- bill@imaps.org