

Engineering and Measuring RF Waveforms - the Unifying Link Between System Performance, Circuit Design and Transistor Technology

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This talk discusses how appropriately engineered RF waveforms can help meet telecommunication system goals such as power, efficiency, and linearity. It is well known that the performance of transistors in power amplifiers is linked to their mode of operation (Class A, A/B, C, etc.). A number of measurement systems now allow for the direct measurement of RF waveforms, either at RF or in the envelope domain. Coupling such systems with impedance control hardware enables experimental control (engineering) of these terminal RF waveforms. Because these measurement systems operate in the time domain they allow for a more natural integration of measurement and CAD simulation based design approaches.

This talk touches on several topics of interest to microwave engineers including modelling and measurement of power amplifier transistors and circuits; design and predistortion correction of nonlinear telecommunication systems; and circuit design methods that incorporate new transistor technology. Examples will demonstrate measurement feedback to support and link both the design of high power amplifier transistor technology (GaAs HBT/HFET, GaN HFET, Si LDMOS) and the circuit environment (harmonic load-pull, linearisation via base-band injection).