



Discussion Topic 2: Multisine Distributions I



- **General Topical Question: What is needed from a modeling point of view?**
 - **Issue 1:** Signals to use for model construction versus model validation
 - **Issue 2:** Number of tones, their spacing, and overall signal bandwidth
 - **Issue 3:** Tonal amplitude and phase deterministic/random distribution
 - **Issue 4:** Measurements in time-domain versus frequency-domain
- **Some Seed Opinions:**
 - **Opinion 1: Time-domain measurements are typically less accurate than frequency-domain ones, but have no nonlinear application limitations.**
 - » Capture all nonlinearity effects, whether deterministic or stochastic
 - » Allow for use of operational signals as stimuli instead of simple single CW tones
 - » Essentially imperative for model evaluation under realistic operating signal contexts
 - » With appropriate accuracy and stimuli, can provide formal nonlinearity identification



Discussion Topic 2: Multisine Distributions II



- **Seed Opinions (Cont.):**
 - **Opinion 2: Model construction signals determined by methodology and operational context; e.g., polyspectral method for wideband HPA modeling.**
 - » VNA & time-domain measurements made over 8-GHz BW to cover entire HPA BW
 - » 16-APK, pseudo-randomly (uniform distribution) modulated source used to produce signals near operational ones, as required by this operator series approach
 - Sample stimuli corresponds to 4096-component periodic multisine with 12.5 MHz spacing, over 3 times Nyquist rate time sampling (for 8-GHz BW), emulating 16-APK signal
 - Pseudo-random distribution imposed by method's identification requirements
 - **Opinion 3: Models need to be evaluated using operational signals.**
 - » Simple tonal evaluations not sufficient to guarantee needed fidelity
 - » Need becomes more critical with increasing BWs, data rates, modulation complexity
 - » Requires sufficiently accurate time-domain measurements
 - » Fidelity needed can be determined systematically from system performance measures (e.g., BER curves for digital modulation used)