



MM-WAVE MEASUREMENT & MODELING FOR 5G

Farshid Aryanfar
Straight Path Communications Inc.

UNIQUE 5G CHALLENGES @ MM-WAVE

- ❑ Optimal Radio: Cost – Performance
- ❑ mm-Wave Power Amplifiers
- ❑ Cost of Measurement

OPTIMAL RADIO: COST – PERFORMANCE

- ❑ Integrated Transceiver + Front End in Silicon **OR** Hybrid of Silicon & GaAs/GaN
- ❑ Phase Shifting Scheme IF/LO/RF/Hybrid
- ❑ IC on PCB **OR** Module with Integrated Antennas

MM-WAVE POWER AMPLIFIERS

- ❑ Choice of technology: many small Silicon (CMOS/SiGe) PAs or fewer GaAs/GaN PAs
- ❑ Limited Device Models @ mm-Wave
- ❑ Thermal challenges due to low PAE:
Co-Simulation vs. Iterative Design
- ❑ Packaging and its direct impact on FEM performance

COST OF MEASUREMENT

- ❑ Equipments with Higher Frequency, BW and Dynamic Range
- ❑ Controlled Environment for Over-the-Air (OTA) Measurement
- ❑ Phased Array Calibration
- ❑ Measuring Out of Band Emissions in an OTA setup is Time consuming