5G-Summit Lunchtime Panel:

mmWave Radios in Smartphones: What they will look like in 2, 5 and 10 years

Moderators:

Dylan F. Williams, NIST

Dylan F. Williams received a Ph.D. in Electrical Engineering from the University of California, Berkeley in 1986. He joined the Electromagnetic Fields Division of the National Institute of Standards and Technology in 1989 where he develops electrical waveform and microwave metrology. He has published over 100 technical papers, is a Fellow of the IEEE, is the recipient of the 2013 IEEE Joseph F. Keithley Award. He served as Editor of the IEEE Transactions on Microwave Theory and Techniques and as 2017 President of the IEEE Microwave Theory and Techniques Society.

Amarpal Khanna, National Instrument

Dr. Amarpal Khanna is a distinguished engineer at National Instruments in Santa Clara, CA where he is driving innovation in the development of technologies and products for 5G and automotive radar test solutions. His technical expertise and specialties include millimeter-wave transceivers, signal generation, and high-speed technologies up to 100 GHz. He has previously held leadership positions at Phase Matrix, Agilent Technologies, and Hewlett Packard.

Dr. Khanna received a B.S. in electronics and communications engineering from PEC Panjab University, India and M.S. and Ph.D degrees from the University of Limoges, France. He has co-authored three books, published more than 50 peer-reviewed journal and conference papers and six patents. Dr. Khanna is an elected member of IEEE MTT ADCOM and was the general chair for the IEEE IMS2016 conference in San Francisco. Dr. Khanna is a Life Fellow of IEEE.

Panelists:

Walid Ali-Ahmad, Facebook

Walid Ali-Ahmad is currently with Facebook Connectivity team as Connectivity Specialist and RF Systems lead. Prior to this he was a Visiting Professor in the ECE department at UC San Diego, involved in 5G research and focused on Wireless RF systems engineering. He was also a VP of Technology at Qualcomm, Inc, where he was involved in the architecture and RF systems design of advanced RF Front-Ends and transceiver systems for 4G and sub-6GHz 5G User Equipment (UE). He was also a senior director of Technology at Mediatek, and led the architecture and RF systems design of low-cost 2G/3G/LTE integrated transceivers and SoCs for China market feature phones and smartphones. He also held a position as a principal member of Technical staff at Maxim Integrated products, and led the systems development of the first low-cost low-power WCDMA direct-conversion transceiver IC in SiGe BiCMOS. He holds several patents in the area of RF front-end tuning, and has published many articles and given many talks in the area of RF systems design for cellular and millimeter-wave radio systems. He is a senior IEEE member and an IEEE distinguished microwave lecturer for the 2017 – 2019 term. He has been part of the IEEE RFIC conference technical program and steering committees since 2004; he is currently the RFIC2018 general chair.

Farshid Aryanfar; Compound Waves, Dallas/Fort Worth

Farshid Aryanfar received his PhD from University of University of Michigan. He has worked on subjects ranging from IC design to Antennas, Radios and Wave propagation. From 2012 to 2015, Farshid was the architect and team lead building Samsung's 5G mm-wave radios at 28GHz. He then joined Straight Path Communications, as VP of Technology and built a Gbps end-to-end system at 39GHz. He has now founded a new company, Compound Waves. Farshid is an IEEE Sr. member with more than 50 published papers, and 40 Patents.

Harish Krishnaswamy, Columbia University

Harish Krishnaswamy (S'03–M'09) received the B.Tech. degree in electrical engineering from IIT Madras, Chennai, India, in 2001, and the M.S. and Ph.D. degrees in

electrical engineering from the University of Southern California (USC), Los Angeles, CA, USA, in 2003 and 2009, respectively. In 2009, he joined the Electrical Engineering Department, Columbia University, New York, NY, USA, where he is currently an Associate Professor and the Director of the Columbia High-Speed and Millimeter-Wave IC Laboratory (CoSMIC).

In 2017, he co-founded MixComm Inc., a venture-backed startup, to commercialize CoSMIC Laboratory's advanced wireless research. His current research interests include integrated devices, circuits, and systems for a variety of RF, mmWave, and sub-mmWave applications.

Dr. Krishnaswamy was a recipient of the IEEE International Solid-State Circuits Conference Lewis Winner Award for Outstanding Paper in 2007, the Best Thesis in Experimental Research Award from the USC Viterbi School of Engineering in 2009, the Defense Advanced Research Projects Agency Young Faculty Award in 2011, the 2014 IBM Faculty Award, the 2015 IEEE Radio Frequency Integrated Circuits Symposium Best Student Paper Award (First Place), and the 2017 IEEE ISSCC Demonstration Session Certificate of Recognition. He has been a member of the technical program committee of several conferences, including the IEEE International Solid-State Circuits Conference since 2015 and the IEEE Radio Frequency Integrated Circuits Symposium since 2013. He currently serves as a Distinguished Lecturer for the IEEE Solid-State Circuits Society and as a member of the DARPA Microelectronics Exploratory Council.

Tim LaRocca, Northrop Grumman

Tim LaRocca received his PhD in electrical engineering from the University of California, Los Angeles in 2009, respectively, investigating V-band reconfigurable CMOS transmitters and transformer-based power amplifiers. He works at Northrop Grumman in Redondo Beach, CA managing highly integrated RF/Millimeter-wave CMOS transmitter, receiver and phased array designs for space and ground missions. He is the PI on the current DARPA ELASTx program designing CMOS SoC transceivers for Military Satellite

Communication (MILSATCOM) terminals. He is an IEEE Senior Member and a member of the IEEE RFIC Technical Program Committee. In 2006 he received a Northrop Grumman Fellowship award and 2015 Leader of the Year. Prior to Northrop Grumman, he worked at Litton Solid State and two start-ups designing low noise and power amplifier MMICs and components for military and commercial products based on GaAs pHEMT and HBT processes.

Joy Laskar, Maja Systems

Joy Laskar received his B.Sc. in Computer Engineering (with Physics and Math Minors) from Clemson University and the M.Sc. and Ph.D. degrees from the University of Illinois at Urbana-Champaign. Dr. Laskar is a co-Founder and CTO/SVP for Maja Systems (winner of the most recent ACE Awards for most innovative RF/Microwave Products in the market). Dr. Laskar's technical expertise contributions are at the intersection of Radio Frequency Electronics, Analog Electronics and Electromagnetics. Dr. Laskar has co-founded 4 companies, co-authored 5 textbooks, published more than 600 peer-reviewed journal and conference papers, 60 patents (issued or pending) and graduated 41 Ph.D. students (while holding various tenured faculty positions at the University of Hawaii and Georgia Tech). He has helped pioneer the development of integrated high efficiency integrated Power Amplifier (PA) technology in both GaAs (co-founder of RF-Solutions and the primary PA solution for the Intel Centrino Platform) and CMOS PA technology (incorporated into Qualcomm's RF360 LTE Platform) and has investigated aggressive mixed-signal communication architectures resulting in Quellan. Most recently he has helped pioneer the development of low power millimeter wave gigabit wireless circuits which has resulted in the founding of Maja Systems which is providing gigabit wireless connectivity and sensor products for Enterprise Connectivity, Data Center, Automotive ADAS and emerging 5G platforms. Dr. Laskar is an IEEE Fellow.

W. Devereux Palmer, Lockheed Martin

W. Devereux Palmer (S'89-M'91-SM'01-F'12) received the Ph.D. degree in electrical engineering from Duke University, Durham, NC, in 1991. He is Chief Technology Officer at Lockheed Martin Advanced Technology Laboratories in Cherry Hill, NJ, responsible for defining and executing technology strategy for innovation incubation.

Prior to joining Lockheed Martin, he served as Program Manager at DARPA from 2012 to 2017, where he directed a portfolio of research and development programs on submillimeter wave and terahertz solid-state and vacuum electronics. He served as Program Manager for electromagnetics, microwaves, and power at the Army Research Office from 2001 to 2012. His success in guiding research and technology transition led to his selection for the Army Research Laboratory Award for Program Management in 2010, the Army Superior Civilian Service Medal in 2011, the Secretary of Defense Award for Excellence in 2013, and the DARPA Meritorious Service Award in 2017.

Dr. Palmer is an IEEE Fellow and volunteer focused on member advancement and recognition. He holds an Amateur Extra class radio operators license, is a registered Professional Engineer, and a member of the Association of Old Crows, the Materials Research Society, Sigma Xi, and USNC-URSI Commissions C and D. He received the IEEE Region 3 Outstanding Service Award in 2013.

Gary St. Onge, Anokiwave

Gary St. Onge has served as the Vice President of Sales since April 2014. Gary's track record of successes includes leadership roles in sales, marketing, and engineering. Prior to joining Anokiwave, he served as the Director for New Product Engineering at MACOM where he led an international team of 25 people bringing new products to market. Prior to that, he served as Senior Vice President of International Sales at WIN Semiconductors Corporation, where he was responsible for substantial sales growth year to year. Gary holds a B.S.E.E. from the University of Massachusetts at Amherst, and an M.S.E.E. from Northeastern University.