

THE INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS, INC.

NORTH JERSEY SECTION

MTT-Society & AP-Society Joint Chapter

PRESENTS



27th ANNUAL SYMPOSIUM AND MINI – SHOW

THURSDAY OCTOBER 4, 2012

PLACE: Hanover Manor, 16 Eagle Rock Ave., E. Hanover, NJ 07936. Ph#973-992-7425

The conference presents a series of lectures describing the state of the art in Microwave, RF, and Wireless Communications, technologies by leaders in their respective fields.

MINI SHOW FEATURING LATEST PRODUCTS - (9:30 AM TO 4:30 PM)

TECHNICAL SESSIONS (8:50AM to 4:40PM)

Time	Topic	Speakers	Title	Affiliation
8:50	Opening Remarks	George Kannell	Tech. Chair IEEE MTT/AP NJ	LGS Bell Labs
9:00-9:30	RF2D Technologies for Wideband Military Electronic Systems	Tim Fountain	Business Segment Manager	Tektronix
9:30-10:00	802.11AC & 802.11AD Technology and Test challenges	Brian Kane	Applications Engineer	Agilent Technologies
10:00	BREAK - MINI SHOW EXHIBITION			
10:30-11:00	Small Licensed Transmitters and Their RF Exposure assessment	S. Majkowski D. Moongilan	Distinguished Member of Technical Staff	Alcatel Lucent
11:00-11:30	Fundamentals of Wireless Communications and 4G Technologies	Fanny Mlinarsky	President	Octoscope
11:30-12:00	Microwave Near-field Imaging of Human Tissue: Hopes, Challenges, Outlook	Dr. Natalia Nikolova	IEEE Fellow, P.Eng.(ON), Professor	McMaster University
12:00	LUNCH - MINI SHOW EXHIBITION			
1:00-1:30	Antenna System Design and Platform Placement Analysis using Advanced Electromagnetic Simulation	C. Blair B. McGinn	Senior Applications Engineer	Ansys, Inc.
1:30-2:00	Use of the overdrive voltage in the design of an internally matched MMIC Low Noise Amplifier	Aaron Vaisman	Design Engineer	Mini Circuits
2:00-2:30	Secrets of Low Loss Coaxial Cables	Rich Pouliot	President	RF Depot
2:30	BREAK - MINI SHOW EXHIBITION			
3:00-3:30	Perspective on Microwave Monitor and Control Interfaces	Wayne Miller	President	Wayne Miller Assoc.
3:30-4:00	Patent Law for Engineers: How to safeguard your idea	Joel Miller	Patent Attorney	JoelMillerLaw.com
4:10	Closing remarks	Kirit Dixit	Chair IEEE MTT/AP NJ	Microcom Sales

Registration is on-site. Details are in the October issue of the NORTH JERSEY IEEE NEWSLETTER and Section Home page <http://www.ieee.org/go/njsection> calendar.

**ALL ARE WELCOME (IEEE Membership not required). REGISTRATION IS ON-SITE
THERE IS NO CHARGE TO ATTEND THE SYMPOSIUM OR SHOW.
COMPLEMENTARY BREAKFAST / LUNCH INCLUDED FOR ALL.**

FOR FURTHER INFORMATION

Chair / Exhibition:	Kirit Dixit	201-669-7599	kdixit@microcomsales.com
Chair MTT/APS Symposium	Har Dayal	973-633-4618	dayalhar@gmail.com
Technical Program Chair:	George Kannell	973-437-9990	gkk@lgsinnovations.com
Publicity:	Arthur Greenberg		a.h.greenberg@ieee.org
Event / Location Coordinator:	Ken Oexle	973-386-1156	
MTT/AP Chapter Chair	Dr. Ajay Poddar	201-560-3806	akpoddar@synergymwave.com
MTT/AP Chapter Vice Chair	Professor. Edip Niver	973-596-3542	edip.niver@njit.edu
Event Coordinator:	Russell Pepe	201-960-6796	rpepe@att.net

8:50 – 10:00

BREAK - MINI SHOW EXHIBITION

8:50-9:00 **Opening Remarks**

George Kannell Technical Program Chair LGS Innovations /Bell Labs

George Kannell is a Technical Manager with the Government Communication Laboratory at LGS Innovations (successor to the Lucent and Alcatel Government Solutions business units). At Bell Laboratories, he is responsible for System Architecture and realization of next generation Wireless systems. He taught courses in Digital Communications as an Adjunct Professor at the New Jersey Institute of Technology. Prior to Bell Laboratories, he worked as a Senior Engineer at Ansoft Corporation in Simulation of Communications Systems, Microwave Circuits, RFIC circuits, Bipolar and FET device characterization and software development. Before this, at KDI/Triangle Electronics, he managed an engineering team in the design of Active and Passive Microwave Components and Subsystems. He's published technical articles, has several patents and presented at technical conferences. He received his MSEE degree from NJIT in 1988 and his BSEE in 1984. He is a member of Eta Kappa Nu and a Senior Member of the IEEE.

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9:00-9:30 **RF2D Technologies for Wideband Military Electronic Systems**

Tim Fountain Business Segment Manager Tektronix

The need for improved spectral coverage in the operational theatre is driving the requirement for wider bandwidth solutions. Additionally, to improve platform performance and mission capabilities there is an increasing focus on cost and reductions in the size, weight and power of the system.

This session will discuss technologies for acquiring and generating wide bandwidth (>1 GHz) RF spectra by replacing narrow-band multi-stage mixing technologies with direct down/up-conversion blocks, high-speed, low-latency data converters and FPGA-based digital processing..

Tim Fountain is a Business Segment Manager at Tektronix and responsible for Tektronix' Component Solutions Data Converter products sold into military & aerospace applications. He joined TCS in Jan 2011. Prior to that Tim spent 21 years at National Instruments in a variety of role including R&D, product strategy, sales, marketing and support in both Austin TX and Newbury, UK. Tim holds a masters degree in electrical and electronic engineering from University of Hertfordshire in the UK. He is also certified as a licensed professional engineer in Europe and a chartered engineer in the UK. In his spare time, Tim likes to fly and is working on his Commercial Airplane License.

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9:30-10:00 **802.11AC & 802.11AD Technology and Test challenges**

Brian Kane Applications Engineer Agilent Technologies

The increasing use of high-definition video and the desire for wireless connections is driving the need for higher data rates to support transmission of large data files between devices in a home, office, or workplace. Some example applications include wireless connections to displays or projectors, distribution of video files around the home or office, and rapid file transfers for synchronizing devices or downloading movies from a kiosk. To address the need for "very high throughput" data rates, there are two new standards that are currently under development. 802.11ac is focused on frequencies below 6 GHz where the current WLAN standards operate, while 802.11ad is focused on the 60 GHz band. The 802.11ad draft standard is mostly adopted from work done by the Wireless Gigabit Alliance, with a physical layer that uses ultra-wideband technology.

Brian Kane is a Senior RF and Microwave Application Engineer within Agilent Technologies Electronic Measurement Group (EMG). Brian joined Hewlett-Packard/Agilent Technologies in September 1980 and has held multiple positions in Manufacturing, Production Engineering, and System Engineering. His current role is to support various customers focused on cellular technologies like LTE, W-CDMA, and CDMA. Brian is based in the New York area. He has a BS/EE degree in Electrical Engineering and holds one US Patent.

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10:00 - 10:30**BREAK - MINI SHOW EXHIBITION****10:30- Small Licensed Transmitters and Their RF Exposure assessment****11:00 S. Majkowski & D. Moongilan Distinguished Member of Technical Staff Alcatel-Lucent**

Deploying small cells, i.e., small licensed transmitters, is one of the key solutions to manage the recent data explosion and network congestion. Small cells are mainly deployed in residential or enterprise environments. Therefore, they can be located in close proximity to human bodies. Their RF output power is low, usually in the range of mW to a couple of watts. This paper addresses the RF exposure compliance for small cells, including regulations, criteria and rules in United States, Canada, Australia and European Union. In addition, small cells' RF safety requirement in various countries in relation to their RF output power levels is investigated. This information would not only help the designers understand the regulatory RF exposure compliance requirements for small cells thoroughly, but also provide them with guidance in determining the proper RF transmitting power levels for small cells. As a result, less time and lower cost would be required in meeting their global regulatory RF exposure assessment requirements.

Steve Majkowski is a member of technical staff of the Global Products Compliance Laboratory at Alcatel-Lucent's Bell Laboratories in Murray Hill, New Jersey. Since 1997 he has been responsible for the evaluation, test and certification of new wireless base stations products with the Federal Communication Commission. He has executed 30 Formal Product Certification filings with the FCC for AWS, Cellular 850 and PCS products and has performed hundreds of product evaluations. These products form the bulk of the wireless infrastructure for such companies as Verizon and Sprint within the US of A and other wireless service providers in the Americas and internationally. During this time he led the development of an automated measurement system and a methodology for the evaluation of medium power (< 5kW) RF transmitters.

Prior to joining Bell laboratories He was at Lockheed Martin AstroSpace where he was the EMC Technical Leader for the composite structured A2100 Commercial Satellite Programs Core Spacecraft design. He personally supervised development and construction of multiple spacecraft including ChinaStar, GE1 through GE5, EchoStar 104, 105 & 106 and the AceS Spacecraft. The Commercial Space projects followed a significant success as the EMC Technical Leader for NASA's Earth Observing System.

Mission to Planet Earth "terra" spacecraft. The \$1.7B terra spacecraft was a revolutionary advance in spacecraft technology incorporating a composite structure, 120VDC direct energy DC power systems, high data rate communication systems, a revolutionary hybrid grounding system and the first space based solid state data recorder memory management system. The terra spacecraft was the most expensive, largest, most powerful, highest data rate, most sensitive and the most electromagnetically quiet spacecraft that NASA had ever launched. Other previous spacecraft contributions included the International Space Station, GPS Block IIR, Milstar, TIROS, Intelsat and Inmarsat.

Previously the author had spent 10 years in the RF Engineering and Radar group at Lockheed Electronics. It was there as the Senior Principal Engineer for EMC and High Power RF design that he was involved in the development of components, antennas and systems for multiple programs including the Space Shuttle, B2 Bomber, Trident C4/D5, Aegis, Hubble, C5 Galaxy, B52, F15, F16, F22 and other classified programs.

Mr. Majkowski received his BSEE from New Jersey Institute of Technology in 1979 and performed Graduate studies at Stevens Institute, NJIT and George Washington University. He is a NARTE Certified EMC Engineer and a member of the IEEE EMC Society. He has received commendations from the US Navy, the US Air Force and NASA for his work on various programs.

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Dheena Moongilan is a Distinguished Member of Technical Staff in the Global Product Compliance Laboratory, Bell Laboratories, Alcatel-Lucent. Murray Hill, New Jersey. He is a member of Alcatel-Lucent Technical Academy. He is an electromagnetic compatibility (EMC) consultant for Alcatel-Lucent and is chairman of Alcatel-Lucent's EMC corporate committee and EMC expert committee. He has published several technical papers including twenty papers in the International IEEE symposiums. He received 2012 IEEE EMC International Symposium Best Paper Award. He holds two U.S. patents. He has a B. E. in electrical engineering and an M. S. E. E in applied electronics from the College of Engineering at Madras University in Guindy, India and an M. S. E. E in computer engineering from the Illinois Institute of Technology in Chicago.

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11:00-11:30 Fundamentals of Wireless Communications and 4G Technologies**Fanny Mlinarsky****President****Octoscope**

Wi-Fi and Long Term Evolution (LTE) technologies have come through several generations and are now poised to dominate wireless broadband for commercial, public safety and military applications. Spectrum in the 700 MHz band has recently been licensed by the FCC to carry a nationwide public safety broadband network. In July of 2009 the LTE was selected as the next generation technology for public safety communications. E911 and smart grid applications are also looking to leverage this licensed band. Wi-Fi is increasingly used in military networks for controlling battlefield robots and for mission critical communications.

This tutorial will cover the basics of Wi-Fi and LTE technologies and standards, including PHY, MAC and higher layers. We will discuss public safety, smart grid and military applications, their requirements and the wireless technologies most suited to meet these requirements. The tutorial will review performance, interoperability and certification testing. We will cover deployment issues and concerns. We will also overview the emerging standards, including 802.11n/ac and LTE-Advanced.

Fanny Mlinarsky is the founder of octoScope, a wireless solutions and services company. With 29 years of experience in progressively influential technology roles with companies including Agilent and Teradyne, she has developed hardware and software, managed R&D teams and founded Azimuth Systems, a successful VC funded wireless test equipment company. Her expertise spans RF, PHY, MAC, transport and application layers. Mlinarsky has published over 20 articles, 19 white papers and 6 test reports on wireless technologies and standards. She has delivered numerous presentations at industry forms, including the IEEE HST'11 LTE Tutorial, and has developed two highly rated online courses for EE Times: Fundamentals of Wireless and Fundamentals of LTE Physical Layer . Mlinarsky has a BS/EE and BA/CS from Columbia University with some graduate work at MIT. She holds 5 patents. In 2004, Fanny received a Woman to Watch award from Mass High Tech.

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11:30-12:00 Microwave Near-field Imaging of Human Tissue: Hopes, Challenges, Outlook**Professor, Canada Research Chair in****Dr. Natalia Nikolova****High-frequency Electromagnetics****McMaster University**

More than 40 years ago Larsen and Jacobi experimented with microwaves in the imaging of canine kidney. Their pioneering work triggered high hopes for a new diagnostic modality in medicine but also identified serious challenges. Research effort in this area continues unabated, focused especially on early-stage breast-cancer detection. This talk briefly reviews past and recent developments in near-field microwave methods for tissue imaging. In the context of these developments, the major challenges are discussed – challenges which have so far prevented microwave imaging from becoming a clinically viable modality. Promising new directions of research are described that have the potential to bring about a breakthrough.

Natalia K. Nikolova is a Professor at the Department of Electrical and Computer Engineering, McMaster University, Canada. She also holds a Canada Research Chair in High-frequency Electromagnetics. Her research interests include theoretical and computational electromagnetism with applications in inverse scattering, microwave imaging and computer-aided design. Prof. Nikolova has published more than 210 refereed manuscripts. She has authored 4 book chapters and has delivered many invited lectures on computer-aided microwave analysis and design as well as on microwave near-field imaging. Prof. Nikolova is a Fellow of the IEEE.

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12:00 - 1:00

LUNCH - MINI SHOW EXHIBITION

1:00-1:30 Antenna System Design and Platform Placement using Advanced Electromagnetic Simulation

Charlotte Blair

Senior Applications Engineer

Bill McGinn

Senior Applications Engineer

Ansys, Inc.

Mutually destructive interference can occur among antennas located at a common site, such as an aircraft, a ship or a vehicle. Proper antenna placement is required to prevent interference among systems. Full-wave analysis techniques are needed to accurately predict multi-band/co-site effects and to evaluate antenna placement issues.

In this presentation, 3D Electromagnetic simulation techniques will be used to do antenna co-site simulations of a Boeing V22 Osprey aircraft as well as an Oslo Class Frigate. Advanced simulation techniques will be presented which work efficiently for open-space electrically-large metallic models, such as antenna co-site and Radar Cross Section. Additionally, harmonic coupling among antennas from voice radios (VHF & UHF) to SATCOM to IFF system is studied including the effect of nonlinear amplifiers driving antenna feeds. Parametric analysis of antenna placement, rotor/engine position effect on coupling terms and antenna patterns is demonstrated.

Charlotte Blair is a Senior Applications Engineer for ANSYS,INC. (Burlington, Mass, USA). She received her BSEE from Rutgers University, Piscataway, NJ, USA and MSEE and PhD at NJIT, Newark, NJ, USA. Dr. Blair serves as IEEE MTTTS Region 1 Coordinator and WIE MTTTS Coordinator and IEEE MTTTS Connecticut Section Chair. She received the IEEE Region 1 Award in 2009.

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Bill McGinn is currently a Senior Application Engineer for Ansys Inc. In the past he has worked as a hardware design engineer and was involved in the development of RF/Microwave hybrid components, MMICs and subsystems. Additionally, as a designer in a high-speed digital IC group, he led a CAD effort, and contributed to the generation of active device models for FETs. Most recently he has worked for Ansoft Corporation specializing in high frequency circuit and system level design and simulation. As an Engineering Director he was responsible for QA, Customer Support and Production. Most recently, as a Senior Applications Engineer, he is involved with application development and product definition aimed at both component and system level design. He has most recently been involved in application development and system simulation for wireless applications as well as electromagnetic and thermal simulation of microwave components. He has written multiple articles and holds a BSEE from Stevens Institute of Technology as well as a Business degree from St. Peters College in NJ.

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2:30 -3:00

BREAK - MINI SHOW EXHIBITION

3:00-3:30 **Perspective on Microwave Monitor and Control Interfaces**

Wayne Miller President

Wayne Miller Assoc.

Thirty years ago, active microwave components were supplied with a variety of monitor and control interfaces with little regard to ease of system integration. The result was that system integrators were required to design hardware-specific interfaces for each device and to characterize them individually because of wide unit-to-unit variation. Devices with numerous control lines resulted in increasingly cumbersome system wiring. As systems have become more complex over the years, the needs to reduce system wiring and to have more consistent unit-to-unit performance have been driving the microwave component industry towards more sophisticated and more standardized interfaces. This presentation explores interface solutions that minimize the impact on microwave component OEMs while providing rugged, standardized system interfaces.

Wayne Miller has been a consultant in North Jersey since 1980, supporting a number of industries, but with heavy concentration in the microwave field. Prior to becoming a consultant, he worked for five years as a development engineer for Aircraft Radio in Boonton, where he worked on their first L-band DME product, and for which he obtained two US patents. With his experience in microwave synthesizers, pulse transmitters, and receivers; he was hired by Engelmann Microwave, where he became the manager of the Source Group, which developed and produced low noise oscillators, PLOs and digital synthesizers.

While at Engelmann Microwave, requests came from other companies that encouraged Miller to become an independent consultant. In this capacity, he has worked with dozens of companies in a variety of industries and research groups, most of which are in the microwave industry. The greatest concentration of his design efforts has been with microwave systems, subsystems, and components. Three decades of ongoing industry involvement at all levels have provided the insight for this presentation.

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3:30-4:00

Patent Law for Engineers: How to safeguard your idea

Joel Miller

Patent Attorney

Joel Miller, Esq

Working with a hypothetical, new product for detecting and monitoring wireless signals, we will explore various methods for protecting the product and its design (i.e., with patents, trade secrets, copyrights, and trademarks) and discuss how you would employ them. Our goal will be to develop a comprehensive strategy for product protection. Everyone will be encouraged to participate in the discussion.

Joel Miller has practiced law for over thirty years, specializing in patent, trademark, copyright, unfair competition, and antitrust law. Following graduation from law school, Mr. Miller served as a patent examiner in the U.S. Patent and Trademark Office, examining patent applications in the fields of telemetry, digital display systems, and computers. He also served as patent counsel and counsel for the Kearfott Division of the former Singer Company, handling patent matters, licensing, trade secret and export issues, and employment-related litigation. Prior to establishing his solo practice in 1991, Mr. Miller was associated with the law firm of Weil, Gotshal & Manges in New York City, where he worked on a variety of patent, trademark, and antitrust matters. Before graduation from law school, Mr. Miller held engineering positions with Aerocom, Inc., Coral Gables, Fla. (ground-based avionics), the Federal Aviation Administration, Washington, D.C. (radar), and Research Cottrell, Inc. (pollution control), and has worked as a bench technician (high-frequency crystal filters), a draftsman, and as a licensed broadcast engineer (WEEX and WJRH, Easton, PA).

Mr. Miller is a member of the District of Columbia, New Jersey, and New York Bars, admitted to practice before the U.S. Patent and Trademark Office, and a Fellow of the American Bar Foundation. He is the Legal Activities Chair for the North Jersey Section of the IEEE and is also active in the American Bar Association and the American Intellectual Property Law Association, holding leadership positions and frequently speaking before both groups. Mr. Miller is the author of the book, Patent Appeals at the USPTO: Appellate Advocacy and Practice. Mr. Miller received a B.S. in Electrical Engineering from Lafayette College in 1975 and a J.D. from the University of Miami in 1978.

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4:00-4:10

Closing remarks

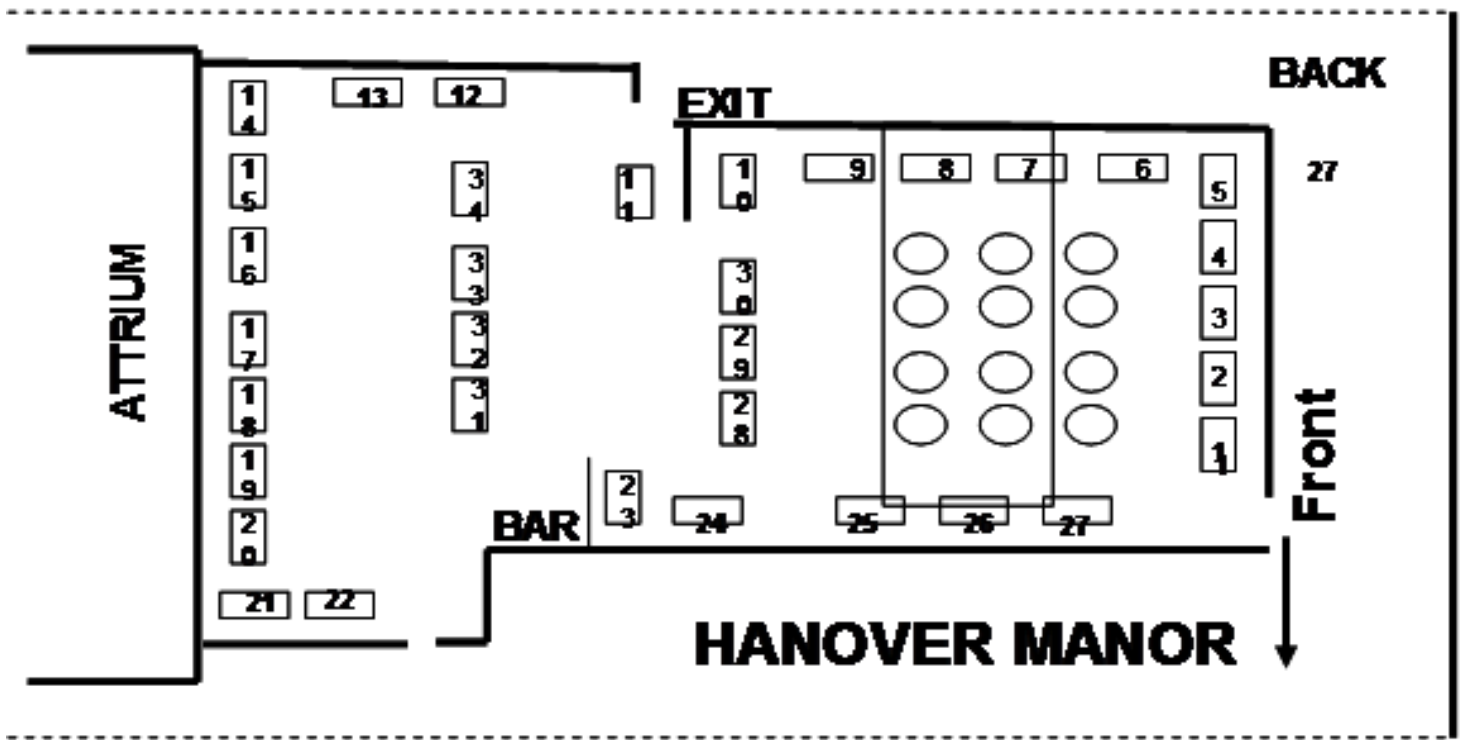
Kirit Dixit Chair, IEEE North Jersey Section

Microcom Sales LLC

Kirit Dixit is one of the founders of Microcom Sales LLC since 2004 and works as a manufacturer's representative in Metro NY/NJ Area. He was with RFESCO for the past 15 years prior to forming his company in similar capacity. For the prior eight years, he was the area manager for California Eastern Labs, representing NEC RF and Microwave products. He was responsible for the successful development and growth of eastern Canada and the Metropolitan NY/NJ territories. For the three years prior to CEL, Kirit was a Product Marketing Manager for Microwave Semiconductor Corp., in the Hi-Rel Satcom and Military Markets. Kirit received his BSEE in India, and his MSEE Specializing in Microwave from Stevens Institute of Technology, Hoboken, NJ.

Kirit has been active in IEEE activities in North Jersey Section and was Co-Chair of APS/MTTS chapter for the past 10 years. He was the Section Chair of the North Jersey section in 2007-2008 and presently volunteering as Chair of North Jersey Minishow since 2000.

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