

**29th Annual IEEE Compound Semiconductor Integrated Circuit
Symposium**

**2007 IEEE CSIC Symposium:
“Tastes of the Northwest”**

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TECHNICAL DIGEST 2007

Portland, Oregon, USA

14-17 October 2007

Catalogue: 07CH37881

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Dave Halchin, *RFMD*

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PANEL SESSION 1: 100 GbE: Market Drivers, Architectures, Technical and Economic Challenges

Moderators: Koichi Murata, *NTT Photonics Laboratories*
Tod Dickson, *IBM*

Optical communication links operating at 100 Gbit/s are no longer just the purview of the research community. For over a year now, the IEEE 802.3 Higher Speed Study Group (HSSG) has been exploring the need for and possible implementation of “real” 100 GbE fiber optic links. 100 GbE promises to be an important technology driver with widespread benefits for both the consumer and the high-speed optoelectronic IC industry. This panel will discuss market drivers, architectures, and the enormous technical and economic challenges that 100 GbE represents. In addition to clarifying the technical requirements of an economical 100 GbE transceiver, the session will be used to weigh up and compare the various proposed solutions. By better understanding what is technically and economically feasible, and what options exist, it is hoped that this panel will provide useful insight for IC and optoelectronic IC developers.

Panel Members:

Christopher Cole, *Finisar*
Petre Popescu, *Astar*
Yoshiyasu Doi, *Fujitsu*
Yves Baeyens, *Alcatel-Lucent*
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Moderators: Matthew Poulton, *RF Micro Devices*
Robb Shimon, *Agilent Technologies*

Efficiency and linearity are critical circuit specifications for basestations. Next generation modulation standards such as 4G/LTE (Long Term Evolution) and WiMAX continue to demand improved efficiency while maintaining or demanding more stringent linearity requirements. Over the last few years circuit designers have used a range of different techniques, both circuit design based and software based, to improve backed off efficiency levels and maintain linearity. Often combinations of circuit and software solutions are used. Additionally during this timeframe a number of new semiconductors (such as GaN HEMT, high voltage GaAs pHEMT and HBT or SiC MESFETs) have been developed to compete against the dominant technology in the RF power amplifier marketplace today, silicon LDMOS.

Panelists will be asked:

- 1) To address the relative merits and shortcomings of promising circuit topologies: Doherty, EER, switched-mode, drain modulation, and other variants.
- 2) To provide their view on which semiconductor device technologies are delivering solutions to new amplifier topologies today or in the near term future.
- 3) What are the attributes of the “ideal power device” for the power amplifier circuit topologies discussed?

Panel Members:

Bumman Kim, *POSTECH*
Don Kimball, *University of California, San Diego*
David Kelly, *Pulsewave RF*
Dave Runton, *RF Micro Devices*
Gerrard Wimpenny, *Nujira*
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¹*University of Toronto, Toronto, ON, Canada, ²STMicroelectronics,*
Crolles, France

PANEL SESSION 3: Potential of Future Applications of the mm-wave CMOS — Feasibility of 60GHz WLAN/WPAN in CMOS

Moderators: Sorin Voinigescu, *University of Toronto*
Jean-Olivier Plouchart, *IBM*

60GHz WLAN/WPAN is emerging as a potential solution for multi-Gbit/s wireless communication. This could be a high-volume consumer market for high-definition video and high-bit rate data streaming. III-V is currently used in mmWave products. With CMOS scaling, FET performance has improved significantly, but is it good enough to design mmWave products? Can CMOS succeed at mmWave frequencies? With the escalating cost of nanometer CMOS product development and variability, does it make sense economically to use CMOS?

If a 60GHz wireless I/O is going to be integrated with a 45nm microprocessor, is a standalone 60GHz CMOS transceiver viable? Can a 130nm or 90nm CMOS solution compete performance-wise with a 45nm CMOS radio? Do any of the 60GHz 90nm and 130nm CMOS chips reported to date work at 100C? Is a 60GHz CMOS radio start-up going to survive unless it sells the IP to a microprocessor company? Does it make sense to have a 60GHz radio in SiGe BiCMOS addressing the indoor wireless HDTV market?

By better understanding what is technically and economically feasible, and what integration options exist, it is hoped that this panel will provide useful insight for IC developers.

Panel Members:

Mahbod Eyvazkhani, *Nokia Research Center*
Ali M. Niknejad, *Berkeley Wireless Research Center*
Gabriel Rebeiz, *University of California San Diego*
Jonghae Kim, *IBM SRDC*
Kenjiro Nishikawa, *NTT Research Laboratories*
Joy Laskar, *Georgia Tech*

PANEL SESSION 4: Which Switch Gets Ditched?

Moderators: Peter Zampardi, *Skyworks Solutions*
Peter Katzin, *Hittite Microwave Corp.*

The RF switching function is becoming ubiquitous and increasingly important in modern electronics from mobile handsets and cordless telephones to cellular infrastructure, wired and wireless broadband networks, automotive telematics to surface, air-, and space-born military radar, communication, and ECM systems. For example, the trend towards multi-mode, multi-band switching handset front-end modules requires compact, highly sophisticated band-selection/transmit-receive duplexing switches that must also meet stringent performance specifications. Other embedded applications include, amplifier bypass, phase shifters, and attenuators where high performance switches also play a critical role. Our panelists present and discuss the important aspects (and trade-offs) of competing compact RF switch technologies such as PIN diodes, pHEMT, SOS, and MEMs that must be considered for use in practical systems.

Panel Members:

Dylan Kelly, *Peregrine*
Domingo Farias, *TriQuint Semiconductor*
Heinrich Heiss, *Infineon Technologies*
Julio Costa, *RF Micro Devices*
Rick Cory, *Skyworks Solutions*
John McKillop, *TeraVista Technologies*