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MTT Society News

TC-23 Wireless Communications Committee—Technical Activities in 2024–2025

■ Vittorio Camarchia and Kevin Chuang

During the 2024–2025 biennium, the MTT-S TC-23 Wireless Communications Committee continued to promote technical exchange and visibility in the broad area of wireless communications, including wireless system architectures, radio access technologies, channel modeling, waveforms, baseband processing, multiple-input, multiple-output (MIMO), next-generation and beyond-5G communications, satellite communications, cognitive radio, and spectrum sharing/coexistence.

TC-23 members contributed to the Society and to the broader microwave and wireless community through leadership roles, conference organization, technical program activities, editorial service, Distinguished Lecturer activities, and cross-disciplinary initiatives. The committee also maintained active engagement in areas that connect microwave engineering with advanced wireless systems and emerging network technologies.



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A major collective outcome of the biennium is the preparation of an approved focus issue of *IEEE Microwave Magazine*, with four articles generated within the TC-23 community. This initiative highlights the technical vitality of the committee and provides additional visibility to coordinated dissemination activities emerging from within TC-23.

Selected Member Activities

- Nuno Borges Carvalho continued to provide high-level leadership and visibility to the microwave community during the 2024–2025 biennium, building on his prior service in the Society's presidential role. He also remained active in international scientific leadership, including URSI-related activities.
- Debabani Choudhury continued her strong involvement in wireless community initiatives through IEEE 5G-related activities, summit leadership, and service on technical and steering committees.
- Roberto Gómez-García contributed through editorial and publication leadership, including guest-editing activities for several special and focus issues and sections.
- Kevin S. Chuang contributed to an *IEEE Microwave Magazine* manuscript dedicated to IEEE Radio & Wireless Week (see https://ieeexplore.ieee.org/abstract/document/11230178). He also organized a full-day STEM workshop during IEEE IMS2025, bringing wireless industry speakers from Keysight and Analog Devices to inspire local high school students who are passionate about science and technology (https://ieeexplore.ieee.org/abstract/document/10963801).
- Rui Ma served as an MTT-S Distinguished Microwave Lecturer

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during the biennium, contributing to the worldwide dissemination of topics relevant to future wireless systems.

- Olga Boric-Lubecke served in important MTT-S leadership roles and contributed to major conference-related activities, including service as IMAS2025 TPC cochair.
- Jenshan Lin served as the chair of the MTT-S Fellow Search Committee in 2024–2025, contributing to professional recognition activities and related community engagement.
- Kenneth E. Kolodziej contributed through conference-related service and editorial activities, including service as an associate editor of *IEEE Microwave Magazine*.
- Christian Fager contributed through editorial service as an associate editor of *IEEE Microwave Magazine* and *IEEE Microwave and Wireless Components Letters* while continuing to provide technical leadership in areas relevant to wireless communications.
- Pere Gilabert contributed to the TC-23 technical scope through sustained work in digital predistortion, linearization techniques, and signal processing

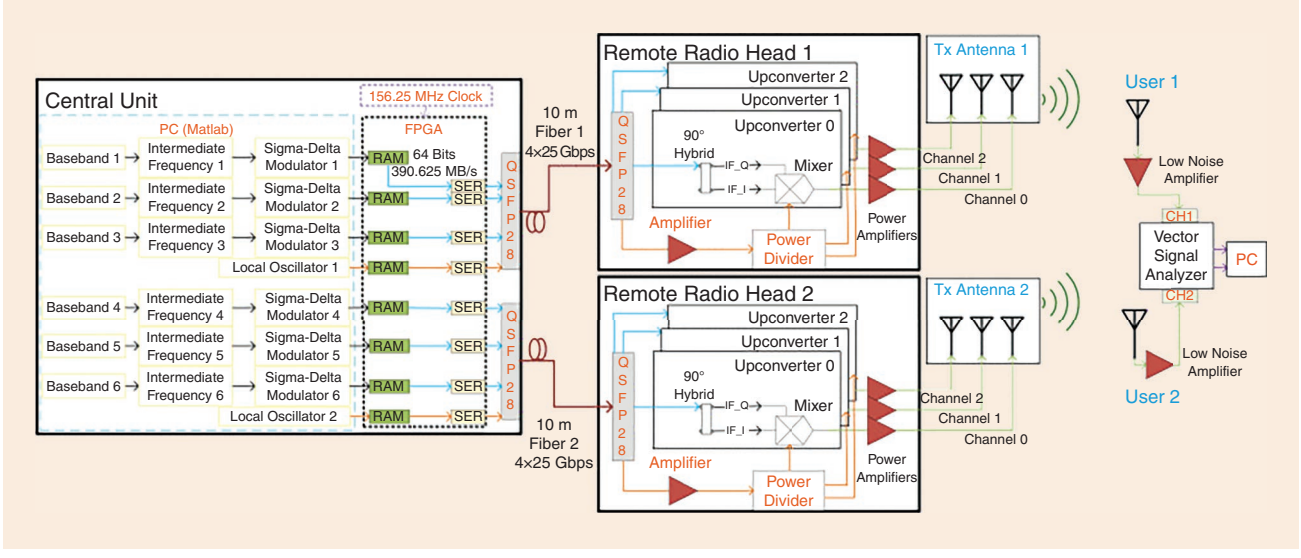


Figure 1. *The proposed sigma-delta-over-fiber distributed-MIMO transmitter architecture, in which a central unit feeds two coherent remote radio heads through optical links for wideband mm-wave wireless transmission. Tx: transmitter; SER: serializer. (Source: Taken from [1].)*

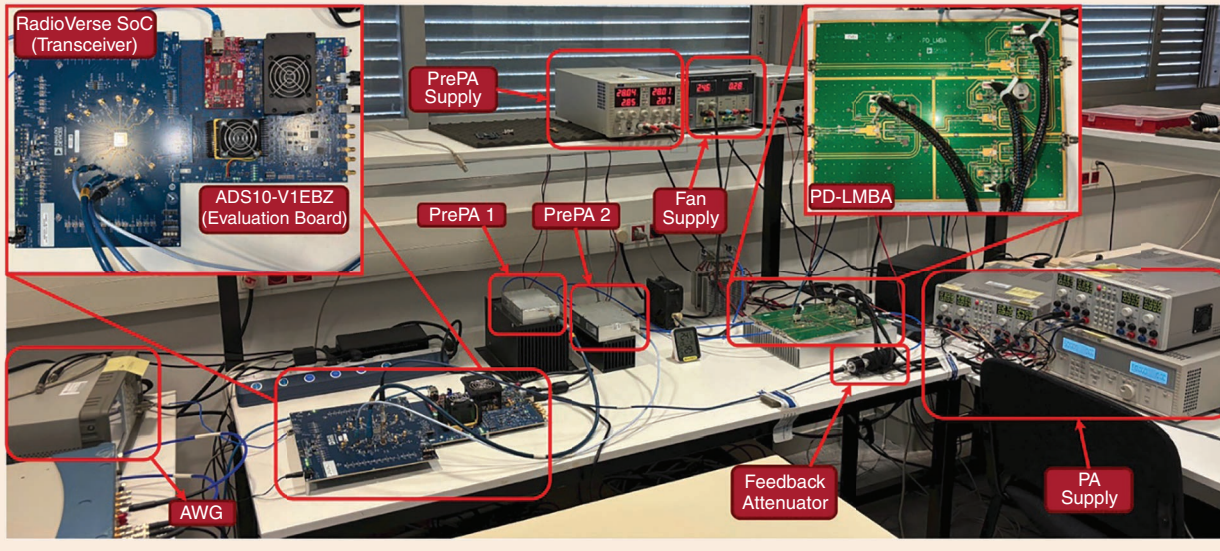


Figure 2. *Experimental setup for DPD linearization of a dual-input pseudo-Doherty-load modulated balanced amplifier (PD-LMBA). Soc: system on chip; DPD: digital predistortion; PrePA: prepower amplifier. (Source: Taken from [2].)*

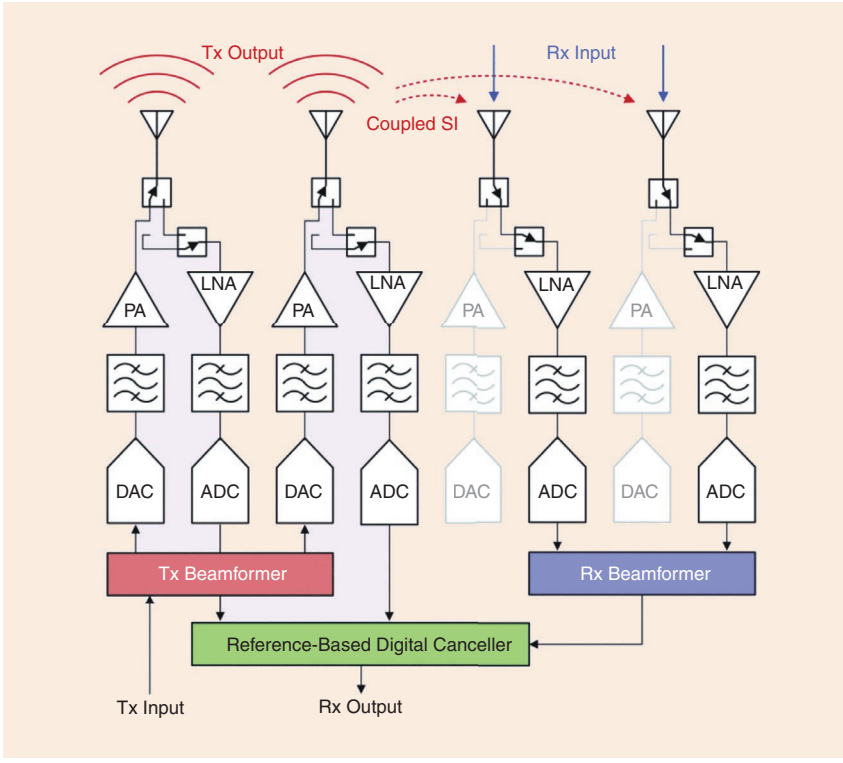


Figure 3. *An in-band full-duplex (IBFD) aperture-level phased-array architecture highlighting adaptive transmit and receive digital beamforming as well as reference-based digital cancellation using observation feedback signals for self-interference cancellation (SIC) processing. Rx: receiver; PA: power amplifier; LNA: low-noise amplifier; ADC: analog-to-digital converter; DAC: digital-to-analog converter. (Source: Taken from [3].)*

solutions for efficient transmitter architectures.

- Upkar Dhaliwal contributed to wireless community building and technical dissemination in areas including beyond-4G/5G systems, cognitive radio, distributed wireless systems, and Internet of Things-oriented communications.

Representative Technical Contributions

The technical breadth of TC-23 is also reflected in recent member publications. For example, Christian Fager coauthored a 2024 article, "Wideband mm-Wave 6 × 2 Distributed MIMO Transmitter Using Sigma-Delta-Over-Fiber" [1], which demonstrates a coherent and wideband distributed MIMO transmitter architecture for millimeter-wave (mm-wave) wireless systems (Figure 1). Pere Gilabert and Kevin Chuang coauthored "Model-Order Reduction of Multistage Cascaded Models for Digital Predistortion" [2], addressing the challenging linearization of broadband 5G signals using multistage cascaded digital predistortion (DPD) models when amplified with a highly

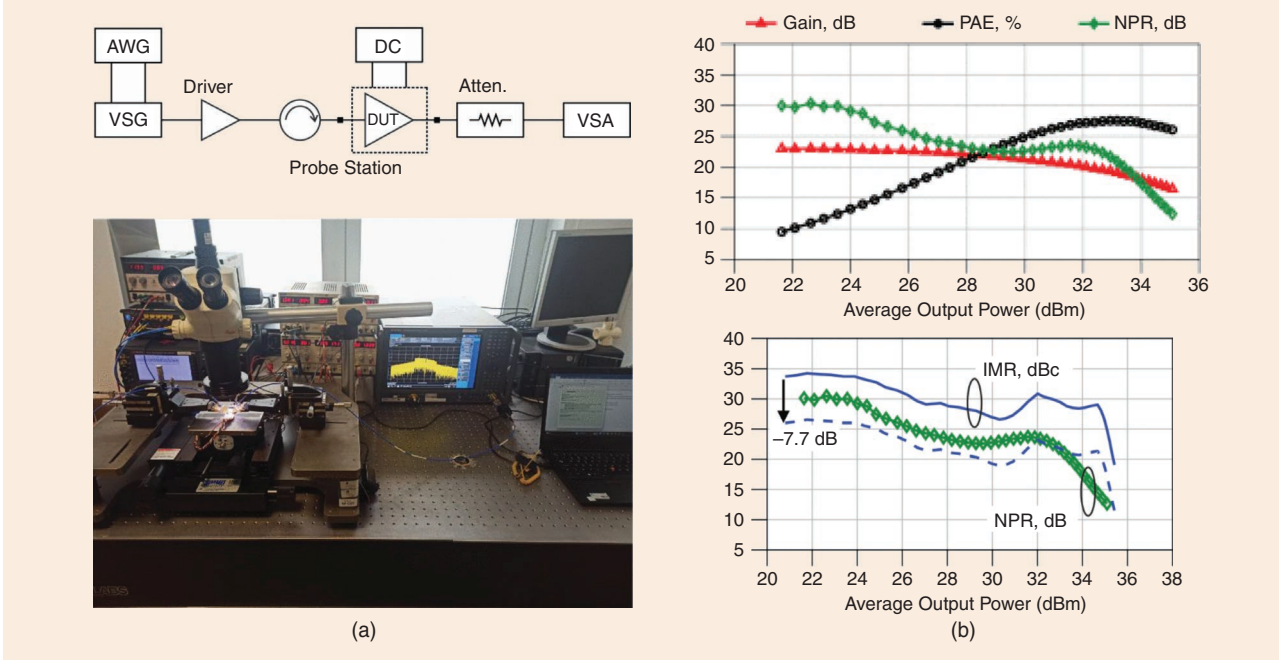


Figure 4. *(a) A block diagram of the experimental setup for the NPR characterization system and (b) measured Doherty power amplifier (DPA) performance. AWG: arbitrary waveform generator; VSG: vector signal generator; PAE: power-added efficiency; DUT: device under test; VSA: vector signal analyzer; IMR: intermodulation ratio. (Source: Taken from [4].)*

efficient load-modulated balanced amplifier (LMBA)

Kenneth E. Kolodziej coauthored a 2024 *IEEE Microwave Magazine* article, "Simultaneous-Multifunction Phased Arrays: Enabled by In-Band Full-Duplex Technology" [3], highlighting advanced phased-array concepts for future multifunction wireless platforms (Figure 3). Finally, Anna Piacibello, Ricardo Figueiredo, Paolo Colantonio, Nuno Borges Carvalho, and Vittorio Camarchia coauthored an article, "Design and Extensive NPR Characterization of a Highly Linear SatCom GaN MMIC Doherty PA" [4], where they present a state-of-the-art noise-to-power ratio (NPR) characterization of a Doherty power amplifier (DPA), discussing the impact on linearity of various characteristics of the signal to be transmitted, comparability of such measurements, and possible steps toward a standardized NPR measurement methodology (Figure 4).

These representative works show the diversity of TC-23 contributions, spanning distributed mm-wave MIMO systems, digital linearization for efficient transmitters, multifunction phased-array architectures enabled by in-band full-duplex operation, and PA design and characterization for linear and efficient signal transmission.

Concluding Remarks

Overall, TC-23 maintained solid technical activity and visibility throughout 2024 and 2025. The committee's contributions spanned Society leadership, conference organization, editorial service, lecturer activities, and coordinated publication efforts. The approved featured issue of *IEEE Microwave Magazine*, with four TC-23-generated articles, is a particularly visible outcome of the biennium and reflects the active engagement of the committee members across the wireless communications field.

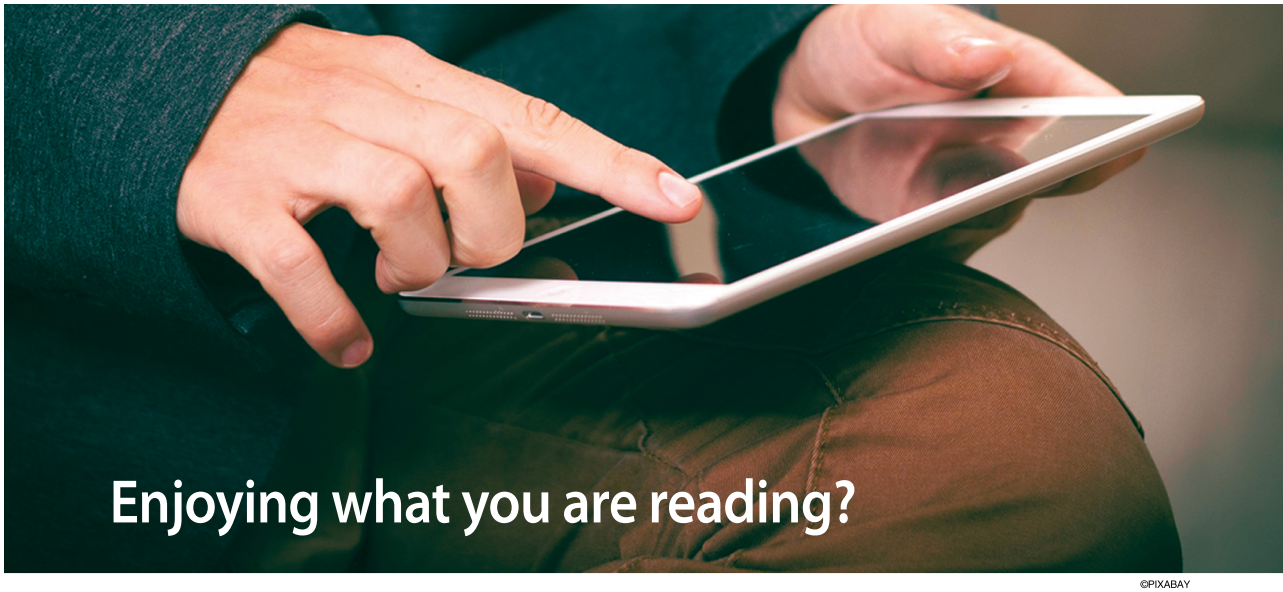
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