Session 6 Overview:

High-Performance Receivers and Transmitters for Sub-6GHz Radios

WIRELESS SUBCOMMITTEE

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In sub-6GHz radios, in-band signal fidelity, out-of-band interference tolerance, large signal bandwidth and low power consumption are highly desirable for 5G and WiFi applications. This session will demonstrate advancements of the state-of-the-art in a high-drain-efficiency transmitter, in blocker-resistant receivers by N-path filtering, in spatial and spectral suppression, and in filtering by aliasing.

8:30 AM

6.1 A Low-Power and Low-Cost 14nm FinFET RFIC Supporting Legacy Cellular and 5G FR1

Jongsoo Lee, Samsung Electronics, Hwaseong, Korea

In Paper 6.1, Samsung Electronics presents a 14nm FinFET CMOS transceiver supporting legacy and New-Radio (FR1) cellular and dual-mode GNSS standards with dynamic biasing and adaptive supply-voltage regulation to deliver low-power operation.

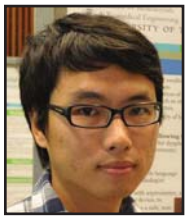
8:38 AM

6.2 A 4-Way Doherty Digital Transmitter Featuring 50%-LO Signed IQ Interleave Upconversion with more than 27dBm Peak Power and 40% Drain Efficiency at 10dB Power Back-Off Operating in the 5GHz Band

Mohammadreza Beikmirza, Delft University of Technology, Delft, The Netherlands

In Paper 6.2, Delft University of Technology presents a +27dBm peak-output-power digital I/Q transmitter in 40nm CMOS and demonstrates 4-way Doherty power amplification to achieve 40% efficiency at 10dB power back-off. It's IQ image, LO leakage, and CIM3 for a 120MHz signal are better than -62, -67, and -68dBc, respectively, over a 4.5 to 6GHz band.

8:46 AM



6.3 A 0.9V Dual-Channel Filtering-by-Aliasing Receiver Front-End Achieving +35dBm IIP_3 and <–81dBm LO Leakage Supporting Intra- and Inter-Band Carrier Aggregation

Shi Bu, University of California, Los Angeles, CA

In Paper 6.3, the University of California, Los Angeles presents a filtering-by-aliasing receiver front-end that enables intra- and inter-band carrier aggregation with low LO leakage re-radiation. At a supply of 0.9V, +35dBm OOB IIP3 and <-81dBm LO leakage power are achieved.

8:54 AM

6.4 A 1-to-3GHz Co-Channel Blocker Resistant, Spatially and Spectrally Passive MIMO Receiver in 65nm CMOS with +6dBm In-Band/In-Notch B_{1dB}

Jitesh Poojary, University of Minnesota, Minneapolis, MN

In Paper 6.4, the University of Minnesota presents a 4×4 MIMO receiver in 65nm CMOS utilizing on-chip spatial and spectral filters for improved in-band and in-beam blocker tolerance. The measured in-band / in-beam & in-band / in-notch IIP3 are 5.48dBm and 22.81dBm respectively.

9:02 AM

6.5 A 3dB-NF 160MHz-RF-BW Blocker-Tolerant Receiver with Third-Order Filtering for 5G NR Applications

Mohammad Ali Montazerolghaem, Delft University of Technology, Delft, The Netherlands

In Paper 6.5, Delft University of Technology presents a 0.4-to-3.2GHz blocker-tolerant receiver with 3rd-order filtering that supports 160MHz RF BW for 5G NR applications while achieving +13dBm of OOB IIP3.

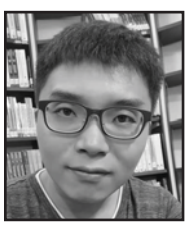
9:10 AM

6.6 Full-Duplex Receiver with Wideband Multi-Domain FIR Cancellation Based on Stacked-Capacitor, N-Path Switched-Capacitor Delay Lines Achieving >54dB SIC Across 80MHz BW and >15dBm TX Power-Handling

Aravind Nagulu, Columbia University, New York, NY

In Paper 6.6, Columbia University presents a 0.2-to-1GHz full-duplex receiver with 54dB self-interference cancellation across an 80MHz bandwidth. Multi-tap cancelers with switched-capacitor true time delay lines that span 0.25 to 1.75ns at RF and 12.5 to 87.5ns at baseband are used.

9:18 AM



6.7 A 1.75dB-NF 25mW 5GHz Transformer-Based Noise-Cancelling CMOS Receiver Front-End

Kaituo Yang, Nanyang Technological University, Singapore, Singapore

In Paper 6.7, Nanyang Technological University presents a 5GHz noise-canceling receiver front-end with 1.75dB NF and 25mW power consumption using a transformer to extract the difference between drain and gate voltages of a common-source amplifier. The associated parallel resonance absorbs parasitic capacitances and provides selectivity.