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Technical Sessions

Thursday, Aug 31

Session TH_1A: Analog and mixed-mode circuits (9:00 - 10:30, Gayageum A)

Session Chairs: Changsik Yoo (Hanyang University, Seoul, Korea),
Woogeun Rhee (Tsinghua University, China)

TH_1A_1	09:00 – 09:30 pg. 1 A ZVS Active Diode Rectifier for Wireless Power Transmission Using Voltage-Time-Conversion DLL (Invited) K. Miyaji, H. Shinohara (Shinshu University, Japan)
TH_1A_2	09:30 – 09:50 pg. 4 A Dual-mode Signal Generator using PLL for X-band Radar Sensor Applications K. -W. Ha ¹ , J. -Y. Lee ¹ , S. Park ¹ , J. -G. Kim ² , D. Baek ¹ (¹ Chung-Ang University, Korea, ² Kwangwoon University, Korea)
TH_1A_3	09:50 – 10:10 pg. 7 900-MHz, 3.5-mW, 8-bit Pipelined Subranging ADC Combining Flash ADC and TDC K. Muroya, D. Hayakawa, K. Sewaki, K. Imayanagida, K. Ueno, Y. Sonoda, K. Ohhata (Kagoshima University, Japan)
TH_1A_4	10:10 – 10:30 pg. 10 A Wide-Band High-efficiency Envelope Tracking Supply Modulator for Cellular Front-End Module Y. Xiao, Q. Li, Y. Liu, Z. Li, H. Zhang (Chinese Academy of Sciences, China)

Session TH_1B: Packaging and Modeling (9:00 - 10:30, Gayageum B)

Session Chairs: Jinho Jeong (Sogang University, Korea),
Noriharu Suematsu (Tohoku University, Japan)

TH_1B_1	09:00 – 09:30 pg. 13 Compact Bandpass Filter with Wide Stopband Using Slow-Wave CPW Resonator with Back-to-Back Coupled-Scheme (Invited) B. Yang, H. J. Qian, Y. Shu, X. Luo (UESTC, China)
TH_1B_2	09:30 – 10:00 pg. 16 Education Materials of Electricity and Magnetism using MATLAB (Invited) T. Hirano, J. Hirokawa (Tokyo Institute of Technology, Japan)
TH_1B_3	10:00 – 10:30 pg. 19 A Preliminary Analysis of Domain Coupling in Package Power Distribution Network (Invited) B. Bae ¹ , S. Kim ¹ , Y. Kim ² , S. Kang ¹ , I. J. Kim ³ , K. Kim ³ , S. Kang ³ , K. J. Han ¹ (¹ Ulsan National Institute of Science and Technology, Korea, ² Kwangwoon University, Korea, ³ Samsung Electronics, Korea)
Break	10:30 – 11:00

Technical Sessions

Session TH_2AB: Plenary Session (11:00 – 12:20, Gayageum A/B)

Session Chair: Franklin Bien (UNIST, Korea)

11:00 – 11:20	Opening Ceremony
TH_2AB	11:20 – 12:20 pg. N/A Progress of CMOS Power Amplifier toward 5G Application at mm-wave Band (Plenary) Bumman Kim (Pohang University of Science and Technology (POSTEC), Korea)
Lunch	12:20 – 13:40

Session TH_3A: mm-wave and Sub-mm-wave Circuits (I) (13:40 – 15:40, Gayageum A)

Session Chairs: Dongha Shim (Seoul Tech, Korea), Tian-Wei Huang (National Taiwan University, Taiwan)

TH_3A_1	13:40 – 14:10 pg. 22 Enhancement of CMOS THz Imaging Sensing By Packaging Technology (Invited) C. -N. Kuo ¹ , W. -C. Chen ¹ , T. -Y. Chiu ² , C. -H. Li ² (¹ National Chiao Tung University, Taiwan, ² National Central University, Taiwan)
TH_3A_2	14:10 – 14:40 pg. 25 State-of-the-Art THz Integrated Circuits in InP HBT Technologies (Invited) S. Kang ¹ , D. Kim ¹ , M. Urteaga ² , M. Seo ¹ (¹ Sungkyunkwan University, Korea, ² Teledyne Scientific Company, USA)
TH_3A_3	14:40 – 15:00 pg. 28 2.37-dBm-Output 288-310 GHz Frequency Multiplier in 40 nm CMOS K. Katayama, K. Takano, S. Amakawa, T. Yoshida, M. Fujishima (Hiroshima University, Japan)
TH_3A_4	15:00 – 15:20 pg. 31 A CMOS 300-GHz 7 by 7 Detector Array for THz Imaging K. Song, J. Kim, D. Kim, M.-G. Seo, J.-S. Rieh (Korea University, Korea)
TH_3A_5	15:20 – 15:40 pg. 34 Comparison Between L-2L and Thru-Reflect-Line De-embedding Methods for W-Band CMOS Amplifier Design I. Abdo, K. K. Tokgoz, T. Fujimura, K. Okada, A. Matsuzawa (Tokyo Institute of Technology, Japan)

Session TH_3B: Building Blocks for RFICs (I) (13:40 – 15:40, Gayageum B)

Session Chairs: Youngjin Kim (Korea Aerospace University, Korea), Shigeo Kawasaki (Japan Aerospace Exploration Agency, Japan)

TH_3B_1	13:40 – 14:10 pg. 37 A 2x2 MIMO Multi-band RF Transceiver and Power Amplifier for Compact LTE Small Cell Base Station (Invited) K. Lim ¹ , H. D. Lee ² , H. Ahn ³ , S. Lee ¹ , S. Jang ² , S. Baek ³ , B. Moon ¹ , Y. Lee ¹ , H. Shin ¹ , S. Kim ¹ , J. Lee ¹ , H. Lee ¹ , K. Kang ¹ , H. Shim ¹ , C. Sung ¹ , G. Park ¹ , G. Lee ¹ , M. Kim ¹ , S. Park ¹ , H. Jung ¹ , O. Lee ³ , B. Park ² , J. Lee ¹ (¹ FCI, Korea, ² ETRI, Korea, ³ Pusan National University, Korea)
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TH_3B_2	14:10 – 14:40 pg. 40 Energy-Efficient Proprietary Transceivers for IoT and Smartphone-Based WPAN (Invited) W. Rhee, D. Liu, Y. Zhang, Z. Wang (Tsinghua University, China)
TH_3B_3	14:40 – 15:00 pg. 43 Wideband Receiver Front-End Employing Feedback Input Matching and Feed-Forward Blocker Cancelling D. Kim, S. Nam (Seoul National University, Korea)
TH_3B_4	15:00 – 15:20 pg. 46 A 34-42GHz Single-Side-Band Transmitter with Switchable VCO/PLL in 90nm-CMOS Process C. -Y. Huang ¹ , K. -L. Wu ¹ , R. Hu ² , C. -Y. Chang ¹ (¹ National Chiao-Tung University, Taiwan, ² National Chiao-Tung University, Taiwan)
TH_3B_5	15:20 – 15:40 pg. 50 A Low-Loss 60GHz Integrated Antenna Switch in 65nm CMOS K. K. Tokgoz, S. Kawai, K. Okada, A. Matsuzawa (Tokyo Institute of Technology, Japan)
Break	15:40 – 16:00

Session TH_4A: mm-wave and Sub-mm-wave Circuits (II) (16:00 – 18:10, Gayageum A)

Session Chairs: Ho-Jin Song (POSTECH, Korea), Minoru Fujishima (Hiroshima University, Japan)

TH_4A_1	16:00 – 16:30 pg. 53 Reconfigurable Phased-Array Design Techniques for 5G and Beyond Communications (Invited) P. Agarwal, S. N. Ali, D. Heo (Washington State University, USA)
TH_4A_2	16:30 – 17:00 pg. 56 A CMOS Sub-Terahertz Full-Duplex Phased-Array Transceiver for Short-Distance Data Center Communication (Invited) A. Apriyana, J. Luo, Q. Chen, G. Feng, H. Yu (Nanyang Technological University, Singapore)
TH_4A_3	17:00 – 17:30 pg. 59 Near-Fiber-Optic-Speed 300-GHz-Band Link and a Dedicated CMOS Transceiver (Invited) M. Fujishima (Hiroshima University, Japan)
TH_4A_4	17:30 – 17:50 pg. 62 A 57-to-64 GHz Two-path Phased-Array Transmitter Using Linearity Enhancement Techniques in 28nm CMOS Process W. Zhu, L. Zhang, D. Huang, X. Zhu, J. Qin, Y. Wang (Tsinghua University, China)
TH_4A_5	17:50 – 18:10 pg. 65 A 416-mW 32-Gbit/s 300-GHz CMOS Receiver S. Hara ¹ , K. Katayama ² , K. Takano ² , R. Dong ² , I. Watanabe ¹ , N. Sekine ¹ , A. Kasamatsu ¹ , T. Yoshida ² , S. Amakawa ² , M. Fujishima ² (¹ National Institute of Information and Communications Technology, Japan, ² Hiroshima University, Japan)

Technical Sessions

Session TH_4B: Building Blocks for RFICs (II) (16:00 – 18:00, Gayageum B)

Session Chairs: Ickjin Kwon (Ajou University, Korea), Shawn Hsu (National Tsing Hua University, Taiwan)

TH_4B_1	16:00 – 16:30 pg. 68 $\Delta\Sigma$-based Injection-Locking Technique for Frequency Synthesis (Invited) C. -H. Heng, K. -H. Teng (National University of Singapore, Singapore)
TH_4B_2	16:30 – 17:00 pg. 71 A Review of Microwatt Low-Noise Amplifier for Microwave and Millimeter-wave IoT Applications (Invited) H. Alsuraisry ¹ , S. -C. Hsiao ² , Y. -H. Lin ² , P. -Y. Li ² , J. -H. Tsai ³ , T. -W. Huang ² (¹ KACST, Saudi Arabia, ² National Taiwan University, Taiwan, ³ National Taiwan Normal University, Taiwan)
TH_4B_3	17:00 – 17:20 pg. 74 60GHz Direct Up-Conversion Mixer with Wide IF Bandwidth and High Linearity in 65nm CMOS J. -G. Lee, H. -J. Lee, S. H. Kim, C. W. Byeon, C. S. Park (KAIST, Korea)
TH_4B_4	17:20 – 17:40 pg. 77 Joint Compensation of CIM3 and I/Q Imbalance in the Up-conversion Mixer with a Single Skew Matrix E. Lee (GCT Semiconductor, Korea)
TH_4B_5	17:40 – 18:00 pg. 80 An Ultra-broadband Low Noise Amplifier in GaAs 0.1-μm pHEMT Process for Radio Astronomy Application Y. -C. Chen ¹ , Y. Wang ¹ , C. -C. Chiong ² , H. Wang ¹ (¹ National Taiwan University, Taiwan, ² Academia Sinica, Taiwan)

Friday, Sep 01

Session FR_1A: Power Amplifiers (I) (9:00 – 10:30, Gayageum A)

Session Chairs: Jooyoung Jeon (Broadcom Korea Limited, Korea), Satoshi Tanaka (Murata Manufacturing Co., Ltd., Japan)

FR_1A_1	09:00 – 09:30 pg. 83 Recent Progresses in R&D and Production of GaN HEMT Based Power Amplifiers (Invited) S. Lee, B. Jun, Y. Jung, S. Choi, M. Han, H. Jung, K. Oh, J. Jin, I. Seo, H. Kim, Y. Kim, S. Ha (Gigalane, Korea)
FR_1A_2	09:30 – 09:50 pg. 87 Investigation of GaN Channel Thickness on the Channel Mobility in AlGaIn/GaN HEMTs Grown on Sapphire Substrate S. -J. Chang ¹ , M. A. Bhuiyan ² , C. -H. Won ³ , J. -H. Lee ⁴ , H. W. Jung ¹ , M. J. Shin ¹ , J. -W. Do ¹ , K. J. Cho ¹ , J. -H. Lee ³ , T. P. Ma ² , J. -W. Lim ¹ (¹ Electronics and Telecommunications Research Institute, Korea, ² Yale University, USA, ³ Kyungpook National University, Korea, ⁴ Samsung Electronics, Korea)

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FR_1A_3	09:50 – 10:10 pg. 90 A 1.7-GHz GaN MMIC Doherty Power Amplifier Using an Adaptive Bias Circuit with a Quadrature Coupler S. Lee ¹ , S. Lee ² , S. Kang ¹ , S. Hong ¹ (¹ KAIST, Korea, ² Samsung Electronics, Korea)
FR_1A_4	10:10 – 10:30 pg. 93 X-Band GaN MMIC Power Amplifier for the SSPA of a SAR System D. -H. Shin ^{1,2} , I. -B. Yom ¹ , D. -W. Kim ² (¹ Electronics and Telecommunications Research Institute, Korea, ² Chungnam National University, Korea)

Session FR_1B: Antenna Technologies (I) (9:00 – 10:30, Gayageum B)

Session Chairs: Jae-Young Chung (Seoultech, Korea),
Shih-Yuan Chen (National Taiwan University, Taiwan)

FR_1B_1	09:00 – 09:30 pg. 96 Wireless Powering of Miniaturized Neurostimulator (Invited) S. Kim (Kyung Hee University, Korea)
FR_1B_2	09:30 – 09:50 pg. 99 Study on the Effective Loading Shape of Magnetic Sheet for Receiver Coil in WPT Systems H. Odanaka, Y. Okano (Tokyo City University, Japan)
FR_1B_3	09:50 – 10:10 pg. 102 Advanced Measurement Method for evaluation of Microwave Properties using Rectangular Cavity Perturbation Technique C. -K. Kim, S. -O. Park (KAIST, Korea)
FR_1B_4	10:10 – 10:30 pg. 104 Design of Functional Wal Considering Oblique Incidence K. Nakamura, Y. Okano (Tokyo City University, Japan)
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Session FR_2A: Power Amplifiers (II) (10:50 – 12:20, Gayageum A)

Session Chairs: Sung-Jae Chang (ETRI, Korea), Jeong-Sun Moon (HRL Laboratories, USA)

FR_2A_1	10:50 – 11:20 pg. 107 Some Non-Linear operations in Linear Power Amplifier for Mobile Applications (Invited) S. Tanaka (Murata Manufacturing, Japan)
FR_2A_2	11:20 – 11:50 pg. 110 Multimode Multiband Power Amplifier Module integrated Duplexer for Mobile Applications (Invited) J. Jeon, J. Oh, J. Jung, S. Paek (Broadcom Korea, Korea)

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FR_2A_3	11:50 – 12:20 pg. 113 A V-band Power Amplifier with Transformer Combining and Neutralization Technique in 40-nm CMOS (Invited) J. –K. Wang, Y. –H. Lin, Y. –H. Hsiao, K. –S. Yeh, H. Wang (National Taiwan University, Taiwan)
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Session FR_2B: Antenna Technologies (II) (10:50 – 12:20, Gayageum B)

Session Chairs: Sanggeun Jeon (Korea University, Korea),
Chiennan Kuo (National Chiao Tung University, Taiwan)

FR_2B_1	10:50 – 11:20 pg. 117 Experimental Study of Double-Balanced-Multiplier Integrated Circularly Polarized Microstrip Antenna for Tx and Rx operation (invited) E. Nishiyama, T. Ino, I. Toyoda (Saga University, Japan)
FR_2B_2	11:20 – 11:40 pg. 120 Bond-Wire Interconnected 60-GHz Low-Profile Series Fed E-shaped Patch Array with Parasitic Patches T. H. Jang, Y. H. Han, H. Y. Kim, C. W. Byeon, C. S. Park (KAIST, Korea)
FR_2B_3	11:40 – 12:00 pg. 123 A 340-GHz High-Gain Flip-Chip Packaged Dielectric Resonator Antenna for THz Imaging Applications T. –Y. Chiu ¹ , C. Wang ¹ , W. –T. Hsieh ¹ , H. –J. Lin ¹ , T. –Y. Lin ² , R. Liu ³ , D. –C. Chang ² , C. –H. Li ¹ (¹ National Central University, Taiwan, ² National Applied Research Laboratories, Taiwan)
FR_2B_4	12:00 – 12:20 pg. 126 Coupled Line Trans-directional Coupler with Improved Power Distribution and Phase Performance H. Liu, S. Fang, Z. Wang, T. Shao (Dalian Maritime University, China)
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Session FR_3A: Frequency Generation Circuits (I) (13:40 - 15:40, Gayageum A)

Session Chairs: Inchul Hwang (KangWon National University, Korea), Q. Jane Gu (UC Davis, USA)

FR_3A_1	13:40 – 14:10 pg. 129 Low Phase Noise and Wideband Oscillators Using Injection- and Frequency-Locked Loop Technique (Invited) K. –C. Peng ¹ , C. –H. Lee ¹ , D. –G. Wong ¹ , F. –K. Wang ² , T. –S. Horng ² (¹ National Kaohsiung First University, Taiwan, ² National Sun Yat-Sen University, Taiwan)
FR_3A_2	14:10 – 14:40 pg. 132 A CMOS X-Band FMCW Generator IC for Radar Applications (Invited) S. Lee ¹ , D. Kim ¹ , L. Jeon ² (¹ KETI, Korea, ² RFCORE, Korea)
FR_3A_3	14:40 – 15:00 pg. 135 A Buffer-Feedback 140GHz Oscillator with Transmission-Line Shielded Inductor H. Holisa, S. S. Naeini (University of Waterloo, Canada)

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FR_3A_4	15:00 – 15:20 pg. 138 A 100-123GHz CMOS Frequency Doubler with 5.5dBm Output Power and High Fundamental Rejection I. Abdo, K. K. Tokgoz, T. Fujimura, K. Okada, A. Matsuzawa (Tokyo Institute of Technology, Japan)
FR_3A_5	15:20 – 15:40 pg. 141 Mixer-based Injection-locked Frequency Tripler C. -H. Tu, S. -W. Chen, H. -W. Kao, J. -W. Wu (National Chung Cheng University, Taiwan)

Session FR_3B: Innovative RF technologies (13:40 - 15:40, Gayageum B)

Session Chairs: Moon-Que Lee (University of Seoul, Korea),
Nan-Wei Chen (Yuan Ze University, Taiwan)

FR_3B_1	13:40 – 14:10 pg. 144 Varactor-Based Microstrip Circuits with High Frequency Agility and Low Insertion Loss (Invited) N. -W. Chen, Y. -C. Yang, H. -C. Chou (Yuan Ze University, Taiwan)
FR_3B_2	14:10 – 14:40 pg. 147 C-Band Energy Harvester by Si RFICs with GaN Diodes for Microwave Power Transfer (Invited) Shigeo Kawasaki ^{1,2,3} , Ryoko Kishikawa ² , Yuki Furuse ⁴ , Toshihiro Nakaoka ⁴ , Satoshi Yoshida ⁵ , Kenjiro Nishikawa ⁵ , Harunobu Seita ⁶ (¹ The Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, Japan, ² The Graduate University for Advanced Studies, Japan, ³ Space Exploration Innovation Hub Center, Japan Aerospace Exploration Agency, Japan, ⁴ Sophia University, Japan, ⁵ Kagoshima University, Japan, ⁶ UM-Services, Japan)
FR_3B_3	14:40 – 15:00 pg. 150 An 8 Gbps E-band QAM Transmitter Using Symbol-based Outphasing Power Combining Technique S. An ¹ , Z. S. He ¹ , Ji. Chen ¹ , Y. Li ² , H. Zirath ¹ (¹ Chalmers University of Technology, Sweden, ² Ericsson Research, Sweden)
FR_3B_4	15:00 – 15:20 pg. 153 A 140 GHz to 160 GHz Active Impedance Tuner for In-situ Noise Characterization in BiCMOS 55 nm Simon Bouvot ^{1,2} , Joao Carlos Azevedo Goncalves ^{1,2} , Alice Bossuet ^{1,2} , Thomas Quémerais ³ , Sylvie Lépilliet ¹ , Guillaume Ducournau ¹ , François Danneville ¹ , Daniel Gloria ² (¹ IEMN, France, ² STMicroelectronics, 850 rue Jean Monnet, 38920 Crolles, France, ³ STMicroelectronics, 12 rue Jules Horowitz, 38000 Grenoble, France)
FR_3B_5	15:20 – 15:40 pg. 156 Concept of a dielectric waveguide-based chip-to-chip multicast interconnect U. Dey, J. Hesselbarth (University of Stuttgart, Germany)

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Poster Session

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Session Chair: Dong-Wook Kim (Chungnam National University, Korea)

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FR_PO_3	A 300 GHz Single Varactor Doubler in 40 nm CMOS pg. 165 T. A. Vu ² , K. Takano ¹ , M. Fujishima ¹ (¹ Hiroshima University, Japan, ² VNU University of Engineering and Technology, Vietnam)
FR_PO_4	A Dual-band LC VCO with Low Phase Noise in 0.18 um CMOS Technology pg. 168 J. –H. Kim, J. –H. Han, J. –S. Park, J. –G. Kim (Kwangwoon University, Korea)
FR_PO_5	60 GHz Variable Gain LNA with Small NF Variation pg. 171 C. So, S. Hong (KAIST, Korea)
FR_PO_6	High-Linearity Wideband Transmitter for 802.11af/ah Long-Range Wi-Fi pg. 174 J. –H. Choi, D. –W. Kang, C. Kim (Electronics and Telecommunications Research Institute, Korea)
FR_PO_7	A Wideband Noise-Cancelling CG-CS LNA with Transformer Source Coupling pg. 177 Myung-Jae Shin ¹ , Youngjae Lee ² , Changseok Lee ³ , Dong-Ho Lee ³ (¹ Techand, Korea, ² Electronics and Telecommunications Research Institute, Korea, ³ Hanbat National University, Korea)
FR_PO_8	Enhanced Identification Technique for Dynamic Nonlinear Power Amplifiers Modeling Using Twin-Nonlinear Two-Box Structures pg. 180 A. AlZaabi, L. E. Chaar, M. Daher, M. Khalaf, O. Hammi, L. Albasha (American University of Sharjah, United Arab Emirates)
FR_PO_9	A 4.6-GHz Class-F ¹ High Power CMOS Power Amplifier pg. 183 F. Chen, Y. Wang, Y. –H. Hsiao, J. –L. Lin, H. Wang (National Taiwan University, Taiwan)
FR_PO_10	300 W GaN Power Amplifier for LTE Applications pg. 186 H. –S. Kang, I. –J. Lee, K. –T. Bae, D. –W. Kim (Chungnam National University, Korea)
FR_PO_11	Ultra-Wideband Efficient Linearized 10W GaN-HEMT Power Amplifier pg. 189 C. T. Nghe ¹ , D. Maassen ¹ , X. A. Nghiem ² , G. Boeck ^{1,2} (¹ Berlin Institute of Technology, Germany, ² GloMic GmbH, Germany)
FR_PO_12	33~50GHz CMOS Receiver with Wideband RF, IF and LO Chain pg. 192 C. –Y. Huang, K. –L. Wu, R. Hu, C. –Y. Chang (National Chiao-Tung University, Hsinchu, Taiwan)
FR_PO_13	A V-Band High Linearity Sub-harmonic I/Q Demodulator Using Transformer Coupling pg. 196 Y. –T. Chang, H. –Y. Chen, H. –C. Lu (National Taiwan University, Taiwan)
FR_PO_14	Design of a 28-GHz Low Noise Amplifier using 0.15-um InGaAs pHEMT E-mode technology pg. 199 S. Kong, H. D. Lee, C. H. Kim, B. Park (Electronics and Telecommunications Research Institute, Korea)

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FR_PO_15	A W-band Power Amplifier with LC balun in 0.13 μm SiGe BiCMOS Process pg. 202 H. Li, J. Chen, D. Hou, S. Peng, W. Hong (Southeast University, China)
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FR_PO_20	A Ku-Band Direct RF Undersampling Receiver with an Intermittent-Mode Amplifier pg. 217 N. Suematsu, T. Owada, T. K. M. Motoyoshi, S. Kameda (Tohoku University, Japan)
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FR_PO_24	A Compact LNA Integrated Antenna for Global Navigation Satellite Systems pg. 229 J. -G. Go, J. -Y. Chung (Seoul National University of Science and Technology, Korea)

Session FR_4A: Frequency Generation Circuits (II) (16:40 - 18:20, Gayageum A)

Session Chairs: Byung-Wook Min (Yonsei University, Korea),
T.-S. Jason Horng (National Sun Yat-Sen University, Taiwan)

FR_4A_1	16:40 – 17:10 pg. 232 Digital PLL Design Challenges for Cellular RFICs (Invited) S. Ko ¹ , C. -W. Yao ² , J. Lee ¹ , S. Han ¹ , D. Kwon ¹ , W. F. Loke ² , R. Ni ² , T. B. Cho ¹ (¹ Samsung Electronics, Korea, ² Samsung Semiconductor, USA)
FR_4A_2	17:10 – 17:40 pg. 235 Frequency Discriminator based Phase Noise Filter for High Fidelity Clock (Invited) S. Hao, T. Hu, Q. J. Gu (University of California, Davis, CA, USA)
FR_4A_3	17:40 – 18:00 pg. 238 A Fractional-N BB-DPLL with Auto-Tuned DTC and FIR Filter for Noise and Spur Reduction H. Liu, S. Lv, X. Huang, W. Rhee, Z. Wang (Tsinghua University, China)
FR_4A_4	18:00 – 18:20 pg. 241 A 68.1-to-73.8GHz E-band Low Phase Noise QPLL with Amplifier Feedback QVCO in 65-nm CMOS X. Zhu, L. Zhang, Y. Wang (Tsinghua University, China)

Technical Sessions

Session FR_4B: Emerging RF applications (16:40 - 18:30, Gayageum B)

Session Chairs: Han-Lim Lee (Chung-Ang University, Korea),
Jerald Yoo (National University of Singapore, Singapore)

FR_4B_1	16:40 – 17:10 pg. 244 Body Coupled Communication: Towards Energy-Efficient Body Area Network Applications (Invited) J. Yoo (National University of Singapore, Singapore)
FR_4B_2	17:10 – 17:40 pg. 247 IC-Level Hardware Security and Safety for Smart Society (Invited) Noriyuki Miura (Kobe University, Japan)
FR_4B_3	17:40 – 18:10 pg. 250 Integration of CMOS Front-end Circuits with Silicon Photonic Devices for High Speed PAM-4 Optical Links (Invited) S. S. H. Hsu ¹ , Y. -F. Li ¹ , H. -J. Wang ¹ , T. -C. Chen ¹ , C. -k. Tseng ¹ , M. -C. Lee ¹ , K. Li ² , D. J. Thomson ² , G. T. Reed ² (¹ National Tsing Hua University, Taiwan, ² University of Southampton, UK)
FR_4B_4	18:10 – 18:30 pg. 253 Multi-Octave Linear Efficient GaN Power Amplifier J. -S Moon, J. Kang, R. Grabar, H. Fung, P. Chan, H. Y. Tai, and D. Brown (HRL Laboratories, LLC, USA)