

# **2022 Asia-Pacific Microwave Conference (APMC 2022)**

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**Wednesday, November 30**

**Session WE1-F1**

Advanced Low Noise Amplifiers and Receivers

Room F201 09:15-10:55

Wednesday, November 30

Chairs : Koji Yamanaka (Mitsubishi Electric Corp., Japan), Noriharu Suematsu (Tohoku Univ., Japan)

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Wednesday, November 30

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**Wednesday, November 30**

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**Wednesday, November 30**

Chairs : Kazuaki Takahashi (Panasonic Corp., Japan), Sangyeop Lee (Tokyo Inst. of Tech., Japan)

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**Wednesday, November 30**

Chairs : Nozomi Haga (Gunma Univ., Japan), Seungyoung Ahn (KAIST, Korea)

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**Wednesday, November 30**

Chairs : Kensuke Okubo (Okayama Prefectural Univ., Japan), Tetsuya Ueda (Kyoto Ins. of Tech., Japan)

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Wednesday, November 30

Chairs : Christoph Baer (Ruhr-Universität Bochum, Germany), Yoshinori Kogami (Utsunomiya Univ., Japan)

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Wednesday, November 30

Chairs : Toru Fukasawa (Mitsubishi Electric Corp., Japan), Guan Chai-Eu (Nagasaki Univ., Japan)

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Wednesday, November 30

Chairs : Nobuhiro Kuga (Yokohama National Univ., Japan), Takashi Harada (Tokin EMC Engineering Co., Ltd., Japan)

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**Wednesday, November 30**

Chairs : Miao Zhang (Xiamen Univ., China), Keisuke Konno (Tohoku Univ., Japan)

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**Room F206 15:20-17:00**  
**Wednesday, November 30**

Chair : Satoshi Fujii (Toyohashi Univ. of Tech., Japan)

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Organizer: Hideoki Fukushima (Nagoya Univ., Japan)

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**Thursday, December 01**

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**Room F201 09:15-11:15**

**Thursday, December 01**

Chairs : Hiroshi Yamamoto (Sumitomo Electric Industries, Ltd., Japan), Yutaro Yamaguchi (Mitsubishi Electric Corp., Japan)

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**Thursday, December 01**

Chairs : Amir Ebrahimi (RMIT Univ., Australia), Tsugumichi Shibata (Tokyo City Univ., Japan)

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**Thursday, December 01**

Chairs : Ryosuke Suga (Aoyama Gakuin Univ., Japan), Kwai-Man Luk (City Univ. of Hong Kong, Hong Kong)

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**Thursday, December 01**

Chairs : Kiyotaka Sasagawa (Nara Inst. of Science and Tech., Japan), Shigeki Takeda (Ibaraki Univ., Japan)

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**Thursday, December 01**

Chairs : Kenjiro Nishikawa (Kagoshima Univ., Japan), Emanuel Cohen (Israel Inst. of Tech., Israel)

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## Session TH1-F6 Special Session

### Metasurface-Based Millimeter-wave and Terahertz Antennas

Room F206 09:15-10:55

Thursday, December 01

Chairs : Shuyan Zhu (Sun Yat-sen Univ., China), Geng-Bo Wu (City Univ. of Hong Kong, Hong Kong)

Organizers : Shuyan Zhu (Sun Yat-sen Univ., China), Geng-Bo Wu (City Univ. of Hong Kong, Hong Kong)

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**Session TH2-F1**  
Millimeter-Wave and THz Integrated Circuits  
Room F201 12:45-14:45  
Thursday, December 01

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Chairs : Shuhei Amakawa (Hiroshima Univ., Japan), Sangyeop Lee (Tokyo Inst. of Tech., Japan)

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TH2-F1-1	A 24-30 GHz Power Amplifier with >20 dBm Psat and <0.1 dB AM-AM Distortion for 5G Applications Chihiro Kamidaki, Yuma Okuyama and Tatsuo Kubo (Fujikura Ltd., Japan); Wooram Lee, Caglar Ozdag and Bodhisatwa Sadhu (IBM, U.S.A.); Yo Yamaguchi and Ning Guan (Fujikura Ltd., Japan)	273
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**Session TH2-F2**  
Advances in Non-Planar Filter Technologies  
Room F202 12:45-14:45  
Thursday, December 01

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Chairs : Zhewang Ma (Saitama Univ., Japan), Jen-Tsai Kuo (Chang Gung Univ., Taiwan)

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Wideband Antennas  
Room F203 12:45-14:45  
Thursday, December 01

Chairs : Eisuke Nishiyama (Saga Univ., Japan), Saou-Wen Su (ASUSTek Computer Inc., Taiwan)

TH2-F3-1	A 28 GHz Band Dual-Polarized LTCC Filtering Antenna with Extracted-Pole Unit Kaoru Sudo, Ryo Mikase, Yoshinori Taguchi, Koichi Takizawa, Yosuke Sato, Kazushige Sato and Hisao Hayafuji (Murata Manufacturing Co., Ltd., Japan); Masataka Ohira (Saitama Univ., Japan)	306
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**Session TH2-F4**  
Radar and Electromagnetic Sensing II  
Room F204 12:45-14:45  
Thursday, December 01



Chairs :	Yukio Kawano (Chuo Univ., Japan), Florian Probst (Friedrich – Alexander - Universität Erlangen - Nürnberg, Germany), Grant Stankaitis (Univ. of Hawaii, U.S.A.)	
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**Session TH2-F5**  
**Microwave Power Transfer Systems**  
**Room F205 12:45-14:45**  
**Thursday, December 01**

Chairs :	Ichihiko Toyoda (Saga Univ., Japan), Yu-Te Liao (National Yang Ming Chiao Tung Univ., Taiwan)	
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Kazuki Yukawa, Takayuki Matsumuro and Toshio Ishizaki (Ryukoku Univ., Japan); Yohei Ishikawa (Kyoto Univ., Japan)

TH2-F5-5 Multiple-Transmitter Microwave Power Transfer System with Power Control Strategy 353  
Minjae Ahn, Juhwan Shin and Hyunchul Ku (Konkuk Univ., Korea)

## Session TH2-F6

Packaging and Interconnection Technology for Microwave System

Room F206 12:45-14:45

Thursday, December 01

Chairs : Tomoyuki Furuichi (Tohoku Univ., Japan), Satoshi Yoshida (Kagoshima Univ., Japan)

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	Naoki Oshima and Shinichi Hori (NEC Corp., Japan); Jian Pang, Atsushi Shirane and Kenichi Okada (Tokyo Inst. of Tech., Japan); Kazuaki Kunihiro (NEC Corp., Japan)	
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[Special]	Timothy Lee (IEEE Future Networks Initiative Co-Chair, U.S.A.)	

## Session TH3-F1

CMOS Control Circuits for Radar and Other Applications

Room F201 15:15-16:55

Thursday, December 01

Chairs : Nobuyuki Itoh (Okayama Prefectural Univ., Japan), Timothy Lee (IEEE Future Networks Initiative Co-Chair)

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	Laszlo Szilagyi (GlobalFoundries Dresden, Germany); Songhui Li, Xin Xu, Paolo Valerio Testa and Andres Seidel (Technische Universität Dresden, Germany); Corrado Carta (Technische Universität Berlin, Germany, IHP - Leibniz-Institut für innovative Mikroelektronik, Germany); Frank Ellinger (Technische Universität Dresden, Germany)	

TH3-F1-3	A Study on 23.8-43 GHz CMOS Low-Power Ultra-Wideband Injection-Locked Frequency Multiplier with Transformer Input Yoshiki Hashimoto, Naoki Kaneda, Kiyotaka Komoku and Nobuyuki Itoh (Okayama Prefectural Univ., Japan)	372
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### Passive Components in Millimeter and Submillimeter Waves

Room F202 15:15-16:55

Thursday, December 01

Chairs : Atsushi Kanno (Nagoya Inst. of Tech., Japan), Shunichi Futatsumori (ENRI, Japan)

TH3-F2-1	Function Expansion Based Topology Optimization of Optical and Millimeter-Wave Circuit Devices [Invited] Yasuhide Tsuji and Akito Iguchi (Muran Inst. of Tech., Japan); Keita Morimoto (Univ. of Hyogo, Japan); Tatsuya Kashiwa (Kitami Inst. of Tech., Japan)	381
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**Session TH3-F3**  
**MIMO and Beam-Forming Antennas**  
**Room F203 15:15-16:55**  
**Thursday, December 01**

Chairs : Wonbin Hong (POSTECH, Korea), Makoto Sano (Toshiba Corp., Japan)

TH3-F3-1	Optimizations of Curvature of Concave Reflectors and Feed-Point Azimuths of Loop Antennas for Long-Range OAM Communication Katsuya Ishihara, Akira Saitou, Kazuhiko Honjo and Ryo Ishikawa (The Univ. of Electro-Communications, Japan)	393
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**Session TH3-F4**  
**Novel Measurement Technique in Microwave and Millimeter Waves**  
**Room F204 15:15-16:55**  
**Thursday, December 01**

Chairs : Choon Beng Sia (FormFactor Inc., Singapore), Ryo Sakamaki (AIST, Japan)

TH3-F4-1	Achieving Traceable RFCMOS $F_T$ and $F_{MAX}$ Wafer Measurements Choon Beng Sia (FormFactor Inc., Singapore); Chiew Keat Lim, Li Leng Goh, Kirby Tan Kheng Seong and Jacob Ong Soon Ann (GlobalFoundries Singapore, Singapore); Ken Dawson and Peter Andrews (FormFactor Inc., Singapore); Chew Kok Wai and Arunima Dasgupta (GlobalFoundries Singapore, Singapore)	408
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TH3-F4-4	Development of Coaxial-Type Inductance Standard for Megahertz-To-Gigahertz Frequency Range Atsushi Domae (AIST, Japan)	417

TH3-F4-5	Development of a Simplified Six-port Correlator for the 28 GHz Band Koichi Tokita and Kohei Fujiwara (TIRI, Japan); Makoto Yoshida (CDEX, Co., Ltd., Japan); Toshiyuki Yakabe (Multi Port Laboratory Limited Liability Partnership, Japan)	420
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**Session TH3-F5**  
**Electromagnetic Compatibility**  
**Room F205 15:15-16:55**  
**Thursday, December 01**

Chairs : Atsuhiko Nishikata (Tokyo Inst. of Tech., Japan), Sachiko Kodera (Nagoya Inst. of Tech., Japan)

TH3-F5-1	Assessment of Head Exposure at Multiple Frequencies Below and Above 6 GHz Norika Miura and Sachiko Kodera (Nagoya Inst. of Tech., Japan); Junji Higashiyama, Takahiro Iyama and Yasunori Suzuki (NTT DOCOMO, INC., Japan); Akimasa Hirata (Nagoya Inst. of Tech., Japan)	423
TH3-F5-2	Improvement of Broadband Folded Long-Hexagon Antenna for EMI Measurements Keita Kobayashi, Shinobu Ishigami and Ken Kawamata (Tohoku Gakuin Univ., Japan); Katsushige Harima (NICT, Japan); Shingo Inori (Elena Electronics Co. Ltd., Japan)	426
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**Session TH3-F6 Special Session**  
**Selected Research Topics within the European Region**  
**Room F206 15:15-16:45**  
**Thursday, December 01**

Chairs : Luca Perregrini (Univ. of Pavia, Italy), Hiroshi Okazaki (NTT DOCOMO, INC., Japan)

Organizer : Maurizio Bozzi (Univ. of Pavia, Italy)

TH3-F6-1	RF Measurements for Quantum Computing Technologies [Special] Nick Ridler, Xiaobang Shang, Sang-Hee Shin and Manoj Stanley (National Physical Laboratory, U.K.)	N/A
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TH3-F6-2 [Special]	Recent Advancements on Planar, 3D, and Hybrid Technologies for Microwave Sensors Luca Perregrini and Maurizio Bozzi (Univ. of Pavia, Italy)	N/A
TH3-F6-3 [Special]	Coherent Radar Networks for Advanced Imaging and Localization Martin Vossiek, Michael Braunwarth and Marcel Hoffmann (FAU, Germany)	N/A

**Friday, December 02**

**Session FR1-F1**

Frequency/Signal Control Circuits

Room F201 09:15-10:55

Friday, December 02

Chairs : Takayuki Tanaka (Saga Univ., Japan), Adel Barakat (Kyushu Univ., Japan)

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FR1-F1-1	PVT-Insensitive Ka-Band Class-D VCO with Average Current Control in 65 nm CMOS Chuan Ding, Yang He and Tiedi Zhang (UESTC, China); Chao Fan (Chengdu Corpro Technology Co., Ltd., China)	440
FR1-F1-2	Fully Integrated Bandpass Filter with High Isolation Attenuator Function Using Semi-Conductor Distributed Doped Areas Corentin Le Lez, Rozenn Allanic, Denis Le Berre and Cédric Quendo (Univ. Brest, France); Rose-Marie Sauvage (DGA/AID, France); Aude Leuliet and Thomas Merlet (Thales-LAS, France); Douglas Silva De Vasconcellos, Virginie Grimal, Damien Valente and Jérôme Billoué (Université de Tours, France)	443
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FR1-F1-4	30GHz Band Double Voltage Rectifier MMIC with the 0.1 $\mu\text{m}$ E-pHEMT Gated Anode Diode Naoya Kakutani, Fumiya Komatsu, Naoki Sakai and Kenji Itoh (Kanazawa Inst. of Tech., Japan)	449
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**Session FR1-F2**

Advances in Synthesis and Design Techniques for Wideband Filters

Room F202 09:15-10:55

Friday, December 02

Chairs : Chun-Ping Chen (Kanagawa Univ., Japan), Xiaolong Wang (Jilin Univ., China)

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FR1-F2-1	High-Order Input-Reflectionless Quasi-Elliptic-Type Wideband Bandpass Filter Using Dual-Mode Slotline Resonator Li Yang (Univ. of Alcalá, Spain); Dimitra Psychogiou (Univ. College Cork, Ireland); Roberto Gómez-García (Univ. of Alcalá, Spain)	455
FR1-F2-2	Arbitrary Prescribed Wideband Flat Group Delay Higher-Order Quasi-Reflectionless Bandpass Filter Girdhari Chaudhary, Phanam Pech, Jaehoon Lee and Yongchae Jeong (Jeonbuk National Univ., Korea)	458
FR1-F2-3	GA-Optimized UWB Filters Using Slot-Loaded Two-Layered Microstrip Resonators Yuichi Tsujino, Yuichi Nishioka, Hiroyuki Deguchi and Mikio Tsuji (Doshisha Univ., Japan)	461
FR1-F2-4	Synthesis Design of Wideband Differential Bandpass Filter with Intrinsic CM Noise Rejection Using Branch-Line Configuration Pin Wen and Zhewang Ma (Saitama Univ., Japan); Shuangshuang Zhu (Zhengzhou Univ., China); Fan Liu and Masataka Ohira (Saitama Univ., Japan)	464
FR1-F2-5	Design of CRLH-TL UWB Filter Using Interdigital Capacitor and Short Stub by Genetic Algorithm Hinata Ishikawa, Atsuya Hirayama, Seiya Fujino, Takanobu Ohno, Kosei Tanii and Satoko Iida (National Inst. of Tech., Kisarazu College, Japan)	467

## Session FR1-F3

### EM Propagation and Antennas for Propagation Measurement

Room F203 09:15-10:55

Friday, December 02

Chairs :	Sergio Colangeli (Univ. of Rome Tor Vergata, Italy), Takuichi Hirano (Tokyo City Univ., Japan)	
FR1-F3-1	A Compact Overmoded Waveguide Test Environment: Investigation of Propagation Behaviour Manuel Funk, Christoph Dahl, Jan Barowski, Ilona Rolfes and Christian Schulz (Ruhr-Universität Bochum, Germany)	470
FR1-F3-2	A Transmitter Protection Scheme Through Reciprocal Elements Sergio Colangeli, Walter Ciccognani, Patrick E. Longhi, Antonio Serino and Ernesto Limiti (Università of Rome Tor Vergata, Italy)	473
FR1-F3-3	Analysis and Design of Conformal Antenna Cavity for RCS Reduction Minhuan Chen (UESTC, China); Tao Dong (Beijing Institute of Satellite Information Engineering, China); Peng Yang (UESTC, China)	476
FR1-F3-4	On Surface Wave Propagation Characteristics of Porosity-Based Reconfigurable Surfaces Zhiyuan Chu, Kai-Kit Wong and Kin-Fai Tong (Univ. College London, U.K.)	479
FR1-F3-5	A Triple Band Notched UWB MIMO Antenna with Improved Performance Anees Abbas, Md. Abu Sufian, Jinkyu Jung, Azimov Uktam, Jaemin Lee and Nam Kim (Chungbuk National Univ., Korea)	482



**Session FR1-F4**  
**Brand-New Communication Systems Opening Up New Fields**  
**Room F204 09:15-10:55**  
**Friday, December 02**

Chairs : Hideaki Kimura (Chubu Univ., Japan), Masashi Nakatsugawa (National Inst. of Tech., Hakodate College, Japan)

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FR1-F4-1	OAM-Based Reconfigurable Doppler Shifts Enable PAPR Reduction for Multi-Carrier Doppler Diversity Yufei Zhao, Yao Ge, Zhaojie Yang and Gaohua Ju (NTU, Singapore); Lu Ma (Tsinghua Univ., China); Yilong Lu and Yong Liang Guan (NTU, Singapore)	485
FR1-F4-2	Basic Study of Communication System in Seawater Using Magnetic Field Coupler and Wavelet OFDM Ryosuke Hasaba (Tokyo Inst. of Tech., Japan); Kazuhiro Eguchi (Panasonic Connect Co., Ltd, Japan); Toshiyuki Wakisaka (Kyushu Inst. of Tech., Japan); Hiroshi Sato (Panasonic System Networks R&D Lab. Co., Japan); Jiro Hirokawa (Tokyo Inst. of Tech., Japan); Miyuki Hirose, Tohlu Matsushima and Yuki Fukumoto (Kyushu Inst. of Tech., Japan)	488
FR1-F4-3	SIC-MIMO Systems with Neural Networks in OFDM-Based WDM VLCs Naoki Umezawa and Saeko Oshiba (Kyoto Inst. of Tech., Japan)	490
FR1-F4-4	Self-Mixing Noise Reduction Effect in Wi-Fi Backscatter Receiver by Tx Signal Canceller Yuki Fujiya, Koki Edamatsu, Takashi Shiba and Noriharu Suematsu (Tohoku Univ., Japan)	493
FR1-F4-5	40GHz-Band Direct Digital RF Modulator Using the 2 <sup>nd</sup> Image Component of 1-Bit Delta-Sigma Modulated Signal Junhao Zhang and Noriharu Suematsu (Tohoku Univ., Japan)	496

**Session FR1-F5 Special Session**  
**Professor Tatsuo Itoh Memorial Session**  
**Room F205 09:15-10:55**  
**Friday, December 02**

Chairs : Atsushi Sanada (Osaka Univ., Japan), Tetsuya Ueda (Kyoto Inst. of Tech., Japan)

Organizers : Atsushi Sanada (Osaka Univ., Japan), Tetsuya Ueda (Kyoto Inst. of Tech., Japan)

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FR1-F5-1	Professor Itoh's Contribution to APMC and Asia-Pacific Microwave Communities Atsushi Sanada (Osaka Univ., Japan)	N/A
FR1-F5-2	In Memory of Professor Tatsuo Itoh Ching-Kuang Clive Tzuang (National Taiwan Univ., Taiwan), Shigeo Kawasaki (Space & Mobile Wireless Technology Inc., Japan), Olga Boric-Lubecke (Univ. of Hawaii at Manoa, U.S.A.), Chung-Tse Michael Wu (Rutgers Univ., U.S.A.)	N/A
FR1-F5-3	Closing Words Tetsuya Ueda (Kyoto Inst. of Tech., Japan)	N/A

**Session FR1-F6 Special Session**  
**Special Session for Young Professionals**  
**Room F206 09:15-10:15**  
**Friday, December 02**

Chair : Takayuki Matsumuro (ATR, Japan)

Organizers : Takayuki Matsumuro (ATR, Japan), Tohlu Matsushima (Kyushu Inst. of Tech., Japan)

	Opening	N/A
FR1-F6-1	RF and uW Technologies Trend Thru Test and Measurement Industry	N/A
[Special]	Osamu Kusano (Keysight Technologies, U.S.A.)	
FR1-F6-2	Special Offers from IEEE MTT-S Young Professionals	N/A
[Special]	IEEE MTT-S Young Professionals Chair	
FR1-F6-3	Introduction of Fresh Activities by Young Engineers	N/A
	Naoki Fujiki (Ryukoku Univ., Japan), Yu Munemoto (Kyushu Inst. of Tech., YOTA Japan, Japan), Kazunobu Serizawa (Waseda Univ., ATR, Japan)	
FR1-F6-4	Closing	N/A

**Session FR2-F1**  
**GaN-Based Power Amplifier and Related Techniques for Base Stations**  
**Room F201 12:45-14:45**  
**Friday, December 02**

Chairs : Yuji Komatsuzaki (Mitsubishi Electric Corp., Japan), Masaru Sato (Fujitsu Limited, Japan)

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Room F202 12:45-14:45

Friday, December 02

Chairs : Simone Bastioli (RS Microwave Company Inc., U.S.A.), Dmitry V. Kholodnyak (Saint Petersburg Electrotechnical Univ., Russia)

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Friday, December 02

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**Friday, December 02**

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**Friday, December 02**

Chairs : Naoki Hasegawa (Softbank Corp., Japan), Nimrod Ginzberg (Israel Inst. of Tech., Israel)

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**Room F206 12:45-14:05**  
**Friday, December 02**

Chair : Satoshi Yoshida (Kagoshima Univ., Japan)

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Organizers : Satoshi Yoshida (Kagoshima Univ., Japan), Hiroyuki Nakanishi (Kagoshima Univ., Japan)

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FR2-F6-1	A Study on a Delay-Line-Based Ramp-Compare ADC for Radio Astronomical Applications Atsushi Nishimura (NINS, Japan); Takeru Matsumoto (Osaka Metropolitan Univ., Japan); Yudai Matsue (Nagoya Univ., Japan); Teppei Yonetsu (Osaka Metropolitan Univ., Japan); Yuka Nakao (Osaka Prefecture Univ., Japan); Shinji Fujita and Hiroyuki Maezawa (Osaka Metropolitan Univ., Japan); Kengo Tachihara (Nagoya Univ., Japan); Toshikazu Onishi and Hideo Ogawa (Osaka Metropolitan Univ., Japan)	581
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Room F201 15:15-16:55

Friday, December 02

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**Friday, December 02**

Chairs : Toshio Ishizaki (Ryukoku Univ., Japan), Ching-Wen Tang (National Chung Cheng Univ., Taiwan)

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**EM Analysis and High Frequency Components**  
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**Friday, December 02**

Chairs : Jun Shibayama (Hosei Univ., Japan), Tazeen Shaikh (IIT Kharagpur, India)

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Chairs : Jerome Cuenca (Cardiff Univ., U.K.), Bo Yang (Kyoto Univ., Japan)

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**Women In Engineering / Microwaves**  
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**Friday, December 02**

Chairs : Takana Kaho (Shonan Inst. of Tech., Japan), Ramesh K. Pokharel (Kyushu Univ., Japan)

Organizers : Takana Kaho (Shonan Inst. of Tech., Japan), Ramesh K. Pokharel (Kyushu Univ., Japan)

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