

Thailand – Japan MicroWave 2015



TJMW2015

August 6 – 8, 2015

Chulalongkorn University, Bangkok, Thailand



THE INSTITUTE OF ELECTRONICS,
INFORMATION AND COMMUNICATION ENGINEERS

Proceedings of Thailand – Japan MicroWave 2015 (TJMW 2015)

TJMW2015 is sponsored by IEICE Technical Committee on
Microwaves and is jointly hosted by Chulalongkorn University

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Message from the General Co-Chair of TJMW2015

On behalf of Chulalongkorn University, it is our great pleasure to organize the Thailand-Japan MicroWave (TJMW2015). This conference is a platform for researchers to share the recent research trends and experiences between researchers from Japan, Thailand, ASEAN countries and the vicinity. It is technically co-sponsored by IEICE Bangkok Section, ECTI Association, and IEEE MTT/AP/ED Thailand Chapter.

Our technical program covers variety of topics ranging from RF circuits, microwave systems and active components, antenna techniques and applications, metamaterials, and optical fiber systems. The tutorial session on fundamentals of microwave measurements is organized on August 6, 2015. The technical program lasts two days from August 7 to August 8, 2015.

We faithfully appreciate the contributions of the invited speakers from Japan, Indonesia, the Philippines and Brunei. The young researcher session is organized to encourage the new generation researchers.

I would like to thank the members of Steering Committee, Organizing Committee and Technical Program Committee for their constant support and cooperation. In particular, I would like to thank the authors who have made this conference possible. In addition, the supports from Rohde & Schwarz Japan and Rohde & Schwarz Thailand are highly appreciated.

I believe that there might be some inconveniences both during the preparation time and possibly during your stay. I solely accept all your complaints. However, if there is any impression, please acknowledge that it results from the hard work of the organizing committee members. By the way, during your stay if you need any help, please do not hesitate to let us know. We will be pleased to serve you.

I wish you enjoy your stay and have fruitful discussions.

Tuptim Angkaew,
Chulalongkorn University,
TJMW2015 General Co-Chair (Thailand)

Message from the General Co-Chair of TJMW2015

Welcome to 2015 Thailand-Japan MicroWave (TJMW2015) !

It is my great pleasure to see all of microwave friends again in Bangkok, Thailand. Microwave researchers in Thailand and Japan organize this conference to accumulate friendship between both societies. First of all I need to say my appreciation to all of microwave friends, related societies and affiliations. Also we can have this conference again under the deep understandings of Chulalongkorn University.

In 1999, we had the first TJMW at Pattaya, Thailand. It was a small, but great step for both microwave societies. Unfortunately, there were fewer opportunities to have technical discussions on microwave theory and techniques after TJMW1999. Through the discussions in APMC2007 held in Bangkok, all of members feel the warm atmosphere and intensions between Thailand and Japan, resulting in organizing TJMW again. The renewal TJMW started at King Mongkut's University of Technology North Bangkok (KNUTNB) in 2009. Since 2009, TJMW has held in Bangkok every year except 2010. The 6th renewal TJMW, TJMW2015, will be held on Aug. 6-8, at Chulalongkorn University again.

TJMW2015 is organized and co-sponsored by IEICE Technical Committee on Microwaves and is jointly hosted by Chulalongkorn University. The workshop is also technically co-sponsored by IEICE Bangkok Section, IEEE MTT/AP/ED Thailand chapter, ECTI Association, IEEE MTT-S Japan/Kansai/Nagoya chapters, IEICE Technical Committee on Integrated Circuits and Devices, and IEICE Technical Committee on Wireless Power Transfer. With the great helps from above societies, we received many paper submissions of more than 70 including 40 young researchers' papers. I appreciate all of you.

For long years, our microwave society have been keeping important role as "the hub port of technologies" among antenna, communication, optics, electronic devices, integrated circuits, EMC and so on. Also TJMW is becoming the important hub port of the regional human network between ASEAN and Japan. It is our pleasure to contribute for the construction of the hubs/networks in technologies. We expect accumulations of strong friendships among multi-regions and multi-generations in TJMW2015.

I would like to express my appreciation to Prof. Tuptim Angkaew and her team for their continuous support that makes this conference success. Finally, I would like to appreciate all the authors, speakers, and attendees.

Kenjiro Nishikawa,
Kagoshima University,
TJMW2015 General Co-Chair (Japan)

Thursday, August 6th, 2015

09:50 - 12:00

Tutorial Session:

Chairs: Panuwat Janpugdee, Chulalongkorn Univ., Thailand

Registration time 09:30 - 10:00

Opening: 09:50 - 10:00

Time: 10:00 - 12:00

**Tutorial Topic Evolution toward 5G-Next Generation Mobile Network and Its
Applications**

Speaker Dr. Hiroshi Okazaki

NTT DOCOMO, Japan

Venue 2nd Floor Auditorium, Engineering 4 Building

Faculty of Engineering, Chulalongkorn University

Thursday, August 6th, 2015
13:00-14:00 (Oral)
14:00-15:30 (Poster)
TH1: Young Researchers Session

Chairs: **Sarawuth Chaimool, Udon Thani Rajabhat University, Thailand**
 Shoichi Narahashi, NTT DOCOMO, Japan

TH1-01 **Okumura-Hata Model Optimization for DVB-T2 Propagation in Urban Area of Surattani, Southern Thailand**

Pitak Keawbunsong, Sathaporn Promwong
KMITL, Thailand

TH1-02 **Dual-band Dual-pole Antenna for compatibility of MPT with communication**

Naoki Hasegawa*, Hyeonjae Ju#, Satoshi Yoshida**, Akihira Miyachi##,
Makoto Matsunoshita ##, Kenjiro Nishikawa**, Shigeo Kawasaki##
* Kyoto Univ, Japan, # The Univ. of Tokyo, Japan,
** Kagoshima Univ., Japan. ## ISAS/JAXA, Japan

TH1-03 **Comparison on Optimization and Calibration Methods for DTTV Propagation in Urban Area of Surattani, Southern Thailand**

Pitak Keawbunsong, Sathaporn Promwong
KMITL, Thailand

TH1-04 **Study of Radio Wave Propagation for low-power Autonomous WSN**

-- Attenuation and Fading Modeling by Measurements --
Ryohei Yamane, Tatsuki Tokunou, Toshihiko Hamasaki
Hiroshima Inst. of Tech., Japan

TH1-05 **UHF RFID Reader using Slanted Slot Patch Metasurface on Microstrip Patch Antenna**

Pawares Vijitsulakkana*, Wanwisa Thaiwirot*, Sarawuth Chaimool#,
Prayoot Akkaraekthalin*
*KMUTNB, Thailand, # UDRU, Thailand

TH1-06

Basic characteristics of the third order PLL oscillator

Junki Ogawa, Kenji Itoh, Keisuke Noguchi, Tetsuo Hirota, Shigeru Makino
Kanazawa Inst. of Tech., Japan

TH1-07

Combination of Substrate Integrated Waveguide and Microstrip Structure for Controllable Wideband Bandpass Filters

Nonchanutt Chudpooti*, Sarawuth Chaimool#, Prayoot Akkaraekthalin*
* KMUTNB, Thailand, #UDRU, Thailand

TH1-08

The Output Power Formulas of the Balanced Diode Mixer Driven by the Square Wave LO

Honami Hama, Kenji Itoh, Keisuke Noguchi, Tetsuo Hirota, Shigeru Makino
Kanazawa Inst. of Tech., Japan

TH1-10

A 24-GHz Low-Noise Amplifier in 180nm CMOS

Yoshiki Sato*, Yohei Kondo#, Kiyotaka Komoku*, Takayuki Morishita*,
Nobuyuki Itoh*
* Okayama Pref. Univ., Japan, # Sharp Takaya, Japan

TH1-11

BAN-UWB Transmission Model for Wireless Body Area Network

Phouthong Southisombath, Sanit Teawchim, Sathaporn Promwong
KMITL, Thailand

TH1-12

The 500MHz band low power rectenna with a high impedance antenna

Takahiro Furuta, Motoki Ito, Kenji Itoh, Keisuke Noguchi, Jiro Ida
Kanazawa Institute of Tech., Japan

TH1-13

Coupled Slot Antenna for Mango Classification

Karn Sukpong*, Chayot Jatupornprasit*, Chayut Tripathumrat*,
Chattapon Rienthong*, Paiboon Yoiod#, Monai. Krairiksh*
* KMITL, Thailand, # RSU, Thailand

TH1-14

A study on LH ferrite waveguide using half mode waveguide

Sho Yasugi, Kensuke Okubo, Mitsuyoshi kishihara, Hironori Takimoto
Okayama Pref. Univ., Japan

TH1-15

Microwave Sensor for Defected-Fruit Classification

Prapan Leekul, Chinarong Kittiyapunya, Sorawat Chivapreecha,
Monai Krairiksh
KMITL, Thailand

- [TH1-16](#)** **A numerical study on nonreciprocal transmission characteristics of antiparallel magnetized LH ferrite waveguide**
Taichi Adachi, Kensuke Okubo, Mitsuyoshi Kishihara, Hironori Takimoto
Okayama Pref. Univ., Japan
- [TH1-17](#)** **Bandwidth Enhancement of Unidirectional Bow Tie Antenna Using Incision Gap for Terrestrial Digital Video Broadcasting**
Bancha Luadang, Chuwong Phongcharoenpanich
KMITL, Thailand
- [TH1-18](#)** **Maximum symbol rate feasible for LED visible light communication with low-frame-rate CMOS camera**
Tomoki Kondo, Ryotaro Kitaoka, Wataru Chujo
Meijo Univ., Japan
- [TH1-19](#)** **Truncated-Corner Loop Tag Antenna Radiating Circular Polarization for National UHF-RFID Standard**
Arnon Sakonkanapong, Chuwong Phongcharoenpanich
KMITL, Thailand
- [TH1-20](#)** **Flicker-free modulation technique for LED visible light communication with low-frame-rate CMOS camera**
Ryotaro Kitaoka, Tomoki Kondo, Wataru Chujo
Meijo Univ., Japan
- [TH1-21](#)** **Integrated Antenna using a Magneto-Dielectric Substrate for DVB-H Application**
Pipat Bumrungkarn, Bancha Luadang, Chuwong Phongcharoenpanich
KMITL, Thailand
- [TH1-22](#)** **Consideration on Mounting Structure for MEMS Switch at 60 GHz Band**
Kengo Nakajima*, Futoshi Kuroki*, Masanori Eguchi#, Takeshi Yamakawa#
* NIT, Kure, Japan, # FLSI, Japan
- [TH1-23](#)** **The FOA Design for Linear Antenna Array Optimization Problem**
Nattaset Mhudtongon*, Chuwong Phongcharoenpanich*, Supakit Kawdungta#
* KMITL, Thailand, # RMUTL, Thailand

- [TH1-24](#)** **Equivalent Circuit Model of Multi-layered Coils at Mediate Frequencies**
Kaiji Nakahara, Futoshi Kuroki
NIT, Kure, Japan
- [TH1-25](#)** **Perturbation of a Probe Excited Circular Ring Antenna above the Square Reflector with Inserted Slabs for Circularly Polarized Radiation**
Rungsinee Sukamat, Nattaset Mhudtongon, Chuwong Phongcharoenpanich
KMUTL, Thailand
- [TH1-26](#)** **Evaluation Method of Transmission Loss Using Unloaded Q factor of Transmission Line**
Yoshihiko Kamo, Futoshi Kuroki
NIT, Kure, Japan
- [TH1-27](#)** **A Study of Electromagnetic Wave Diffracted from Corners of Thin Material Coated Metallic Surface**
Awika Pimpatang, Titipong Lertwiriayaprapa
KMUTNB, Thailand
- [TH1-28](#)** **Consideration on Wireless Power Transmission Efficiency in KHz Frequency Bands**
Katsuyoshi Aoki*, Kenji Shodai#, Kouichi Yamanoue**, Futoshi Kuroki*
*NIT, Kure, Japan, #Hiroshima Univ., Japan, **Imasen Co.Ltd, Japan
- [TH1-29](#)** **Study of Electromagnetic Absorber Made by Natural Rubber**
Kiadtisak Salayong, Titipong Lertwiriayaprapa
KMUTNB, Thailand
- [TH1-30](#)** **The far-carrier phase noise measurement of the RF oscillator**
Yasuhiro Tonomo, Kenji Itoh, Tetsuo Hirota, Keisuke Noguchi, Shigeru Makino
Kanazawa Institute of Tech., Japan
- [TH1-31](#)** **Design of a Low cost and Simple Wireless Battery Charging by using Repeater Antenna Technique**
Warayut Samakkhee, Kittisak Phaebua, Titipong Lertwiriayaprapa
KMUTNB, Thailand

- TH1-32** **Technique to expand power transfer area on short range wireless power transfer system**
Tatsuro Kuwahara, Ryo Takamori, Kenjiro Nishikawa
Kagoshima Univ., Japan
- TH1-33** **Measurement for Radar Target Identification using Matrix Pencil Method**
Feaveya Kheawprae, Akkarat Boonpoonga
KMUTNB, Thailand
- TH1-34** **Modeling of Grounded CPW Line with Anomalous Skin Effect in THz band.**
Yuta Sakiyama, Masashi Muraguchi, Hiroto Sakaki, Kenjiro Nishikawa
Kagoshima Univ., Japan
- TH1-35** **Radar Target Identification of Coated Object Using Cauchy Method**
Nattawat Chantasen, Akkarat Boonpoonga
KMUTNB, Thailand
- TH1-36** **An RF Universal Board for SSOP Elements**
Motohiro Takayasu, Toshiaki Gonda, Yosuke Ishikawa, Hiroyuki Ito,
Noboru Ishihara, Kazuya Masu
Tokyo Tech., Japan
- TH1-37** **Analysis of Object Buried in Multi-layer Soil by using Matrix Pencil Method**
Lakkhana Bannawat, Cheepchanok Yochanang, Akkarat Boonpoonga
KMUTNB, Thailand
- TH1-38** **Pattern Diversity Unidirectional Antenna using Elevated Strip on Rectangular Ground Plane for WLAN Applications**
Sukumarn Sankaewthong, Sitthichai Dentre, Chuwong Phongcharoenpanich
KMITL, Thailand
- TH1-39** **A Dual-band Textile Antenna using Two Layers of Strip Line and Round-off Circular Patch**
Warangkana Chaihongsa, Chuwong Phongcharoenpanich
KMITL, Thailand

Friday, August 7th, 2015

09:00-10:20

Plenary Session

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

Faculty of Engineering, Chulalongkorn University

Chair: Kenjiro Nishikawa, Kagoshima Univ., Japan

Opening Remarks

Message from General Chair

Tuptim Angkaew

Chulalongkorn Univ., Thailand

Plenary

Wireless Smart-city Technologies Launched from Asian Activities

Futoshi Kuroki

NIT, Kure, Japan

Keynote

Convergence of radio and optical technologies for high resolution imaging

Tetsuya Kawanishi

Waseda Univ., Japan

Friday, August 7, 2015

10:40-12:15

FR1: Novel Passive Components and Technologies

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

Chairs: Prayoot Akkaraekthalin, KMUTNB, Thailand
Masataka Ohira, Saitama Univ., Japan

FR1-01 [Invited] Low-loss Silica-Based Bandpass Filter for 60-GHz applications

Yusuke Uemichi*, Osamu Nukaga*, Kei Nakamura*, Xu Han*, Ryouhei Hosono*,
Ning Guan*, Shuhei Amakawa#

* Fujikura Ltd., Japan, # Hiroshima Univ., Japan

**FR1-02 On the Design Method of Microstrip Filtering Antennas Using Only
Amplitude Property of Input Reflection Responses**

Masataka Ohira, Zhewang Ma

Saitama Univ., Japan

**FR1-03 A Fourth Band BPF using Interdigital and Step-Impedance Techniques for
4G, WiMAX and WLAN Systems**

Mr. Pongpat Ketkuntod

KMUNB, Thailand

**FR1-04 Study of influences of underfill material on CPW type millimeter-wave
MMIC by flip chip packaging**

Takashi Shimizu*, Yoshinori Kogami*, Yasutake Hirachi#

* Utsunomiya Univ., Japan, # Tokyo Tech., Japan

**FR1-05 Planar Waveguide-to-Microstrip Transition with Multiple Microstrip-line
Output Ports**

Kunio Sakakibara, Nobuyoshi Kikuma

NItech, Japan

FR1-06 Geometrical interpretation of edge states in transmission lines

Kei Sawada

RIKEN, Japan

Friday, August 7, 2015

13:15-14:45

FR2: Advanced Antenna Technologies

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

Chairs: Chuwong Pongjareonpanich, KMITL, Thailand
Kunio Sakakibara, NITech., Japan

**FR2-01 A Multiband Antenna with Square Slots and Capacitive CPW Feed for
LTE,WiMAX and WLAN Systems**

P. Singsura, P. Chomtong, S. Meesomklin, P. Akkaraekthalin
KMUTNB, Thailand

FR2-02 Fundamental Study of the Helmet Antenna for Disaster Prevention

Hisashi Morishita, Naoto Nishiyama, Naobumi Michishita
National Defense Academy, Japan

**FR2-03 Development of a Microstrip Antenna for In-Vehicle Digital Television
Reception**

Teerapong Pratumsiri, Panuwat Janpugdee
Chulalongkorn Univ., Thailand

**FR2-04 Self Resonant Characteristics of Normal-Mode Helical Antennas Embedded
in Dielectric or Magnetic Materials**

Nguyen Thanh Tuan*, Yoshihide Yamada*, Nguen Quoc Dinh#
*MJIT, Malaysia, # Le Quy Don Technical University, Vietnam

**FR2-05 Dispersion and Far-Field Analysis of a Hertzian Dipole Embedded in
Multiple Periodic Structures of Lossless Multilayer Slabs Using the
Equivalent CCITL Model**

Supakit Kawdungta*, Danai Torrungrueng#
* RMUTL, Thailand, # Asian University, Thailand

**FR2-06 Experimental study of an improved mono-pulse DOA estimation antenna by
integrating microwave circuits**

Eisuke Nishiyama, Ryo Tanaka, Ichihiko Toyoda
Saga Univ., Japan

Friday, August 7, 2015

15:05-16:30

FR3: Advanced Measurement Techniques

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

Chairs: Thitipong Lertwiriaprapa, KMUTNB, Thailand
Masahiro Horibe, NMIJ-AIST, Japan

FR3-01 [Invited] Measurement and Analysis of Nanoparticle Ferromagnetic Resonance -- Non-Resonant Transmission Line Technique --

Khattiya Chalapat*, Jaakko Timonen#, Maija Huupola#, Lari Koponen#,
Christoffer Johans#, Robin Ras#, Olli Ikkala#, Markku Oksanen**, Eira Sepp**,
Sorin Paraoanu#

* KMITL, Thailand, # Aalto University, Finland,

** Nokia Research Center, Finland

FR3-02 [Invited] A Reflectometer with Beam Switching Capability

Chainarong Kittiyapunya, Monai Krairiksh
KMITL, Thailand

FR3-03 Permittivity measurement of low-loss material by installation into microwave cavity

Yuto Kato, Masahiro Horibe
AIST, Japan

FR3-04 Impact of Adaptor on Impedance Measurement at RF Frequency

Ryoko Kishikawa, Masahiro Horibe
AIST, Japan

FR3-05 Comparing Measurement Results between Waveguide Vector Network Analyzer Measurement System with Different Cable Setup

Masahiro Horibe, Ryoko Kishikawa, Yuto Kato
NMIJ-AIST, Japan

Friday, August 7, 2015

16:50-17:40

FR4: Novel Radar and Sensor Systems

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

Chairs: Panuwat Janpugdee, Chulalongkorn Univ., Thailand
Hiroshi Okazaki, NTT DOCOMO, Japan

**FR4-01 [Invited] Ground Penetrating Radar (GPR) for Counter
Improvised-Explosive Devices in Thailand**

Akkarat Boonpoonga

KMUTNB, Thailand

**FR4-02 ZigBee Sensor Network Installed with Ultrasonic Radar Sensor for Care
Environment -- Comparison to Millimeter-Wave Radar --**

Mitsutaka Hikita, Takeo Sato, Yukari Kaneda

Kogakuin Univ., Japan

FR4-03 Field trial of radio-over-fiber based high-resolution radar

Tetsuya Kawanishi*, Atsushi Kanno#, Nobuhiko Shibagaki**,

Naruto Yonemoto###, Tuptim Angkaew†, Panuwat Janpugdee†

* Waseda Univ., Japan, # NICT, Japan, ** Hitachi, Japan,

ENRI, Japan, † Chulalongkorn Univ., Thailand

Saturday, August 8th, 2015

10:00-11:30

SA1: Special Session: RF Power Devices and Its Applications

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

**Chairs: Thitipong Lertwiriaprapa, KMUTNB, Thailand
Kenji Itoh, Kanazawa Inst. of Tech., Japan**

SA1-01 [Invited] Microwave high power devices for social infrastructure systems in south east Asia

Koji Yamanaka, Kazuhiro Iyomasa, Shintaro Shinjo, Masatake Hangai
Mitsubishi Electric Corp., Japan

SA1-02 [Invited] An X-band Dual-Polarimetric Doppler Weather Radar System as Applications of Microwave Circuits and Its Observation Examples

Takuo Kashiwa, Toshiaki Takaki, Masahiro Minowa, Yuta Ishigaki
Furuno Electric, Japan

Saturday, August 8th, 2015

13:00-13:55

SA2: Advanced Millimeter Wave Device and Systems

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

**Chairs: Sarawuth Chaimool, Udon Thani Rajabhat Univ., Thailand
Koji Yamanaka, Mitsubishi Electric Corp., Japan**

**[SA2-01](#) [Invited] The Three-Dimensional MMIC and Its Evolution to Wafer-Level
Chip Size Package MMIC**

Tsuneo Tokumitsu

SEI, Japan

**[SA2-02](#) [Invited] A 60GHz Band 3-D Phased Array Antenna Module for Beam
Forming W-PAN receivers**

Noriharu Suematsu, Mizuki Motoyoshi, Satoshi Yoshida, Yuya Suzuki, Wenying
Ye, Surugu Kameda, Tadashi Takagi, Kazuo Tsubouchi

Tohoku Univ., Japan

**[SA2-03](#) Research on a Millimeter-Wave Close Proximity High-Speed Data Transfer
System**

Tadao Nakagawa*, Hideki Toshinaga*, Toshimitsu Tsubaki*, Tomohiro Seki#,
Ken Hiraga*, Masashi Shimizu*

* NTT, Japan, # Nihon Univ., Japan

Saturday, August 8th, 2015

14:15-15:25

SA3: Advanced CMOS Technologies

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

Chairs: Panuwat Janpugdee, Chulalongkorn Univ., Thailand
Minoru Fujishima, Hiroshima Univ., Japan

SA3-01 [Invited] Innovation challenges from materials, devices and circuits in IoT/IoE era

Kazuya Masu

Tokyo Tech., Japan

SA3-02 [Invited] Present Status of Characteristics Variability in Scaled MOS Transistors

Toshiro Hiramoto

Univ. of Tokyo, Japan

SA3-04 Power line decoupling up to 325 GHz in CMOS

Shuhei Amakawa, Ryuhei Goda, Kosuke Katayama, Kyoya Takano, Takeshi Yoshida, Minoru Fujishima

Hiroshima Univ., Japan

Saturday, August 8th, 2015

15:25-15:35

Closing Session

2nd Floor Auditorium, 100 Year Anniversary Engineering Building

Chair: Tuptim Angkaew, Chulalongkorn Univ., Thailand

Closing Remarks

Kenjiro Nishikawa

Kagoshima Univ., Japan