

# 2010 Asia-Pacific Microwave Conference

## APMC 2010

December 7-10, 2010 Pacifico Yokohama, Yokohama, Japan

<http://www.apmc2010.org/>



### ADVANCE PROGRAM



## “ Novel Technology Waves from Historical Port ”

Sponsored by  
the Institute of Electronics, Information and Communication Engineers (IEICE)

Cooperatively sponsored by  
IEEE MTT-S, IEEE AP-S, EuMA, URSI,  
IEEE MTT-S Japan/Kansai/Nagoya Chapters

Supported by Ministry of Internal Affairs and Communications



Ministry of Internal Affairs  
and Communications

# PROGRAM AT A GLANCE

**12/6(MON)** Registration (16:00 – 19:00) “2F, Conference Center”

12/7(TUE)	Room A (301)	Room B (302)	Room C (303)	Room D (304)	Room E (311+312)	Room F (313+314)	Room G (315)
9:00	SC1A Modeling and Design Techniques for High Power Amplifiers and Their Performance	SC1B Electromagnetic Metamaterials and their Microwave Applications	WS1C Progress and Prospects of RF-MEMS	WS1D Channel Modeling and Simulator for Mobile Communications			
12:00	<b>LUNCH TIME</b>						
13:30	WS2A Recent Trends and Prospects of Wide Bandgap Semiconductor Devices	WS2B Recent Progress in Filters and Couplers	WS2C Tunable RF-Components and their Applications to Wireless Systems	WS2D Short-Range Wireless Communications and Technologies			
16:30							
Welcome Reception (17:30 – 19:30) “Inter Continental The Grand Yokohama”				Registration (8:00 – 17:30) “2F, Conference Center”			

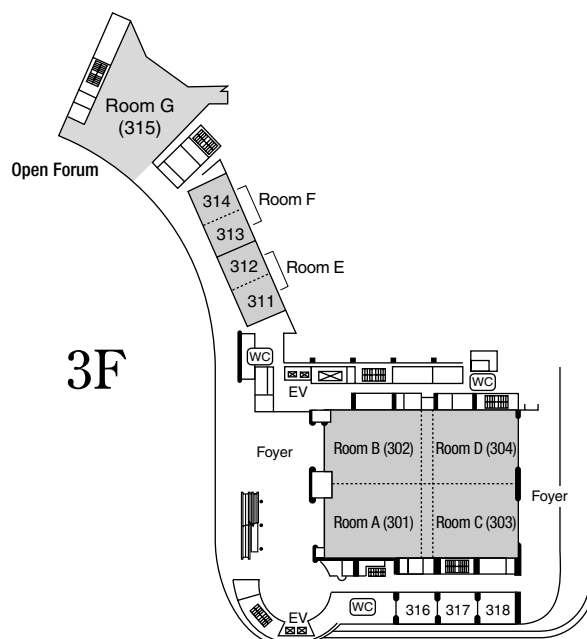
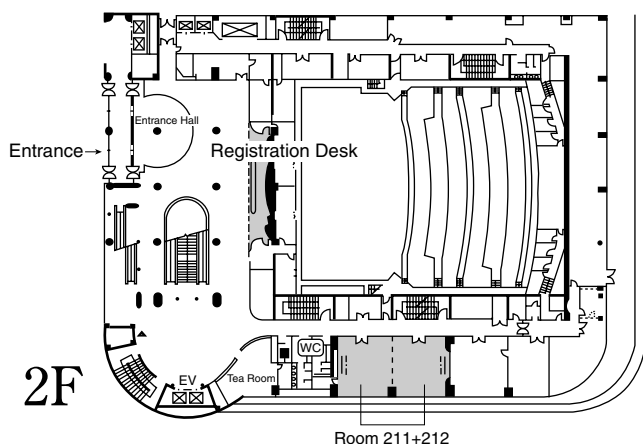
12/8(WED)	Room A (301)	Room B (302)	Room C (303)	Room D (304)	Room E (311+312)	Room F (313+314)	Room G (315)
8:50	WE1A Low Distortion Power Amplifier Technology	WE1B Wide Band Planar Filters	WE1C Microwave Applications	WE1D CAD and Numerical Techniques	WE1E Low Profile and Small Antennas	WE1F Design and Implementation Techniques for Microwave Filters 1	
10:30	COFFEE BREAK						
10:50	WE2G (Room H (501+502)) Opening Ceremony Keynote Address						
12:30	LUNCH TIME						
14:00	WE3A High Power GaN HEMT Applications	WE3B Tunable and Metamaterial Filters and Resonators 1	WE3C Terahertz and Microwave Applications	WE3D Progress in Antenna Applications	WE3E System Consideration	WE3F Mobile Antennas 1	
15:40	COFFEE BREAK						15:00–16:30 WE3G Open Forum (Poster)
16:00	WE4A EuMA Special Session	WE4B Design and Implementation Techniques for Microwave Filters 2	WE4C Microwave Medical and Biological Applications	WE4D Planar Antennas	WE4E Microwave Photonics	WE4F CMOS Low Noise Amplifier	
18:00							
Microwave Exhibition (10:00–17:30) “Exhibition Hall A+B”				Registration (8:00–17:30) “2F, Conference Center”			

12/9(THU)	Room A (301)	Room B (302)	Room C (303)	Room D (304)	Room E (311+312)	Room F (313+314)	Room G (315)
8:50	TH1A Theory and Implementation of Oscillators	TH1B Transmission Lines and Waveguide 1	TH1C UWB Antennas 1	TH1D Reconfigurable Antennas, Active Antennas	TH1E High Efficiency Power Amplifiers	TH1F Tunable and Metamaterial Filters and Resonators 2	10:00–11:30 TH1G Open Forum (Poster)
10:30	COFFEE BREAK						
10:50	TH2A Frequency Conversion Techniques	TH2B Power Dividers	TH2C UWB Antennas 2	TH2D MIMO Antennas	TH2E Si-based Millimeter-wave ICs	TH2F Miniaturized and Multi-Band Directional Couplers	
12:30	LUNCH TIME						
14:00	TH3A Wireless Transceiver and Receiver IC Design Techniques	TH3B Highly-Integrated Planar Filter/Resonator	TH3C Electromagnetic Wave Theory 1	TH3D Metamaterial Antennas	TH3E Emerging Technologies on Active Circuits	TH3F Packaging Techniques and Functional Devices	
15:40	COFFEE BREAK						15:00–16:30 TH3G Open Forum (Poster)
16:00	TH4A Broadband and Millimeter-wave Circuit Designs	TH4B APMC Special Session	TH4C Electromagnetic Wave Theory 2	TH4D Antennas for Wireless Systems	TH4E Advanced Technologies on Devices, Amplifiers, and Oscillators	TH4F CMOS Frequency Converters	
18:00							
Award Banquet (18:30 – 20:40) “Pan Pacific Yokohama Bay Hotel Tokyu”							
Microwave Exhibition (10:00 – 17:30) “Exhibition Hall A+B”				Registration (8:00 – 17:30) “2F, Conference Center”			

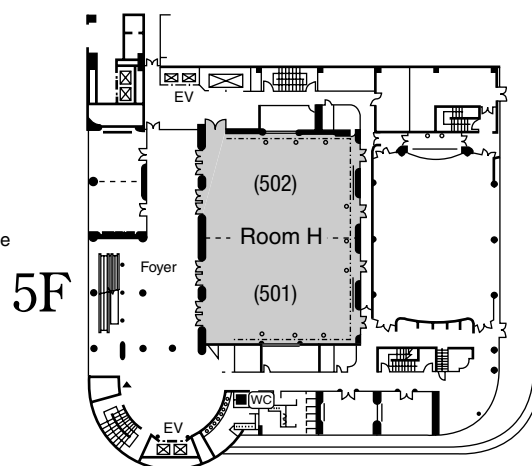
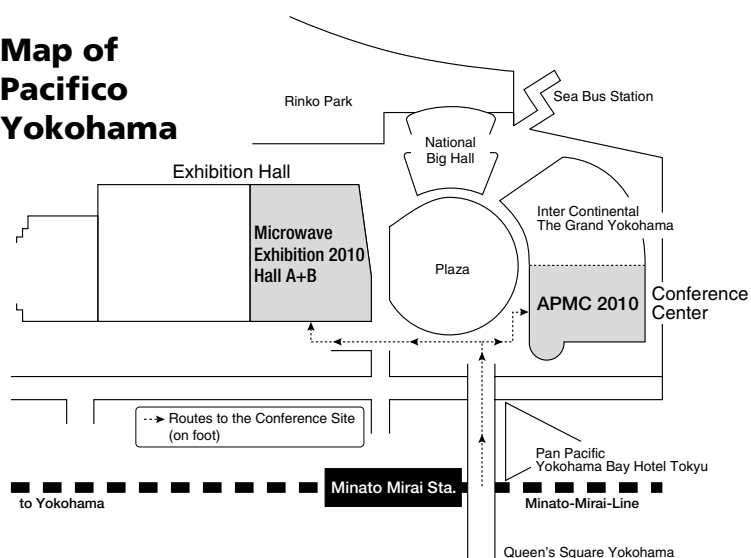
12/10(FRI)		Room A (301)	Room B (302)	Room C (303)	Room D (304)	Room E (311+312)	Room F (313+314)	Room G (315)	
	8:50	FR1A High Frequency Low Noise Amplifier	FR1B Artificial Materials and Applications	FR1C Propagation and Interference	FR1D Advances in Reflector and Slot Antennas	FR1E MIMO Systems	FR1F Transmission Lines and Waveguide 2	10:00–11:30 FR1G Open Forum (Poster)	
	10:30	COFFEE BREAK							
	10:50	FR2A CMOS Power Amplifiers	FR2B Advances in Coupler / Balun Technologies	FR2C Radar and Imaging Systems	FR2D Millimeter Wave Antennas, Antenna System	FR2E Sensing and Measurements 2	FR2F Innovative Non-Planar Filter Techniques		
	12:30	LUNCH TIME							
	14:00	FR3A Microwave Control Circuits	FR3B Multi Band Filters	FR3C Microwave and Millimeter-Wave Measurement Techniques	FR3D Mobile Antennas 2	FR3E Sensing and Measurements 1	FR3F MEMS and Tunable Devices	15:00–16:30 FR3G Open Forum (Poster)	
	15:40	COFFEE BREAK							
	16:00	FR4A Silicon Millimeter-Wave Circuits and Devices	FR4B Multi Mode Filters	FR4C VNA Measurements and ITS Applications	FR4D Wideband Antennas	FR4E Propagation	FR4F Design and Implementation Techniques for Microwave Filters 3		
	18:00								
Microwave Exhibition (10:00 – 17:00) “Exhibition Hall A+B”					Registration (8:00 – 16:00) “2F, Conference Center”				

# FLOOR PLAN

## Conference Center



## Map of Pacifico Yokohama



# TABLE OF CONTENTS

PROGRAM AT A GLANCE.....	i
FLOOR PLAN .....	ii
GREETINGS FROM THE STEERING COMMITTEE CHAIR .....	1
MESSAGE FROM THE TECHNICAL PROGRAM COMMITTEE CHAIR .....	1
GENERAL INFORMATION.....	2
CONFERENCE SITE .....	2
YOKOHAMA .....	2
REGISTRATION .....	2
HOTEL ACCOMMODATIONS .....	3
OFFICIAL TRAVEL AGENT .....	3
YOUTH HOSTEL INFORMATION .....	4
TRANSPORTATION .....	4
VISA REQUIREMENT FOR FOREIGN ATTENDEES .....	5
OTHER INFORMATION .....	5
SOCIAL PROGRAM.....	6
MEETINGS INFORMATION .....	6
APMC 2010 PRIZE .....	7
CONFERENCE SESSIONS .....	7
TECHNICAL SESSIONS.....	8
OPEN FORUM (POSTER) SESSIONS .....	20
WORKSHOPS .....	28
SHORT COURSES .....	30
EXHIBITION.....	31
APMC 2010 COMMITTEE OFFICERS .....	34



## GREETINGS FROM THE STEERING COMMITTEE CHAIR

It is my great honor to welcome you to participate in the 2010 Asia-Pacific Microwave Conference (APMC 2010), which is well recognized as the most prestigious microwave conference in the Asia Pacific region, to be held during December 7–10, 2010 at Pacifico Yokohama in Yokohama, Japan.

APMC 2010 is the 22nd APMC, which started in 1986 in India, and the 6th to be held here in Japan. During that time, Microwaves and related technologies made remarkable progress supported by social demands through the world. We organize the conference under the theme of “Novel technology waves from historical port” at Yokohama, the famous historical port opened to the world from the mid 19th century. Waves are always ultimate ubiquitous tool for information and energy transmission, as well as a variety of sensing.

Organized and sponsored by the Institute of Electronics, Information and Communication Engineers, APMC 2010 is devoted to the research, development, and application of RF and microwave theory and techniques, and aims to continue and accelerate the momentum of researching in microwave areas and bring together researchers and engineers from the Asia-Pacific region as well as other parts of the world to discuss and exchange experiences. Six workshops and two short courses offer very exciting topics in the microwave technologies definitely. It is also cooperatively sponsored by IEEE MTT-S, EuMA, IEEE AP-S, URSI, IEEE MTT-S

Japan/Kansai/Nagoya Chapters and supported by the Ministry of Internal Affairs and Communications of Japanese Government.

At the Exhibition Hall adjacent to the Conference Center, “Microwave Exhibition 2010,” which is the largest trade show dedicated to RF and microwaves in Asia, will be held from December 8–10, 2010. More than 350 microwave-related companies from all over the world will exhibit the latest products. To add to all of this, an exhibition by the Japanese microwave history and another exhibition by the universities and colleges from Japan and other countries will be held in the same hall.

I would like to express my sincere thanks to the authors for submitting their papers and presenting their results, to the sponsors, invited speakers and all the steering committee members, without whose supports this conference might not be possible.

Finally I wish you will join APMC 2010 and enjoy the novel technology waves emerging in the Microwave oceans.

Kiyomichi Araki  
APMC 2010 Steering Committee Chair



## MESSAGE FROM THE TECHNICAL PROGRAM COMMITTEE CHAIR

On behalf of the APMC 2010 Technical Program Committee (TPC), it is an honor to welcome you to the APMC 2010 in Yokohama.

The TPC has organized a highly technical and exciting program covering a wide variety of microwave technologies and related fields.

We have received an impressive number (810) of papers from 39 countries, i.e., Taiwan (156), Japan (144), and Republic of Korea (93) among others. This is the highest number of submissions ever in APMC's history in Japan. Due to the highly professional quality of these papers, it was an extremely difficult task to evaluate them all and then cut them down to a controllable number. A total of 263 reviewers around the world participated in the paper review and selection processes. We finally selected 604 papers (328 for oral presentations, 276 for open forums), which is the maximum allowable number in this location for this period.

The technical programs will start with workshops and short courses at 9:00 a.m., on Tuesday, December 7, which were selected from the most exciting topics in our fields. This year there are 6 workshops and 2 short courses. APMC regular sessions will commence at 8:50 a.m., on Wednesday, December 8, with 6 sessions proceeding simultaneously. A total of 66 oral presentation sessions and 5 open forum

sessions are scheduled for paper presentations.

The plenary session is scheduled for 10:50 a.m., on Wednesday, December 8, where Prof. Kazuhiko Honjo from the University of Electro-Communications will present his Keynote Address entitled, “A Technology Perspective on Active Microwave Circuits.” Dr. Shinichi Nomoto of KDDI R&D Laboratories, Inc. will make a presentation entitled, “Further Evolution of Wireless Technology toward World of Ambient Intelligence” as well. This year we have also invited 18 outstanding speakers who are very active in their individual fields.

We are proud to present this program for APMC 2010, which could not have been achieved without the valuable contributions of many enthusiastic TPC members and reviewers. I would like to express my sincerest appreciation to them for developing the conference with an outstanding technical program.

We are looking forward to seeing you in Yokohama, and wish you an enjoyable and productive stay.

Masahiro Muraguchi  
APMC 2010 Technical Program  
Committee Chair



# GENERAL INFORMATION

## CONFERENCE SITE

The APMC 2010 will be held from December 7 to 10, 2010, at the Conference Center in Pacifico Yokohama. Pacifico Yokohama is one of the largest convention centers in the world, consisting of the Conference Center, the Exhibition Hall, a hotel and a big national hall, and is located in the Minato Mirai 21 (MM21) area of Yokohama (see the map on the back of this booklet). Its beautiful shell-and-sail-shaped appearance is impressive when viewed from sea and from land as well.

The conference will be held in the Conference Center: Entrance Hall on the 2nd floor for Registration; Meeting Rooms on the 3rd floor for Technical Sessions, Workshops and Short Courses; and Meeting Rooms on the 5th floor for the Opening Ceremony and the Keynote Addresses.

## YOKOHAMA

Opened in 1859, Yokohama is celebrating its 150-year tradition of being the largest trading port of Japan. It is conveniently located 30 kilometers south of downtown Tokyo. The conference venue is in the Minato Mirai district, a collection of hotels, shopping malls, and restaurants. You may find pop Japanese culture in Akihabara, a town famous for electronics and animations, and historical Japanese flavor in Asakusa in downtown Tokyo. In Kamakura and Nikko, which are just day-time trips from Yokohama, you will be impressed by Japanese historical shrines, traditional temples and beautiful natural scenery. Japanese scenic spots are very comfortable since they were laid out for walking at leisure.

## REGISTRATION

### Pre-Registration and On-Site Registration

Those who intend to participate in APMC 2010, including the speakers of contributed papers, session chairs, committee members, etc., are requested to register for the “Conference” (from December 8 to 10, 2010) and/or the “Workshops and Short Courses” (on December 7, 2010).

Pre-Registration is available on the APMC 2010 website from August 10 to November 22, 2010.

For those who cannot register beforehand, On-Site Registration is available at the Registration Desk at the Conference Site from December 6 to 10, 2010.

### Registration Fees

The registration fees are separated for the “Conference” and “Workshops and Short Courses,” but you can take advantage of a better deal by selecting “SUPERPASS,” which covers both the “Conference” and “Workshops and Short Courses.”

Those who registered for the “Conference” will get admission to the Welcome Reception, the Opening Ceremony and Keynote Addresses, and the Technical Sessions (from December 8 to 10, 2010).

Those who registered for the “Workshops and Short Courses” will get admission to the Workshops and Short Courses on December 7, 2010.

There are also privileges of membership of the APMC 2010 sponsoring organizations; “IEICE,” “IEEE MTT-S,” “IEEE AP-S,” “EuMA,” or “URSI.” Please visit the sponsoring organizations’ websites for membership application, only if you like.

Category (Appropriate Period)		Early bird (Aug. 10 – Sep. 30)	Advanced (Oct. 1 – Nov. 22)	On-site (Dec. 6 – Dec. 10)
SUPERPASS (Conference & Workshops and Short Courses)	regular (member)	47,000 JPY	52,000 JPY	—
	(non-member)	57,000 JPY	63,000 JPY	—
	student/retiree (member)	12,000 JPY	12,000 JPY	—
	(non-member)	17,000 JPY	17,000 JPY	—
Conference	regular (member)	45,000 JPY	50,000 JPY	60,000 JPY
	(non-member)	55,000 JPY	61,000 JPY	67,500 JPY
	student/retiree (member)	10,000 JPY	10,000 JPY	15,000 JPY
	(non-member)	15,000 JPY	15,000 JPY	20,000 JPY
Workshops and Short Courses	regular (member)	5,000 JPY	6,000 JPY	8,000 JPY
	(non-member)	6,000 JPY	7,000 JPY	10,000 JPY
	student/retiree (member)	5,000 JPY	6,000 JPY	8,000 JPY
	(non-member)	6,000 JPY	7,000 JPY	10,000 JPY

\* Please note that, from November 23 to December 5, 2010, the Pre-Registration will not be accepted. Those who could not complete registration by November 22, 2010, should register during the conference period.

# GENERAL INFORMATION

The Registration Fee differs depending on;

- the application date for registration,
- whether the registrant is a student or not,
- whether the registrant is a member of any of the APMC 2010 Sponsoring Organizations above or not.

## Registrant's Kit

Those who registered for the "Conference" (including "SUPERPASS") will each receive a set of the Conference Registrant's Kit, which includes a copy of the Conference Proceedings (CD-ROM or USB Flash Memory Stick), a printed copy of the Abstract Book, a Conference Bag, etc.

The kit will also include a souvenir gift for those who pre-registered early; the number of the gifts is limited and they will be provided on a first-come-first-served basis.

Those who registered for the "Workshops and Short Courses" (including "SUPERPASS") will receive a copy of the Digest (CD-ROM).

The registration fees ("SUPERPASS," "Conference," and "Workshops and Short Courses") do NOT include the Award Banquet fees.

## Accompanying Persons

Those who pre-registered for the "Conference" (or "SUPERPASS") can have an accompanying person at APMC 2010. Accompanying Persons should be the registrant's family or relative, such as his/her spouse (husband or wife), sibling (brother or sister), child, etc., who does not intend to attend the conference sessions, but will participate in the conference official events like "Welcome Reception" (free of charge) or "Award Banquet" (3,000 or 4,000 or 5,000 JPY (Japanese Yen) per person; see below) or an excursion trip provided by the travel agent.

Please note that an accompanying person cannot attend the conference sessions (technical sessions, workshops, short courses, etc.) and will not be provided with a copy of the Conference Proceedings.

Those who are interested in participating in the conference sessions should register individually.

## Award Banquet

Those who have registered for the "Conference" (or the "SUPERPASS") can purchase a ticket (or two) to attend the APMC 2010 Award Banquet, which is to be held on the evening of December 9, 2010.

The ticket price depends on the application date for registration (see the table on the right).

It is a sit-down style dinner and there are three options for the menu;

- a full-course French dinner,
- a special course for ovo-lacto vegetarians, which will not contain beef, lamb, pork, poultry, fish, shellfish or animal flesh of any kind, but might contain dairy and egg products,
- a special course for vegans, which will contain no animal products.

Category (Appropriate Period)	Early bird (Aug. 10 – Sep. 30)	Advanced (Oct. 1 – Nov. 22)	On-site (Dec. 6 – Dec. 10)
Award Banquet	3,000 JPY	4,000 JPY	5,000 JPY

\* Please note that the number of the tickets is limited, and they will be sold on a first-come-first-served basis. Therefore, the Award Banquet Tickets might be sold out if you register late.

## Means of Payment

For Pre-Registration, the payment should be done using the on-line Credit Card Settlement System, which will be available right after you complete the Pre-Registration Form.

If you have difficulty in paying the fees by credit card, you can select another way, "Bank Transfer," by clicking the button in the Pre-Registration Form.

For On-Site Registration, the payment should be done in cash (JPY only), or by credit card. Acceptable card types will be VISA, Master, American Express, and Diners Club.

## Registration Desk

The registration and information desk is located in the Entrance Hall (2nd Floor) of Pacifico Yokohama Conference Center. It will be open during the following hours:

December 6, 2010 : 16:00–19:00  
December 7, 2010 : 8:00–17:30  
December 8, 2010 : 8:00–17:30  
December 9, 2010 : 8:00–17:30  
December 10, 2010 : 8:00–16:00

## HOTEL ACCOMMODATIONS

Rooms at nine hotels in Yokohama, which are accessible from/to Pacifico Yokohama are available through the travel agent below. Reservations can be made through the web site for the hotel accommodations.

## OFFICIAL TRAVEL AGENT

JTB Tokyo Metropolitan Corp. Yokohama Convention Center, official travel agent for the conference, has reserved a sufficient number of rooms at several hotels in Yokohama.

Applications and Inquiries concerning hotel accommodations should be addressed to:

APMC 2010 Travel Desk  
JTB Tokyo Metropolitan Corp. Yokohama Convention Center  
3-29-1 Tsuruya-cho, Kanagawa-ku, Yokohama,  
221-0835, Japan.  
Phone: +81-45-316-4602 Fax: +81-45-316-5701  
E-mail: jtb\_convention@met.jtb.jp  
Business hours: 9:30–17:30 (weekdays only)

Please contact JTB for information on sightseeing tours as well.

# GENERAL INFORMATION

## YOUTH HOSTEL INFORMATION

Those with very limited budget may want to directly contact the below Youth Hostel, which is about a 20 minutes' walk to the Conference site, Pacifico Yokohama.

Name: Yokohama Bayside Youth Hostel

Phone: +81-45-241-6503 Fax: +81-45-241-6501

Address: 56 Miyazakicho, Nishi-ku, Yokohama-shi, Kanagawa 220-0031 Japan

E-mail: [jtb\\_convention@met.jtb.jp](mailto:jtb_convention@met.jtb.jp)

URL: <http://www.hihostels.com/dba/hostels-Yokohama>

---Yokohama-Bayside-YH-032020.en.htm

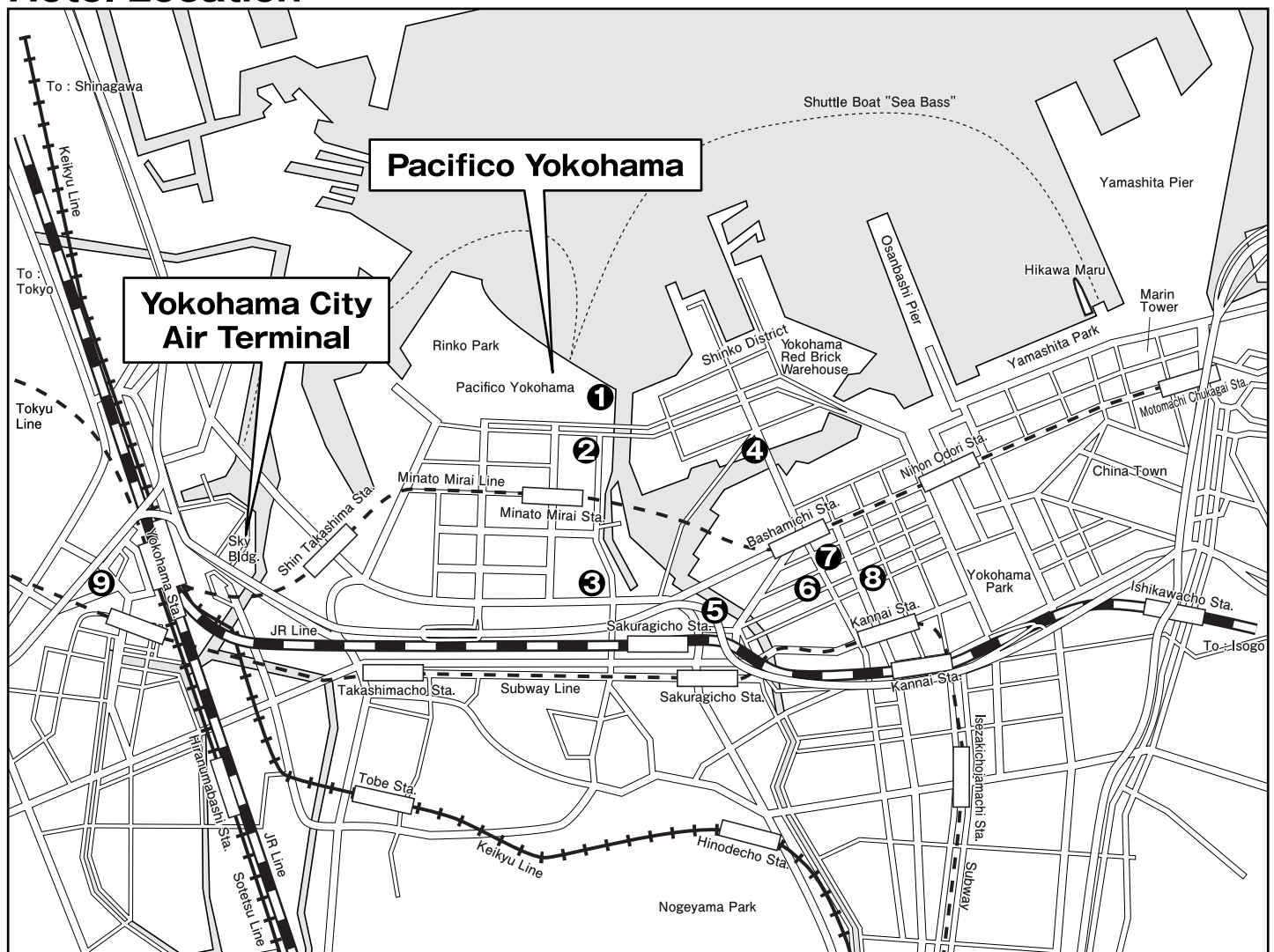
## TRANSPORTATION

The closest airports to Yokohama are Narita Airport and Haneda Airport. Narita Airport, formerly also known as New Tokyo International Airport, is located in the city of

Narita in Chiba Prefecture, about 60 km outside of Tokyo. There are heavy traffic jams in Tokyo and Yokohama area. Public transportation (railways and subways) networks are convenient. Purchase your ticket in cash using the machine at the entrance. For most trains no advance reservation is needed. However, for JR Shinkansen limited express (bullet trains), advance reservation is recommended in order to secure a seat.

Yokohama is served by four railway companies (JR East, Tokyu Railway, Keikyu Railway and Sagami Railway), a municipal subway line and a bus network. The city has two major railway stations: Yokohama Station and Shin-Yokohama Station ("New Yokohama Station"). Train lines of all four railway companies and the subway line pass through Yokohama Station, which is located in the city center. Shin-Yokohama Station, on the other hand, is located outside of the city center, about 10 minutes from Yokohama Station by

## Hotel Location



- |  |   |                              |
|--|---|------------------------------|
| ① Inter Continental The Grand Yokohama | ② Pan Pacific Yokohama                  | ③ Yokohama Royal Park Hotel  |
| ④ Navios Yokohama                      | ⑤ Yokohama Sakuragicho Washington Hotel | ⑥ Yokohama Heiwa Plaza Hotel |
| ⑦ Hotel Route Inn Yokohama Bashamichi  | ⑧ Comfort Hotel Yokohama Kannai         |                              |
| ⑨ Yokohama Bay Sheraton                |   |                              |



## GENERAL INFORMATION

the JR Yokohama Line or the municipal subway. The shinkansen stops at Shin-Yokohama Station.

The nearest station to Pacifico Yokohama is Minato Mirai Station on the Minato Mirai Line, two stops from Yokohama Station. The Minato Mirai Line is directly connected to the Tokyu Toyoko Line. It takes about 3 minutes and costs 180 JPY from Yokohama to Minato Mirai. Pacifico Yokohama is also conveniently accessed from Sakuragicho Station on the JR Keihin-Tohoku Line (Negishi Line) and the municipal subway. (See the map on the back of this booklet.)

### **How to get to Yokohama from Narita Airport By Japan Railways (JR):**

The fastest option to get to Yokohama is the JR Narita Express (NEX), requiring roughly 90 minutes for the one way journey. All seats are reserved. The one way fare between Narita Airport and Yokohama Station is about 4,200 JPY. There is about one connection per hour.

The JR Sobu Line (Rapid Service) is a slower, but cheaper JR alternative to the Narita Express. It takes roughly two hours from Narita Airport to Yokohama Station and costs 1,890 JPY for the one way journey. There is about one connection per hour.

### **By Keisei and Keikyu Railways:**

Take the Keisei Limited Express from Narita Airport to Aoto Station (60 minutes) and transfer to a Keikyu train to Yokohama (60 minutes). A second transfer of trains may be required at Shinagawa Station. The one way fare is 1,450 JPY. There are about three connections per hour.

### **By limousine bus:**

Limousine buses to the Yokohama City Air Terminal (YCAT) near Yokohama Station depart Narita Airport every 20 to 30 minutes. The one way journey takes about 90 minutes and costs 3,500 JPY. In addition, there are direct limousine bus connections to several major hotels in Yokohama.

### **By taxi:**

Since Narita Airport is located about 60 km outside of Tokyo, a taxi ride into central Tokyo is very expensive and not recommended to common travelers.

### **By rental cars:**

Rental cars are available at major railway stations and airports.

## VISA REQUIREMENT FOR FOREIGN ATTENDEES

In principle, foreigners wishing to enter Japan (with the exception of ship and airline crews) are required to apply at an overseas Japanese diplomatic establishment (embassy or consulate) for a visa to be stamped in or attached to their passport valid for travel to Japan.

Nationals of some countries and regions holding valid passports, however, can apply for landing permission for short-term stays for such purposes as sightseeing and business trips without obtaining a visa.

Please see the following webpage for the “list of countries and regions that have visa exemption arrangements with Japan.”

[http://www.mofa.go.jp/j\\_info/visit/visa/short/novisa.html](http://www.mofa.go.jp/j_info/visit/visa/short/novisa.html)

If you are not sure whether you need a visa to enter Japan or not, please contact the diplomatic mission (embassy or consulate) in your country or in your living area.

[http://www.mofa.go.jp/about/emb\\_cons/over/index.html](http://www.mofa.go.jp/about/emb_cons/over/index.html)

In case you need an entry visa to Japan, you will be required to submit two documents, both written in Japanese:

- a. an invitation letter by the conference (APMC 2010)
- b. a detailed schedule during your stay in Japan

All the speakers, session chairs, committee members of APMC 2010, and their acquaintances or family members can obtain these documents from the APMC 2010 Steering Committee under the condition that they...

- a. complete the Pre-Registration with all payments done,
- b. have all the travel arrangements finished, such as hotel accommodations and airline tickets.

## OTHER INFORMATION

### **Electricity**

Electricity supply is 100 Volts/50 Hz in eastern Japan including the Yokohama area, and 100 Volts/60 Hz in western Japan.

### **Weather**

Yokohama lies in the temperate zone and has four distinct seasons. December is the beginning of winter, when Yokohama is rather cold but rarely has snow. The temperature ranges between 4°C (39°F) and 12°C (54°F), averaging 8°C (46°F). Coats or sweaters are needed.

### **No Smoking Policy**

Smoking is prohibited in the Conference Center except at limited smoking corners.

### **Currency**

Japanese yen (JPY) is the only currency that is used at stores and restaurants. You can exchange foreign currencies for Japanese yen at foreign exchange banks and other authorized money exchangers by showing your passport. The exchange rate fluctuates daily.

### **Traveller's Checks and Credit Cards**

Since traveller's checks are not common in Japan, you may use them only at major hotels and leading banks. Major credit cards, such as VISA, Master Card, AMEX, and JCB, can be used at restaurants, hotels, souvenir shops, etc.

### **Tipping**

Tipping is not customary in Japan. For example, you do not need to tip waiters/waitresses at restaurants.

### **Japanese Traffic**

There are heavy traffic jams in Tokyo and Yokohama area. Public transportation (railways and subways) networks are convenient.

# GENERAL INFORMATION

## Internet connection

Internet connection through Wireless LAN and Ethernet cable will be available at the Conference Center. There is no charge for the service.

## Babysitting service

At the two hotels below, which are close to the Conference Center, babysitting services are available.

Inter Continental The Grand Yokohama

Phone: +81-45-223-2222

PANPACIFIC Yokohama Bay Hotel Tokyu

Phone: +81-45-682-2222

## SOCIAL PROGRAM

APMC 2010 will provide original and colorful events; Welcome reception, Opening Ceremony, and Award Banquet.

### Welcome Reception

All the participants in the Conference (from December 8 to 10) are invited to the Welcome Reception to be held from 17:30 to 19:30 on Tuesday, December 7, at the Inter Continental The Grand Yokohama.

### Opening Ceremony

The APMC 2010 Opening Ceremony will be held from 10:50 to 12:30 in Room 501+502 (5th floor) of Pacifico Yokohama Conference Center on Wednesday, December 8. A declaration and brief report by the APMC 2010 Steering Committee Chair and congratulatory addresses by invited representatives of sponsoring organizations including IEEE MTT-S, IEEE AP-S, URSI, EuMA are scheduled at the beginning of the ceremony. Then, we will have the Keynote Addresses given by Prof. Kazuhiko Honjo, The University of

Electro-Communications and Dr. Shinichi Nomoto, R&D Fellow, General Manager, Mobile & Wireless Division, KDDI R&D Laboratories, Inc. The respective titles of their talks are “A Technology Perspective on Active Microwave Circuits” and “Further Evolution of Wireless Technology toward World of Ambient Intelligence”.

### Award Banquet

The APMC 2010 Award Banquet will be held from 18:30 to 20:40 on Thursday, December 9, at Queen's Grand Ballroom on the 2nd basement floor of the PANPACIFIC Yokohama Bay Hotel Tokyu. With a variety of cuisine, the banquet will introduce winners of Japan Microwave Prize. The Banquet will be a sit-down style dinner. (See “Award Banquet” on page 3.) After the greetings by the Conference Chair, you will experience the ceremony “Kagamiwari,” where a large barrel of sake (Japanese rice-wine) is cracked on the top with wooden hammers to celebrate the success of APMC 2010. The APMC 2010 Microwave Prize will be given to the winners selected by the APMC 2010 Prize Award Committee from all the participants presenting a paper at the conference.

## MEETINGS INFORMATION

### IEEE MTT-S Region 10 Chapter Chairs Meeting

The IEEE MTT-S Region 10 Chapter Chairs Meeting will be held from 13:00 to 15:00 on Wednesday, December 8, 2010, at Room 211+212 (Tentative). Region 10 chapter chairs and MTT-S ADCOM members are invited.

### APMC International Steering Committee Meeting

The APMC International Steering Committee Meeting will be held from 12:00 to 16:00 on Thursday, December 9, 2010, at Room 211+212 (Tentative).



## APMC 2010 PRIZE

Papers presented at APMC 2010 will be judged by the APMC 2010 Prize Award Committee, and the authors of selected papers will be awarded the APMC 2010 Prize for outstanding contributions to the microwave field. In addition, outstanding student papers submitted to the conference

will be awarded the APMC 2010 Student Prize. These Prizes, which consist of the commemorative certificates and rewards, will be presented to all the recipients at the APMC 2010 Award Banquet to be held on Thursday, December 9, 2010.

## CONFERENCE SESSIONS

The APMC 2010 Conference Sessions consist of “Technical Sessions (Oral),” “Open Forum (Poster) Sessions,” “Workshops,” and “Short Courses.”

### **Technical Sessions (Oral)**

The Technical Sessions will be held in the session rooms on the 3rd floor of the Conference Center from December 8 to 10, 2010, where the speakers of accepted papers will present their papers orally.

### **Open Forum (Poster) Sessions**

The Open Forum (Poster) Sessions will be held in Room G (315) on the 3rd floor of the Conference Center from December 8 to 10, 2010, where the speakers of accepted papers will present theoretical or experimental materials in poster format.

### **Workshops**

The Workshops will be held in the session rooms on the 3rd floor of the Conference Center on December 7, 2010, where the Workshop speakers, who have all been invited by the Workshop Organizers, will present and discuss their latest researches and studies related to microwave technologies.

### **Short Courses**

The Short Courses will be held in the session rooms on the 3rd floor of the Conference Center on December 7, 2010, where two lecturers will give lectures with the titles of “Modeling and Design Techniques for High Power Amplifiers and their Performance” and “Electromagnetic Metamaterials and their Microwave Applications.”

# TECHNICAL SESSIONS

Wednesday, December 8

8:50 – 10:30

Room A (301)

Session WE1A

## Low Distortion Power Amplifier Technology

**Chairs :** K. Yamauchi, *Mitsubishi Electric Corp., JAPAN*  
H. Jiang, *Alcatel-Lucent, U.S.A.*

### WE1A-1

Experimental Investigation on Wideband Intermodulation Distortion Compensation Characteristics of 3.5-GHz band 140-W Class Feed-Forward Power Amplifier Employing GaN HEMTs

Y. Suzuki, J. Ohkawara, S. Narahashi, *NTT DOCOMO, Inc., JAPAN*

### WE1A-2

Minimization of Baseband Electrical Memory Effects in GaN HEMTs Using Active IF Load-Pull

M. Akmal<sup>1</sup>, J. Lees<sup>1</sup>, V. Carrubba<sup>1</sup>, S. Bensmida<sup>2</sup>, S. Woodington<sup>1</sup>, J. Benedikt<sup>1</sup>, K. Morris<sup>2</sup>, M. Beach<sup>2</sup>, J. McGeehan<sup>2</sup>, P.J. Tasker<sup>1</sup>, <sup>1</sup>*Cardiff Univ., U.K.*, <sup>2</sup>*Univ. of Bristol, U.K.*

### WE1A-3

Performance of a Frequency Compensated EER-PA with Memoryless DPD

T. Kato<sup>1</sup>, Y. Funahashi<sup>1</sup>, A. Yamaoka<sup>1</sup>, K. Yamaguchi<sup>1</sup>, J. Zhou<sup>2</sup>, K. Morris<sup>2</sup>, G.T. Watkins<sup>3</sup>, <sup>1</sup>*Toshiba Corp., JAPAN*, <sup>2</sup>*Univ. of Bristol, U.K.*, <sup>3</sup>*Toshiba Research Europe, Ltd., U.K.*

### WE1A-4

Digital Predistortion Using Adaptive Basis Functions

X. Yu, H. Jiang, *Alcatel-Lucent, U.S.A.*

### WE1A-5

A Simple Envelope Model for Nonlinear Power Amplifiers with Memory Effects Based on Volterra Expansion

Y. Zhang, K. Araki, *Tokyo Institute of Technology, JAPAN*

Room B (302)

Session WE1B

## Wide Band Planar Filters

**Chairs :** C.-P. Chen, *Kanagawa Univ., JAPAN*  
Q. Xue, *City Univ. of Hong Kong, HONG KONG*

### WE1B-1

Design of a Wideband Bandpass Filter Using Microstrip Parallel-Coupled Dual-Mode Ring Resonator

Z. Ma<sup>1</sup>, H. Sasaki<sup>1</sup>, C.-P. Chen<sup>2</sup>, T. Anada<sup>2</sup>, Y. Kobayashi<sup>1</sup>, <sup>1</sup>*Saitama Univ., JAPAN*, <sup>2</sup>*Kanagawa Univ., JAPAN*

### WE1B-2

Design of Wideband Diplexer Using Broadside-Coupled Filters and Stepped-Impedance Resonators

P.-H. Deng<sup>1</sup>, C.H. Chen<sup>2</sup>, B.-L. Huang<sup>3</sup>, J.-H. Jheng<sup>3</sup>, H.-H. Tung<sup>1</sup>, P.-T. Chiu<sup>1</sup>, <sup>1</sup>*National Univ. of Kaohsiung, TAIWAN*, <sup>2</sup>*National Taiwan Univ., TAIWAN*, <sup>3</sup>*National Univ. of Tainan, TAIWAN*

### WE1B-3

Design Procedure of Wideband Band-pass Filter Consists of Inter-Digital Finger Resonator and Parallel Coupled Lines

Y. Omote, T. Yasuzumi, T. Uwano, O. Hashimoto, *Aoyama Gakuin Univ., JAPAN*

### WE1B-4

Ultra Wideband Bandpass Filter with Dual Notch Bands

H.-W. Wu<sup>1</sup>, M.-H. Weng<sup>2</sup>, C.-Y. Hung<sup>3</sup>, <sup>1</sup>*Kun Shan Univ., Taiwan*, <sup>2</sup>*Metal Industries Research & Development Center, TAIWAN*, <sup>3</sup>*Tung-Fang Institute of Technology, TAIWAN*

### WE1B-5

Design of a Compact UWB Bandpass Filter with Notched Band

Q.-X. Chu, X.-K. Tian, *South China Univ. of Technology, CHINA*

Room C (303)

Session WE1C

## Microwave Applications

**Chairs :** Y. Nikawa, *Kokushikan Univ., JAPAN*  
T. Mitani, *Kyoto Univ., JAPAN*

### WE1C-1

Wireless Energy Harvesting Using Serially Connected Voltage Doublers

J.W. Zhang, L.B. Wang, K.Y. See, C.M. Tan, C.C. Boon, K.S. Yeo, M.A. Do, *Nanyang Technological Univ., SINGAPORE*

### WE1C-2

Study and Development of a Microwave Power Receiving System for ZigBee Device

N. Suzuki, T. Mitani, N. Shinohara, *Kyoto Univ., JAPAN*

### WE1C-3

Microwave Energy Focusing for Heating Using Metamaterial

Y. Nikawa, T. Takase, *Kokushikan Univ., JAPAN*

### WE1C-4

Microwave Absorption Characteristics of Liquid Compounds for an Efficient Microwave Pretreatment System of Woody Biomass toward Bioethanol Production

K. Yano, T. Mitani, N. Shinohara, M. Oyadomari, M. Daidai, T. Watanabe, *Kyoto Univ., JAPAN*

### WE1C-5

Intra-car Communications System Using Radio Hose

K. Fujita, H. Sawada, S. Kato, *Tohoku Univ., JAPAN*

Wednesday, December 8

10:50 – 12:30

Room H (501+502)

Session WE2G Opening Ceremony

## Opening Ceremony

**Keynote Addresses (1) :** A Technology Perspective on Active Microwave Circuits

**Speaker :** Prof. Kazuhiko Honjo, *The Univ. of Electro-Communications, JAPAN*

### Abstract :

Advances in modern microwave technology are based on a long history of developments in semiconductor devices and circuit technology, which have emerged from the classical theory of the vacuum-tube era. Retaining power gain in the high frequency regions is the most significant figure of merit for active devices. This fact suggests the existence of a universal operating principle related to available power for all kinds of active devices including quantum devices. On the other hand, maximizing the inherent performance of active devices is one of the major missions of circuit technology design, especially in the microwave and millimeter wave fields.

To compensate for the inferior high frequency performance of vacuum tubes relative to active devices, more sophisticated circuit technology had been required in the past. In this sense, vacuum-tube circuit theory can be considered a goldmine. Thus, many of the classical technologies have been revived and incorporated into the design of modern active microwave circuits with appropriate modifications. Doherty amplifiers, class-F amplifiers, Miller frequency dividers, traveling wave amplifiers, and negative feedback amplifiers are good examples of this.

Advances in accuracy of CAD co-simulation techniques both for semiconductor devices and electro-magnetic fields have also enhanced microwave and millimeter wave applications. Advances in linear/nonlinear measurement technology are also playing important roles. In addition, introductions of novel circuit design approaches such as right/left-handed



This talk will review active microwave device circuit technologies to identify universal technologies that may be helpful in the future.

**Kazuhiko Honjo** received the B.E. degree from the University of Electro- Communications, Tokyo, Japan, in 1974, and the M.E. and D.E. degrees in electronic engineering from the Tokyo Institute of Technology, Tokyo, Japan, in 1976 and 1983, respectively. From 1976 to 2001, he was with the NEC Corporation, Kawasaki, Japan. In 2001, he joined the University of Electro-Communications, as a Professor with the Information and Communication Engineering Department. He is now a director of the Advance Wireless Communication Research Center of the university. He has been involved in research and development of high-power/broadband/low-distortion microwave amplifiers, MMICs, GaAs based HBT device and processing technology, GaN device modeling and circuit applications, miniature broadband microwave antennas and FDTD electromagnetic wave and device co-analysis. Prof. Honjo is a Fellow of IEEE and is also a Fellow of the Institute of Electrical, Information and Communication Engineers (IEICE), Japan. He served as an elected



# TECHNICAL SESSIONS

8:50 – 10:30

Wednesday, December 8

## Room D (304)

### Session WE1D

#### CAD and Numerical Techniques

*Chairs* : G. Xiao, *Shanghai Jiao Tong Univ., CHINA*  
J. Shibayama, *Hosei Univ., JAPAN*

#### WE1D-1

Full Wave Analysis of Large Non-Uniform Metallic Grid FSS Under Oblique Incidence Using Scale Changing Technique

E.B. Tchikaya<sup>1,2</sup>, A. Rashid<sup>1,2</sup>, F. Khalil<sup>1,2</sup>, H. Aubert<sup>1,2</sup>, M. Romier<sup>3</sup>, N. J.G. Fonseca<sup>1,2,4</sup>, <sup>1</sup>CNRS ; LAAS, FRANCE, <sup>2</sup>Université de Toulouse, FRANCE, <sup>3</sup>CNES, FRANCE, <sup>4</sup>ESA/ESTEC, NETHERLANDS

#### WE1D-2

Embedding Thermo Analysis in the Process of Solving Electromagnetic Problems

G. Xiao, Y. Zhou, L. Zhang, J. Mao, *Shanghai JiaoTong Univ., CHINA*

#### WE1D-3

Correction Factors for Field Singularity at 45° Corners in the Finite-Difference Analysis of Microstrip Circuits

T. Shibata, *NTT Corp., JAPAN*

#### WE1D-4

Simple Frequency-Dependent FDTD Algorithm for a Drude-Critical Points Model

J. Shibayama, K. Watanabe, R. Ando, J. Yamauchi, H. Nakano, *Hosei Univ., JAPAN*

#### WE1D-5

Parallel and Distributed Solution for 3-Dimensional TDFEM Analysis in Computational Electromagnetics

X. Wu, Y. Jin, L. Zhou, *Fudan Univ., CHINA*

## Room E (311+312)

### Session WE1E

#### Low Profile and Small Antennas

*Chairs* : P. Hsu, *National Taiwan Univ., TAIWAN*  
K. Noguchi, *Kanazawa Institute of Technology, JAPAN*

#### WE1E-1

A Novel Design of Dual-Band Antennas with Orthogonal Radiation Patterns for MIMO Applications

A. Saitou<sup>1</sup>, Y. Hoshino<sup>1</sup>, Y. Aoki<sup>2</sup>, K. Honjo<sup>1</sup>, <sup>1</sup>The Univ. of Electro-Communications, JAPAN, <sup>2</sup>Casio Computer Co., Ltd., JAPAN

#### WE1E-2

Design of E-Shaped Patch Antennas by Using the Multi-Conductor Transmission Line Mode Theory

K. Noguchi<sup>1</sup>, H. Rajagopalan<sup>2</sup>, Y. Rahmat-Samii<sup>2</sup>, <sup>1</sup>Kanazawa Institute of Technology, JAPAN, <sup>2</sup>Univ. of California, U.S.A.

#### WE1E-3

Conductor-Backed Coplanar Waveguide Fed Circular Coplanar Patch Antenna

J.-H. Chen, S.-Y. Chen, P. Hsu, *National Taiwan Univ., TAIWAN*

#### WE1E-4

Triple-Band Antenna Design for DVB-H/PCS/WLAN

S.J. Oh, S.Y. Park, J.K. Park, *Hanbat National Univ., REPUBLIC of KOREA*

#### WE1E-5

Effect of Film Thickness on the Radiation Efficiency of a 4.5GHz Polypyrrole Conducting Polymer Patch Antenna

A. Verma<sup>1</sup>, C. Fumeaux<sup>1</sup>, V.-T. Truong<sup>2</sup>, B.D. Bates<sup>1,2</sup>, <sup>1</sup>Univ. of Adelaide, AUSTRALIA, <sup>2</sup>Defence Science and Technology Organisation (DSTO), AUSTRALIA

## Room F (313+314)

### Session WE1F

#### Design and Implementation Techniques for Microwave Filters 1

*Chairs* : C. Quendo, *Université Européenne de Bretagne*  
K. Sato, *NTT DOCOMO INC., JAPAN*

#### WE1F-1

A Miniaturized Bandpass Filter Using Quadruple Folded Laminated Waveguide Cavity Resonators in LTCC

T.-Y. Huang, T.-M. Shen, R.-B. Wu, *National Taiwan Univ., TAIWAN*

#### WE1F-2

C-Band Inductive Post SIW Alumina Filter for a Space Application. Experimental Analysis of the Thermal Behavior

A.E. Mostrah<sup>1,2</sup>, B. Potelon<sup>1,2</sup>, E. Riis<sup>1,2</sup>, C. Quendo<sup>1,2</sup>, J.-F. Favennec<sup>1,2</sup>, H. Leblond<sup>3</sup>, H. Yahia<sup>3</sup>, J.-L. Cazaux<sup>3</sup>, <sup>1</sup>Université Européenne de Bretagne, <sup>2</sup>Université de Brest-UEB, FRANCE, <sup>3</sup>Thales Alenia Space, FRANCE

#### WE1F-3

Microstrip High-Pass Filter with Attenuation Poles Using Cross-Coupling

T. Yasuzumi, T. Uwano, O. Hashimoto, *Aoyama Gakuin Univ., JAPAN*

#### WE1F-4

Compact Microstrip Lowpass Filter with Ultra-Broad Stopband

H.-J. Tsai<sup>1</sup>, J.-Y. Chen<sup>1</sup>, N.-W. Chen<sup>2</sup>, <sup>1</sup>National Central Univ., TAIWAN, <sup>2</sup>Yuan Ze Univ., TAIWAN

#### WE1F-5

Design and Implementation of the Canonical-Form-Like Coupling Scheme with Generalized Chebyshev Responses

J.-C. Lu<sup>1</sup>, Y.-W. Lin<sup>2</sup>, C.-Y. Chang<sup>2</sup>, <sup>1</sup>Taiwan Semiconductor Manufacturing Company, Ltd., TAIWAN, <sup>2</sup>National Chiao Tung Univ., TAIWAN

10:50 – 12:30

Wednesday, December 8

AdCom member of IEEE Microwave Theory and Techniques Society (IEEE MTT-S) from 1997 to 2003. He was the recipient of the 1983 Microwave Prize and the 1988 Microwave Prize presented by the IEEE MTT-S. He was also the recipient of the 1980 Young Engineer Award and the 1999 Electronics Award presented by the IEICE.

**Keynote Addresses (2)** : Further Evolution of Wireless Technology toward World of Ambient Intelligence

**Speaker** : Dr. Shinichi Nomoto, *R&D Fellow, General Manager, Mobile & Wireless Division, KDDI R&D Laboratories, Inc., JAPAN*

#### Abstract :

Where is ICT industry heading for? High-speed mobile services such as WiMAX and LTE will expand over the globe, especially in Asian regions, in the next several years to meet with broadband and ubiquitous communication demands.

In the future, ICT will presumably be better integrated into many "things" in our society and people will utilize ICT even without recognizing ICT itself. This can be called the realization of "World of Ambient Intelligence."

The speaker who is with KDDI, the Japanese full-range telecom operator, will review these circumstances and present its view on the expectation of the further evolution of wireless technologies. In order to fulfill wide-range of various requirements in the future, hybrid and harmonized cooperation of multiple radio systems, both intra-system and inter-system, would be the key to enhance the capabilities, e.g. higher reliability, lower latency, and huge number of devices. Obviously, SDR (Software-Defined



Radio) and CRS (Cognitive Radio System) with flexible microwave devices will play a fundamental role in the arena. Some representative R&D activities are also to be presented.

**Shinichi Nomoto** received B.E., M.E., and Ph.D degrees, all in electrical engineering, from Waseda University, Tokyo, Japan, in 1980, 1982, and 1993, respectively. He joined Kokusai Denshin Denwa Co., Ltd.

(now KDDI Corp.), in 1982. Since 1983, he has been engaged in research and development of radio transmission systems. As a professional assignee at Inmarsat HQ's from 1992 to 1995, he has contributed to the "Inmarsat-P (ICO)" project, which includes development of a global personal communications system using a number of non-geostationary satellites. His current research interests include antennas and propagation, broadband wireless access systems, cognitive radio, cooperative radio and QoE management in communication networks. He received the Shinohara Memorial Young Researchers' Award from IEICE in 1988, the Piero Fanti International Prize from INTELSAT/Telespazio in 1988, and the Radio Distinguished Award from RCR (now ARIB) in 1991. In 2004, two of his published papers received the Best Paper Awards from IEICE, one of which was the recipient of the 10th Inose Award (the very best paper of the year) too. He is an Executive Director of KDDI R&D Laboratories, Inc., a R&D fellow of KDDI, a fellow of IEICE, a senior member of IEEE, and a vice chair of Advanced Wireless Communications Study Committee (ADWICS), ARIB.

# TECHNICAL SESSIONS

**Wednesday, December 8**

**14:00 – 15:40**

Room A (301)

**Session WE3A**

## High Power GaN HEMT Applications

*Chairs* : H. Okazaki, *NTT DOCOMO, INC., JAPAN*  
T. Boles., *M/A-COM., U.S.A.*

### WE3A-1

Internally-Matched GaN HEMT High Efficiency Power Amplifier for Space Solar Power Stations

K. Yamanaka, Y. Tsuyama, H. Ohtsuka, S. Chaki, M. Nakayama, Y. Hirano, *Mitsubishi Electric Corp., JAPAN*

### WE3A-2

A 5.9GHz-8.5GHz 20Watts GaN HEMT

S. Mizuno<sup>1</sup>, H. Yamamoto<sup>1</sup>, T. Yamamoto<sup>2</sup>, M. Nishihara<sup>2</sup>, S. Sano<sup>1</sup>, <sup>1</sup>*Sumitomo Electric Industries, Ltd., JAPAN*, <sup>2</sup>*Sumitomo Electric Devices Innovations, Inc., JAPAN*

### WE3A-3

Development of 150W S-band GaN Solid State Power Amplifier for Satellite Use

K. Nakade, K. Seino, A. Tsuchiko, J. Kanaya, *Mitsubishi Electric TOKKI Systems Corp., JAPAN*

### WE3A-4

Cost Effective, High Performance GaN Technology

T. Boles, D. Carlson, C. Varmazis, J. Barrett, *M/A-COM Technology Solutions, U.S.A.*

### WE3A-5

An X-band 50% Bandwidth High-Power GaN HEMT T/R Switch

M. Hangai, R. Komaru, Y. Tarui, Y. Kamo, M. Hieda, M. Nakayama, *Mitsubishi Electric Corp., JAPAN*

Room B (302)

**Session WE3B**

## Tunable and Metamaterial Filters and Resonators 1

*Chairs* : K. Kawai, *NTT DOCOMO INC., JAPAN*  
T. Nishino, *Mitsubishi Electric Corp., JAPAN*

### WE3B-1

Miniaturized Microwave Tunable Bandpass Filters on High-K LTCC

X. Mi<sup>1,2</sup>, Y. Kawano<sup>1</sup>, O. Toyoda<sup>2</sup>, T. Suzuki<sup>1</sup>, S. Ueda<sup>1,2</sup>, T. Hirose<sup>1</sup>, K. Joshin<sup>1</sup>, <sup>1</sup>*Fujitsu Ltd., JAPAN*, <sup>2</sup>*Fujitsu Laboratories Ltd., JAPAN*

### WE3B-2

Tunable Bandpass Filter with Symmetric Attenuation Characteristics

K. Kawai, H. Okazaki, S. Narahashi, *NTT DOCOMO, Inc., JAPAN*

### WE3B-3

Parallel-Coupled Stub-Loaded Resonators Compact Size Tunable Filter

F. Burdin, E. Pistono, P. Ferrari, *Université de Savoie, FRANCE*

### WE3B-4

High-Q MEMS-based Bandwidth-Reconfigurable E-plane Filters

L. Pelliccia, R. Sorrentino, *Univ. of Perugia, ITALY*

### WE3B-5

A Low-Loss and Compact Size Analog Tunable Filter on Flexible Organic Substrate

B. Lacroix<sup>1</sup>, S. Courrèges<sup>1</sup>, K. Choi<sup>2</sup>, Y. Wang<sup>2</sup>, A. T. Hunt<sup>2</sup>, J. Papapolymerou<sup>1</sup>, <sup>1</sup>*Georgia Institute of Technology, U.S.A.*, <sup>2</sup>*nGimat, Inc., U.S.A.*

Room C (303)

**Session WE3C**

## Terahertz and Microwave Applications

*Chairs* : H.-Y. Lee, *Ajou Univ., REPUBLIC of KOREA*  
J. Tan, *Nanjing Forestry Univ., CHINA*

### WE3C-1

Application of Terahertz Spectroscopic Technology in Identification of Pine Wood Nematode Disease

Y.-F. Liu<sup>1</sup>, L. Jiang<sup>1</sup>, J.-J. Tan<sup>1</sup>, Z.-W. Zhang<sup>2</sup>, C.-L. Zhang<sup>2</sup>, <sup>1</sup>*Nanjing Forestry Univ., CHINA*, <sup>2</sup>*Capital Normal Univ., CHINA*

### WE3C-2

Development of a Simple Multiple-Position Identifying System with a Long Range Multiband Leaky Coaxial Cable for Rescue Operations in Tunnels or Passages in Underground Facilities

M. Nakamura<sup>1</sup>, H. Takagi<sup>1</sup>, J. Terashima<sup>1</sup>, K. Einaga<sup>2</sup>, T. Nishikawa<sup>2</sup>, N. Moriyama<sup>2</sup>, K. Wasaki<sup>3</sup>, <sup>1</sup>*Nagano Prefecture General Industry Technology Center, JAPAN*, <sup>2</sup>*Ryosei Syatems, Ltd., JAPAN*, <sup>3</sup>*Shinshu Univ., JAPAN*

### WE3C-3

New Dielectric Heating Under Noninvasive Temperature Measurement Using MR

A. Ishikawa, Y. Nikawa, *Kokushikan Univ., JAPAN*

### WE3C-4

Microwave Absorbing Screens Based on Multilayered Fe Nanofilms

Y. Hao<sup>1</sup>, T. Jiang<sup>1,2</sup>, Y. Feng<sup>1,2</sup>, <sup>1</sup>*Nanjing Univ., CHINA*, <sup>2</sup>*Southeast Univ., CHINA*

### WE3C-5

Analysis and Improvement of Electromagnetic Susceptibility on High Speed LVDS I/O System

J. Byun, H.-Y. Lee, *Ajou Univ., REPUBLIC of KOREA*

**Wednesday, December 8**

**16:00 – 18:00**

Room A (301)

**Session WE4A**

## EuMA Special Session

*Chairs* : T. Ohira, *Toyohashi Univ. of Technology, JAPAN*  
A. Alphones, *Nanyang Technological Univ., SINGAPORE*

### WE4A-1 (Invited)

Innovative Solutions for Compact Waveguide Filters

Prof. R. Sorrentino<sup>1</sup>, Simone Bastioli<sup>2</sup>, <sup>1</sup>*Univ. of Perugia, ITALY*, <sup>2</sup>*RF Microtech SRL, ITALY*

### WE4A-2 (Invited)

MEMS Tunable Metamaterials Surfaces and Their Applications

Prof. A.V. Räisänen<sup>1</sup>, D. Chicherin<sup>1</sup>, M. Sterner<sup>2</sup>, S. Dudorov<sup>1</sup>, D. Lioubtchenko<sup>1</sup>, Y. Li<sup>3</sup>, V. Ovchinnikov<sup>3</sup>, J. Oberhammer<sup>2</sup>, <sup>1</sup>*Aalto Univ., FINLAND*, <sup>2</sup>*Royal Institute of Technology, SWEDEN*, <sup>3</sup>*Micronova, Aalto Univ., FINLAND*

### WE4A-3 (Invited)

Semi-Active Satellite Antenna Front-Ends: a Successful European Innovation

Dr. A.G. Roederer, *IRCTR, Delft Univ. of Technology, NETHERLAND*

Room B (302)

**Session WE4B**

## Design and Implementation Techniques for Microwave Filters 2

*Chairs* : I. Awai, *Ryukoku Univ., JAPAN*  
S. Watanabe, *Aoyama Gakuin Univ., JAPAN*

### WE4B-1 (Invited)

Miniaturization of Substrate Integrated Bandpass Filters

Prof. W. Hong, K. Gong, *Southeast Univ., CHINA*

### WE4B-2

An Extended Doublet Bandpass Filter Implemented with Microstrip Resonator and Substrate Integrated Waveguide Cavity

L.-S. Wu, J.-F. Mao, W. Shen, W.-Y. Yin, *Shanghai Jiao Tong Univ., CHINA*

### WE4B-3

Compact Balanced Combine Bandpass Filters with Two Independently Controllable Transmission Zeros in LTCC Technology

C.-L. Tsai<sup>1,2</sup>, Y.-S. Lin<sup>1</sup>, <sup>1</sup>*National Central Univ., TAIWAN*, <sup>2</sup>*Walsin Technology Corp., TAIWAN*

### WE4B-4

Multi-Layer Coupled Band-pass Filter for 60GHz LTCC System-on-Package

K. Hiraga, T. Seki, K. Nishikawa, K. Uehara, *NTT Corp., JAPAN*

### WE4B-5

Compact Microstrip Bandpass Filters Using Miniaturized Quarter-Wavelength Resonators

C.-H. Liang, W.-S. Chang, C.-Y. Chang, *National Chiao Tung Univ., TAIWAN*

Room C (303)

**Session WE4C**

## Microwave Medical and Biological Applications

*Chairs* : A.M. Abbosh, *The Univ. of Queensland St Lucia, AUSTRALIA*  
Y. Nikawa, *Kokushikan Univ., JAPAN*

### WE4C-1

Ultra-Wideband Array Antenna System for Breast Imaging

M. Bialkowski, D. Ireland, Y. Wang, A.M. Abbosh, *Univ. of Queensland, AUSTRALIA*

### WE4C-2

Breast Cancer Detection: Comparison of Data-Dependent and Data-Independent Approaches

F. Yang, A.S. Mohan, *Univ. of Technology Sydney (UTS), AUSTRALIA*

### WE4C-3

Early Breast Cancer Detection Using Doppler Frequency Shift

A.M. Abbosh, *The Univ. of Queensland, AUSTRALIA*

### WE4C-4

Analysis of Microwave Reflection from Capillary Blood Vessel

Y. Nikawa, *Kokushikan Univ., JAPAN*

### WE4C-5 (Invited)

Recent Advances in Doppler Radar Sensors for Pervasive Healthcare Monitoring

Prof. J. Lin<sup>1</sup>, C. Li<sup>2</sup>, <sup>1</sup>*Univ. of Florida, U.S.A.*, <sup>2</sup>*Texas Tech Univ., U.S.A.*

# TECHNICAL SESSIONS

14:00 – 15:40

Wednesday, December 8

## Room D (304)

### Session WE3D

#### Progress in Antenna Applications

Chairs : K. Ghorbani, *RMIT Univ., AUSTRALIA*  
H. Hirayama, *Nagoya Institute of Technology, JAPAN*

#### WE3D-1

UHF RFID Tag for Metal Containers

K.V.S. Rao, S.F. Lam, P.V. Nikitin, *Intermec Technologies, U.S.A.*

#### WE3D-3

Cylindrical Comblined Microstrip Array for Producing Omnidirectional Radiation Pattern

A. Pirhadi<sup>1</sup>, H. Bahrami<sup>2</sup>, J. Nasrighelbereni<sup>2</sup>, A. Mallahzadeh<sup>3</sup>,  
<sup>1</sup>Shahid Beheshti Univ. (SBU), IRAN, <sup>2</sup>Tarbiat Modares Univ. (TMU), IRAN, <sup>3</sup>Shahed Univ. (SU), IRAN

#### WE3D-4

Interaction Between New Printed Antennas and Human Body in Medical Applications

A. Sabban, *Ort Braude College, ISRAEL*

#### WE3D-5

A New High-Directivity Fractal Antenna Based on the Modified Koch Snowflake Geometry

A.B. Younas, Z. Ahmed, M.B. Ihsan, *National Univ. of Sciences and Technology, PAKISTAN*

## Room E (311+312)

### Session WE3E

#### System Consideration

Chairs : A. Hirata, *NTT Corp., JAPAN*  
Y. Nakasha, *Fujitsu, Ltd., JAPAN*

#### WE3E-1

10-Gbit/s Bi-Directional and 20-Gbit/s Uni-Directional Data Transmission Over a 120-GHz-Band Wireless Link Using a Finline Ortho-Mode Transducer

J. Takeuchi, A. Hirata, H. Takahashi, N. Kukutsu, *NTT Corp., JAPAN*

#### WE3E-2

Performance Analysis of a 10-Gb/s Millimeter-Wave Impulse Radio Transmitter

Y. Nakasha<sup>1</sup>, N. Hara<sup>2</sup>, K. Araki<sup>3</sup>, <sup>1</sup>Fujitsu, Ltd., JAPAN, <sup>2</sup>Fujitsu Laboratories, Ltd., JAPAN, <sup>3</sup>Tokyo Institute of Technology, JAPAN

#### WE3E-3

RFID System Based on Pulse-Position Modulation Using Group Delay Engineered Microwave C-Sections

S. Gupta, B. Nikfal, C. Caloz, *École Polytechnique de Montréal, CANADA*

#### WE3E-4

An All Digital OFDM Receiver Using a Novel RF Quadrature Under-Sampling Technique

M. Inomata, T. Haruta, M. Muraguchi, *Tokyo Univ. of Science, JAPAN*

#### WE3E-5

Investigation into Improving Coverage and Capacity of CDMA Wireless Base Stations with CRFE in Rural Environment

J. E. Mazierska, J. Gileppa, *James Cook Univ., AUSTRALIA*

## Room F (313+314)

### Session WE3F

#### Mobile Antennas 1

Chairs : K.-L. Wong, *National Sun Yat-Sen Univ., TAIWAN*  
R. Yamaguchi, *NTT DOCOMO, INC., JAPAN*

#### WE3F-1

Compact laminated Monopole Antenna Using Air-Gap for Multi-Band Mobile Terminals

C. Park<sup>1,2</sup>, S. Yoon<sup>1,2</sup>, H. Kim<sup>1</sup>, M. Song<sup>1</sup>, Y. Yang<sup>1</sup>,  
<sup>1</sup>SungKyunKwan Univ., REPUBLIC of KOREA, <sup>2</sup>Samsung Electronics, Co., Ltd., REPUBLIC of KOREA

#### WE3F-2

Multiband Internal Antenna for Mobile Phones Using a High Dielectric Material

S. Yoon<sup>1,2</sup>, C. Park<sup>1,2</sup>, M. Kim<sup>1</sup>, K. Kim<sup>1</sup>, Y. Yang<sup>1</sup>,  
<sup>1</sup>SungKyunKwan Univ., REPUBLIC of KOREA, <sup>2</sup>Samsung Electronics, Co., Ltd., REPUBLIC of KOREA

#### WE3F-3

Wideband Mobile Terminal Antenna Design Using Extended Ground

K. Kim, S. Jeon, H. Kim, *Hanyang Univ., REPUBLIC of KOREA*

#### WE3F-4

Super Slim Multiband Inverted-F Antenna for GSM / DCS / PCS Operation

A.R. Razali, M.E. Bialkowski, *The Univ. of Queensland, AUSTRALIA*

#### WE3F-5

Design of a Wideband Internal Monopole Antenna for Wireless USB Dongle Application

D. Kim, U. Kim, J. Choi, *Hanyang Univ., REPUBLIC of KOREA*

16:00 – 18:00

Wednesday, December 8

## Room D (304)

### Session WE4D

#### Planar Antennas

Chairs : H. Shoki, *Toshiba Corp., JAPAN*  
T. Seki, *NTT Corp., JAPAN*

#### WE4D-1 (Invited)

Inkjet-Printed Paper / Polymer-Based "Green" RFID and Wireless Sensor Nodes: The Final Step to Bridge Cognitive Intelligence, Nanotechnology and RF?

Prof. M. Tentzeris, A. Traill, H. Lee, A. Rida, V. Lakafosis, R. Vyas, *Georgia Institute of Technology, U.S.A.*

#### WE4D-2

Investigation of 1-D Meta-Structured Leaky Wave Antennas Using High Radiation Unit Cell

C. Kim, B. Lee, *Kyunghee Univ., REPUBLIC of KOREA*

#### WE4D-3

Anisotropic Meta-Substrate Conical-Beam Leaky-Wave Antenna

A. Shahvarpour<sup>1</sup>, A.A. Melcon<sup>2</sup>, C. Caloz<sup>1</sup>, <sup>1</sup>École Polytechnique de Montréal, CANADA, <sup>2</sup>Universidad Politécnica de Cartagena, SPAIN

#### WE4D-4

Planar 77GHz Antennas on New Thermoplastic Polymer Substrate

M. Schneider, M.D. Richter, *Univ. of Bremen, GERMANY*

#### WE4D-5

Carbon Fibre Reinforced Plastic Slotted Waveguide Antenna

D. Gray<sup>1</sup>, K. Nicholson<sup>2</sup>, K. Ghorbani<sup>1</sup>, P. Callus<sup>2</sup>, <sup>1</sup>RMIT, AUSTRALIA, <sup>2</sup>Defence Science and Technology Organisation (DSTO), AUSTRALIA

## Room E (311+312)

### Session WE4E

#### Microwave Photonics

Chairs : K. Murata, *NTT Corp., JAPAN*  
A. Alphones, *Nanyang Technological Univ., SINGAPORE*

#### WE4E-1 (Invited)

Hybrid Approach for Optical Beamforming for Phased Array

Prof. A. Alphones, P.Q. Thai, *Nanyang Technological Univ., SINGAPORE*

#### WE4E-2

Phase Measurement and Calibration Characteristics of Optically Controlled Phased Array Antenna Using Multiple SMFs

D. Takeuchi<sup>1</sup>, W. Chujo<sup>1</sup>, A. Tsuzuku<sup>1</sup>, S. Yamamoto<sup>2</sup>, Y. Koyamada<sup>3</sup>,  
<sup>1</sup>Meijo Univ., JAPAN, <sup>2</sup>NICT, JAPAN, <sup>3</sup>Ibaraki Univ., JAPAN

#### WE4E-3

Guided Waves on a Dielectric Slab Waveguide with a Variable Period Slot Array Using Photoinduced Semiconductor Plasma

K. Nishimura, *Ryukoku Univ., JAPAN*

#### WE4E-4

Considerations of Optimum Electrode Structure for Lumped Constant Type LN Optical Modulator in the Microwave Band with Electromagnetic Field Simulator

T. Kamio<sup>1</sup>, K. Haeiwa<sup>1</sup>, H. Fujisaka<sup>1</sup>, Y. Toba<sup>2</sup>, <sup>1</sup>Hiroshima City Univ., JAPAN, <sup>2</sup>SEIKOH GIKEN Corp., JAPAN

#### WE4E-5

Remote Microwave Observation Systems Over Optical IP Networks Using a Digitized Radio-Over-Fiber Technique

Y. Shoji, Y. Takayama, M. Toyoshima, H. Ohta, *National Institute of Information and Communications Technology, JAPAN*

## Room F (313+314)

### Session WE4F

#### CMOS Low Noise Amplifier

Chairs : K. Joshin, *Fujitsu Laboratories LTD., JAPAN*  
B. Kim, *Pohang Univ., REPUBLIC of KOREA*

#### WE4F-1

CMOS Dual-Band Low-Noise Amplifier for World-Wide WiMedia Ultra-Wideband Wireless Personal Area Network System

Z.-Y. Huang, C.-C. Hung, *National Chiao Tung Univ., TAIWAN*

#### WE4F-2

A Compact Fully-Integrated 5.2–11.2GHz Low Noise Amplifier Using 0.18- $\mu$ m CMOS Technology

Y.-Y. Hsu, B.-J. Huang, J.-L. Kuo, H. Wang, *National Taiwan Univ., TAIWAN*

#### WE4F-3

3-7GHz Low Power Wide-Band Common Gate Low Noise Amplifier in 0.18  $\mu$ m CMOS Process

A.I.A. Galal, R.K. Pokharel, H. Kanaya, K. Yoshida, *Kyushu Univ., JAPAN*

#### WE4F-4

Using Inverter Structure for 2-6GHz Low Power High Gain Low Noise Amplifier

M.-T. Hsu, T.-C. Liu, *National Yunlin Univ. of Science and Technology, TAIWAN*

#### WE4F-5

A Low Power, High Dynamic Range LNA for Filterless RF Receiver Front-Ends in 90-nm CMOS

T.D. Werth, D. Bormann, S. Kaehlert, L. Liao, R. Wunderlich, S. Heinen, *RWTH Aachen Univ., GERMANY*

#### WE4F-6

A Receiver Front-End with Variable-Gain Control for WiMAX Applications

T.-L. Chiu, M.-F. Huang, C.-C. Wang, *Industrial Technology Research Institute, TAIWAN*

# TECHNICAL SESSIONS

Thursday, December 9

8:50 – 10:30

## Room A (301)

### Session TH1A

#### Theory and Implementation of Oscillators

*Chairs* : K. Itoh, *Kanazawa Institute of technology, JAPAN*  
H. Zirath, *Chalmers Univ., SWEDEN*

#### TH1A-1

A Low Power 10GHz Voltage-Controlled Oscillator with Modified Current-Reused Configuration

M.-T. Hsu, W.-H. Lin, *National Yunlin Univ. of Science and Technology, TAIWAN*

#### TH1A-2

A Ku Band Push-Push Oscillator Array Using Directional Phase Shifter

T. Hama, K. Kawasaki, T. Tanaka, M. Aikawa, *Saga Univ., JAPAN*

#### TH1A-3

High-Frequency Half-Integral Subharmonic Locked Ring-VCO-Based Scalable PLL in 90nm CMOS

S.-Y. Lee, S. Amakawa, N. Ishihara, K. Masu, *Tokyo Institute of Technology, JAPAN*

#### TH1A-4

Phase Noise Analysis of Sinusoidal Oscillators Based on Forced-Oscillation Model

S. Sakihara<sup>1</sup>, O. Ishida<sup>1</sup>, T. Ohira<sup>2</sup>, <sup>1</sup>*Okinawa National College of Technology, JAPAN*, <sup>2</sup>*Toyohashi Univ. of Technology, JAPAN*

#### TH1A-5

A 284- $\mu$ W 1.85-GHz 20-Phase Oscillator Using Transfer Gate Phase Couplers

H. Lee, T. Takeuchi, M. Yoshimoto, H. Kawaguchi, *Kobe Univ., JAPAN*

## Room B (302)

### Session TH1B

#### Transmission Lines and Waveguide 1

*Chairs* : H. Uchida, *Mitsubishi Electric Corp., JAPAN*  
T.-G. Ma, *National Taiwan Univ., TAIWAN*

#### TH1B-1

A Miniaturized Transmission Line with a Mesh-Structure Signal Metal for CMOS ICs

N. Ono, T. Mitomo, H. Hoshino, O. Watanabe, *Toshiba Corp., JAPAN*

#### TH1B-2

Novel Synthesized Microstrip Line with Controllable Transmission Zeros for Harmonic Suppressions

C.-H. Lai, Y.-C. Tseng, T.-G. Ma, *National Taiwan Univ. of Science and Technology, TAIWAN*

#### TH1B-3

Innovative HF Extraction Procedure of the Characteristic Impedance for Embedded Planar Transmission Line on High Conductive Si Substrate

L. Fourneau<sup>1</sup>, T. Lacrevez<sup>1</sup>, J. Charbonnier<sup>2</sup>, A. Farcy<sup>3</sup>, B. Flechet<sup>1</sup>, <sup>1</sup>*Université de Savoie, FRANCE*, <sup>2</sup>*CEA-LETI Minatoc, FRANCE*, <sup>3</sup>*STMicroelectronics, FRANCE*

#### TH1B-4

A Fast Frequency-Domain Method for Lossless Multiconductor Transmission Line Equations and Its Application

F. Xiao, *Univ. of Electronic Science and Technology of China, CHINA*

#### TH1B-5

An Equivalent Circuit Analysis of Coplanar Waveguide Employing Periodic Ground Structure on GaAs MMIC

J.-H. Jeong, Y.-B. Park, B.-R. Jung, J.-G. Ju, S.-Y. Kang, E.-H. Jang, I.-H. Kang, Y. Yun, *Korea Maritime Univ., REPUBLIC of KOREA*

## Room C (303)

### Session TH1C

#### UWB Antennas 1

*Chairs* : Q. X. Chu, *South China Univ. of Technology, CHINA*  
T. Sasamori, *Akita Prefectural Univ., JAPAN*

#### TH1C-1

A Reconfigurable Frequency-Notched UWB Antenna with Split-Ring Resonators

M. Al-Husseini<sup>1</sup>, J. Costantine<sup>2</sup>, C.G. Christodoulou<sup>2</sup>, S.E. Barbin<sup>3</sup>, A. El-Hajj<sup>1</sup>, K.Y. Kabalan<sup>1</sup>, <sup>1</sup>*American Univ. of Beirut, LEBANON*, <sup>2</sup>*Univ. of New Mexico, U.S.A.*, <sup>3</sup>*Universidade de Sao Paulo, BRAZIL*

#### TH1C-2

Compact Circular Polarized Antenna for GPS and CNSS Applications

Z.-H. Tu, Q.-X. Chu, *South China Univ. of Technology, CHINA*

#### TH1C-4

A New Circular UWB Microstrip Antenna, and Its Characterization in Time and Frequency Domains

M. Kumar, A. Basu, S.K. Koul, *Indian Institute of Technology Delhi, INDIA*

#### TH1C-5

A Compact UWB Antenna with Sharp Band-Notched Characteristics and Controllable Notched Bandwidth

Q.-X. Chu, T.-G. Huang, *South China Univ. of Technology, CHINA*

Thursday, December 9

10:50 – 12:30

## Room A (301)

### Session TH2A

#### Frequency Conversion Techniques

*Chairs* : R. Fujimoto, *STARC, JAPAN*  
J. Macháč, *Czech Technical Univ. in Prague, CZECH REPUBLIC*

#### TH2A-1

17-GHz pHEMT Gilbert Single-Quadrature Downconverter With Polyphase Filters for Image Rejection

H.-J. Wei<sup>1</sup>, C.-C. Meng<sup>1</sup>, J.-Y. Su<sup>1</sup>, S.-W. Yu<sup>1</sup>, G.-W. Huang<sup>2</sup>, <sup>1</sup>*National Chiao Tung Univ., TAIWAN*, <sup>2</sup>*National Nano Device Lab., TAIWAN*

#### TH2A-2

Reconfigurable Up-Converter with Image Rejection

X.Y. Zhang<sup>1</sup>, H.-L. Zhang<sup>1</sup>, B.-J. Hu<sup>1</sup>, Q. Xue<sup>2</sup>, <sup>1</sup>*South China Univ. of Technology, CHINA*, <sup>2</sup>*City Univ. of Hong Kong, HONG KONG*

#### TH2A-3

A Low-IF Direct Sampling Mixer with Complex Transfer Function for ISDB-T One Segment Applications

Y. Morishita<sup>1</sup>, N. Saito<sup>1</sup>, K. Araki<sup>2</sup>, <sup>1</sup>*Panasonic Corp., JAPAN*, <sup>2</sup>*Tokyo Institute of Technology, JAPAN*

#### TH2A-4

Nonlinear Analysis of Direct Sampling Mixers Using F-Matrix

K. Aio, K. Araki, *Tokyo Institute of Technology Univ., JAPAN*

#### TH2A-5

A Passive 8 to 24GHz Frequency Tripler Based on Microstrip Line Circuits and Schottky Diodes

C. Baer, T. Musch, *Ruhr-Universität Bochum, GERMANY*

## Room B (302)

### Session TH2B

#### Power Dividers

*Chairs* : K.K.M. Cheng, *The Chinese Univ. of Hong Kong, HONG KONG*  
I. Sakagami, *Univ. of Toyama, JAPAN*

#### TH2B-1

Design Method of Lumped-Element Dual-Band Wilkinson Power Dividers Based on Frequency Transformation

T. Kawai, I. Ohta, A. Enokihara, *Univ. of Hyogo, JAPAN*

#### TH2B-2

A Planar Three-Way Dual-Band Power Divider Using Two Generalized Open Stub Wilkinson Dividers

X. Wang, I. Sakagami, K. Takahashi, S. Okamura, *Univ. of Toyama, JAPAN*

#### TH2B-3

A C-band Thin-Film Three-Way Wilkinson Power Divider / Combiner Using Microstrip Technology on Alumina

J. Nath, Y. Shen, E. Nealis, *Aviat Networks, U.S.A.*

#### TH2B-4

Design of Planar Dual-Band Multi-Way Power Dividers

X. Liu, C. Yu, Y. Liu, S. Li, F. Wu, Y. Wu, *Beijing Univ. of Posts and Telecommunications, CHINA*

#### TH2B-5

Optimum Design for 6-way Power Divider with Inductive Post

D.-H. Kim<sup>1</sup>, S.-S. Oh<sup>2</sup>, K.-S. Min<sup>1</sup>, <sup>1</sup>*Korea Maritime Univ., REPUBLIC of KOREA*, <sup>2</sup>*ETRI, REPUBLIC of KOREA*

## Room C (303)

### Session TH2C

#### UWB Antennas 2

*Chairs* : T. Fukusako, *Kumamoto Univ., JAPAN*  
E. T. Rahardjo, *Universitas Indonesia, INDONESIA*

#### TH2C-1

Compact UWB Chip Antenna Design

S.Y. Park, J.H. Jung, J.M. Song, J.K. Park, *Hanbat National Univ., REPUBLIC of KOREA*

#### TH2C-2

A Circularly Polarized L-Shaped and Rectangular Slot Antenna With An L-Shaped Probe For Wideband Characteristics

S. Nakao, R. Joseph, T. Fukusako, *Kumamoto Univ., JAPAN*

#### TH2C-3

Planar Wideband Adaptive Antenna Consisting of Radially Arrayed Multiple Taper-Slot Antenna Elements Having Wide Fins

T. Baba, A. Hirose, *The Univ. of Tokyo, JAPAN*

#### TH2C-4

Design of Broadband Multi-Layered Circular Microstrip Antenna for Modern Communication Systems

M.M. Sharma<sup>1</sup>, S. Yadav<sup>1</sup>, A. Kumar<sup>1</sup>, D. Bhatnagar<sup>2</sup>, R.P. Yadav<sup>1</sup>, <sup>1</sup>*Malaviya National Institute of Technology, INDIA*, <sup>2</sup>*Univ. of Rajasthan, INDIA*

#### TH2C-5

A Miniaturized Ultra Wideband Antenna With Single Tunable Band-Notched Characteristics

A.M.A. Salem, S.I. Shams El-Din, A.M.M.A. Allam, *German Univ. in Cairo (GUC), EGYPT*



# TECHNICAL SESSIONS

8:50 – 10:30

Thursday, December 9

## Room D (304)

### Session TH1D

#### Reconfigurable antennas, Active Antennas

Chairs : Q. Chen, *Tohoku Univ., JAPAN*  
M. Fujimoto, *Univ. of Fukui., JAPAN*

#### TH1D-1

A Wideband / Image-Rejection Distributed Mixer Integrated with a CRLH Leaky Wave Antenna

C.M. Wu, T. Itoh, *UCLA, U.S.A.*

#### TH1D-2

Design and Performance of Beam-Forming Antenna with Discrete Phase Shifter for Practical Millimeter-Wave Communications Systems

Y. Sato, K. Fujita, H. Sawada, S. Kato, *Tohoku Univ., JAPAN*

#### TH1D-3

Millimeter Wave Frequency Reconfigurable Quasi-Yagi Antenna

P.-Y. Qin<sup>1,2</sup>, A.R. Weily<sup>2</sup>, Y.J. Guo<sup>2</sup>, C.-H. Liang<sup>1</sup>, <sup>1</sup>Xidian Univ., CHINA, <sup>2</sup>CSIRO ICT Centre, AUSTRALIA

#### TH1D-4

A Reconfigurable Orthogonal Antenna Array (ROAA) For Scanning Beam at 5.8GHz

M.T. Ali<sup>1</sup>, T.A. Rahman<sup>2</sup>, M.R. Kamarudin<sup>2</sup>, M.N. Md Tan<sup>1</sup>, M.F. Jamlos<sup>2</sup>, <sup>1</sup>Universiti Teknologi Mara (UiTM), MALAYSIA, <sup>2</sup>Universiti Teknologi Malaysia, MALAYSIA

#### TH1D-5

Analysis of Third-Order Intermodulation Distortion in BST Varactors

M.F. Abdul Khalid, A.S. Holland, J.R. Scott, K. Ghorbani, *RMIT Univ., AUSTRALIA*

## Room E (311+312)

### Session TH1E

#### High Efficiency Power Amplifiers

Chairs : K. Kunihiro, *NEC Corp., JAPAN*  
M. Thian, *Queen's Univ., U.K.*

#### TH1E-1

A Concurrent Dual-Band Doherty Power Amplifier

X. Li<sup>1</sup>, W. Chen<sup>1</sup>, Z. Zhang<sup>1</sup>, Z. Feng<sup>1</sup>, X. Tang<sup>2</sup>, K. Mouthaan<sup>2</sup>, <sup>1</sup>Tsinghua Univ., CHINA, <sup>2</sup>National Univ. of Singapore, SINGAPORE

#### TH1E-2

Distortion Reduction of a GaN HEMT Doherty Power Amplifier with a Series Connected Load

S. Kawai, Y. Takayama, R. Ishikawa, K. Honjo, *The Univ. of Electro-Communications, JAPAN*

#### TH1E-3

Analysis and Optimization of Asymmetric Sequential Power Amplifier

Y. Park, B. Ham, *Hankuk Univ. of Foreign Studies, REPUBLIC OF KOREA*

#### TH1E-4

2.4GHz High-Efficiency Power-Combining Class-E Amplifier with Transmission-Line Harmonic Traps

M. Thian<sup>1</sup>, V. Fusco<sup>1</sup>, P. Gardner<sup>2</sup>, <sup>1</sup>Queen's Univ. Belfast, U.K., <sup>2</sup>Univ. of Birmingham, U.K.

## Room F (313+314)

### Session TH1F

#### Tunable and Metamaterial Filters and Resonators 2

Chairs : T. Nishino, *Mitsubishi Electric Corp., JAPAN*  
M. Hangai, *Mitsubishi Electric Corp., JAPAN*

#### TH1F-1

Compact CPW Dual-Band Bandpass Filters Based on Semi-Lumped Elements and Metamaterial Concepts

M. Durán-Sindreu, J. Bonache, F. Martín, *Universitat Autònoma de Barcelona, SPAIN*

#### TH1F-2

Multiplexers Using Unit-Cell Filters of CRLH TLs

H.-R. Ahn, T. Itoh, *UCLA, U.S.A.*

#### TH1F-3

Novel Miniaturized Triplexer Using Substrate Integrated Technology

A. Corona-Chavez<sup>1,2</sup>, T. Itoh<sup>1</sup>, <sup>1</sup>UCLA, U.S.A., <sup>2</sup>INAOE, MEXICO

#### TH1F-4

The Design and Fabrication of a High Selectivity Bandpass Filter Based on Composite Right/Left-Handed (CRLH) Material

T.-C. Chou, C.-W. Huang, C.-Y. Chen, *National Univ. of Tainan, TAIWAN*

#### TH1F-5

A Loop Resonator Tunable Filter Using Phase Shifters

A. Taslimi, K. Mouthaan, *National Univ. of Singapore, SINGAPORE*

10:50 – 12:30

Thursday, December 9

## Room D (304)

### Session TH2D

#### MIMO Antennas

Chairs : K.-L. Wong, *National Sun Yat-sen Univ., TAIWAN*  
M. Fujimoto, *Univ. of Fukui, JAPAN*

#### TH2D-1

Adaptive Control of Radiation Patterns for Monopole Antenna with Frequency-Selective Reflector with Loading Varactor

Y. Hoshino, A. Saitou, K. Honjo, *The Univ. of Electro-Communications, JAPAN*

#### TH2D-2

Compact Linear Antenna Arrays for MIMO Applications

L.K. Yeung, *The Chinese Univ. of Hong Kong, HONG KONG*

#### TH2D-3

MIMO Antenna with Isolation Enhancement for Wireless USB Dongle Application at WLAN Band

Z. Li, M.-S. Han, X. Zhao, J. Choi, *Hanyang Univ., REPUBLIC OF KOREA*

#### TH2D-4

A Polarization Diversity MIMO Antenna design for WiMAX Dongle Application

L.-C. Chang<sup>1,2</sup>, C.-H. Tsai<sup>1</sup>, Powen Hsu<sup>2</sup>, C.-C. Liu<sup>1</sup>, <sup>1</sup>Industrial Technology Research Institute, TAIWAN, <sup>2</sup>National Taiwan Univ., TAIWAN

#### TH2D-5

Compact Dual-Band MIMO Antenna with High Isolation Performance

I. Yeom<sup>1</sup>, J. Kim<sup>2</sup>, C. Jung<sup>1</sup>, <sup>1</sup>Seoul Nation Univ. of Technology, REPUBLIC OF KOREA, <sup>2</sup>MobiTech Corp., REPUBLIC OF KOREA

## Room E (311+312)

### Session TH2E

#### Si-Based Millimeter-Wave ICs

Chairs : T. Nagatsuma, *Osaka Univ., JAPAN*  
K. Sano, *NTT Corp., JAPAN*

#### TH2E-1

60-80GHz Frequency Doubler Operating Close to  $f_{\max}$

G. Liu, A.C. Ulusoy, A. Trasser, H. Schumacher, *Ulm Univ., GERMANY*

#### TH2E-2

A 50-mW, 386GHz/mm<sup>2</sup> Wideband Amplifier in 0.13- $\mu$ m CMOS Technology

H.-K. Chen<sup>1</sup>, T. Wang<sup>2</sup>, K.-T. Lin<sup>1</sup>, H.-C. Chen<sup>3</sup>, S.-S. Lu<sup>1</sup>, <sup>1</sup>National Taiwan Univ., TAIWAN, <sup>2</sup>Chang Gung Univ., TAIWAN, <sup>3</sup>National Taiwan Univ. of Science and Technology, TAIWAN

#### TH2E-3

An Innovative Injection-Locked Frequency Divider with Transformer Transconductance-Boosted Technique

Y.-L. Yeh<sup>1</sup>, H.-Y. Chang<sup>1</sup>, K. Chen<sup>2</sup>, S.-H. Wu<sup>2</sup>, <sup>1</sup>National Central Univ., TAIWAN, <sup>2</sup>Industrial Technology Research Institute (ITRI), TAIWAN

#### TH2E-4

Admittance-Transforming Injection-Locked Frequency Divider and Low-Supply-Voltage Current Mode Logic Divider

Y.-H. Kuo<sup>1</sup>, J.-H. Tsai<sup>2</sup>, W.-H. Chou<sup>1</sup>, T.-W. Huang<sup>1</sup>, <sup>1</sup>National Taiwan Univ., TAIWAN, <sup>2</sup>National Taiwan Normal Univ., TAIWAN

#### TH2E-5

116GHz CMOS Injection Locked Oscillator with -99.3dBc/Hz at 1MHz offset Phase Noise

M. Motoyoshi<sup>1,2</sup>, M. Fujishima<sup>1</sup>, <sup>1</sup>Hiroshima Univ., JAPAN, <sup>2</sup>The Univ. of Tokyo, JAPAN

## Room F (313+314)

### Session TH2F

#### Miniaturized and Multi-Band Directional Couplers

Chairs : C.-H. Tseng, *National Taiwan Univ., TAIWAN*  
T. Kawai, *Univ. of Hyogo, JAPAN*

#### TH2F-1

A Miniaturized Wide Band Micromachined Directional Coupler

C.-P. Lin, Y.-H. Li, C.F. Jou, *National Chiao Tung Univ., TAIWAN*

#### TH2F-2

A Novel Microstrip Forward Directional Coupler Using Defected Ground Structure

S.-K. Hsu, J.-C. Yen, T.-L. Wu, *National Taiwan Univ., TAIWAN*

#### TH2F-3

Dual-Band Rat-Race Coupler Design in Multilayer LTCC

T.-M. Shen, C.-R. Chen, T.-Y. Huang, R.-B. Wu, *National Taiwan Univ., TAIWAN*

#### TH2F-4

A Compact Branch-Line Coupler Using  $\pi$ -Equivalent Shunt-Stub-Band Artificial Transmission Lines

C.-H. Wu, C.-H. Tseng, *National Taiwan Univ. of Science and Technology, TAIWAN*

#### TH2F-5

Directional Couplers from 30 to 140GHz in Silicon

B. Laemmler<sup>1</sup>, K. Schmalz<sup>2</sup>, C. Scheytt<sup>2</sup>, A. Koelpin<sup>1</sup>, R. Weigel<sup>1</sup>, <sup>1</sup>Univ. of Erlangen-Nuremberg, GERMANY, <sup>2</sup>IHP Microelectronics GmbH, GERMANY

# TECHNICAL SESSIONS

Thursday, December 9

14:00 – 15:40

Room A (301)

Session TH3A

## Wireless Transceiver and Receiver IC Design Techniques

Chairs : K. Nishikawa, *NTT Corp., JAPAN*  
T. T. Lee, *Boeing, U.S.A.*

### TH3A-1

A 0.5-5.5GHz Low Even-Order Distortion CMOS Current-Reused Front-End for Wideband RF Receivers

R.-F. Ye<sup>1</sup>, K.-S. Chen<sup>1</sup>, T.-S. Horng<sup>1</sup>, J.-M. Wu<sup>2</sup>, <sup>1</sup>National Sun Yat-sen Univ., TAIWAN, <sup>2</sup>National Kaohsiung Normal Univ., TAIWAN

### TH3A-2

A 41-mW Single-IF Dual Conversion CMOS Receiver for 5-GHz Wireless LAN

D. Oh, M. Cha, I. Choi, I. Kwon, *Ajou Univ., REPUBLIC of KOREA*

### TH3A-3

A 2.5-2.7 GHz Pseudo-Cascode CMOS Receiver Front-End with Integrated Unequal-Turn-Ratio Transformer Balun

Y.-C. Lin<sup>1</sup>, K.-S. Chen<sup>1</sup>, T.-S. Horng<sup>1</sup>, J.-M. Wu<sup>2</sup>, <sup>1</sup>National Sun Yat-sen Univ., TAIWAN, <sup>2</sup>National Kaohsiung Normal Univ., TAIWAN

### TH3A-4

A Compact K/Ka-Band Transceiver MMIC Using GaAs 3D-MMIC Technology

T. Kaho, Y. Yamaguchi, K. Uehara, *NTT Corp., JAPAN*

Room B (302)

Session TH3B

## Highly-Integrated Planar Filter / Resonator

Chairs : E. Rius, *Université de Bretagne Occidentale, FRANCE*  
S. Narahashi, *NTT DOCOMO INC., JAPAN*

### TH3B-1

A 77-GHz CMOS On-Chip Bandpass Filter Using Slow-Wave Stepped-Impedance Resonators

H.-R. Lin<sup>1</sup>, C.-Y. Hsu<sup>1</sup>, L.-K. Yeh<sup>1</sup>, H.-R. Chuang<sup>1</sup>, C.-Y. Chen<sup>2</sup>, <sup>1</sup>National Cheng Kung Univ., TAIWAN, <sup>2</sup>National Univ. of Tainan, TAIWAN

### TH3B-2

A Compact Millimeter-Wave CMOS Bandpass Filter Using Stepped-Impedance Cross Resonator

Y.-M. Chen, S.-F. Chang, C.-L. Wei, *National Chung Cheng Univ., TAIWAN*

### TH3B-3

High Performance Resonators for MM-Wave ICs

F. Aghamori, I. McGregor, K. Elgaid, *Univ. Of Glasgow, U.K.*

### TH3B-4

A Compact Second Harmonic-Suppressed Bandpass Filter Using  $\pi$ -Equivalent Transmission Lines

C.-L. Chang, C.-H. Tseng, *National Taiwan Univ. of Science and Technology, TAIWAN*

### TH3B-5

UHF Band Semi-Lumped Active Notch Filter

D.L.H. Tong, J.-Y.L. Naour, J.-L. Robert, A. Louzir, *Technicolor R&I, FRANCE*

Room C (303)

Session TH3C

## Electromagnetic Wave Theory 1

Chairs : S. Watanabe, *Aoyama Gakuin Univ., JAPAN*  
K. Okubo, *Okayama Prefectural Univ., JAPAN*

### TH3C-1

Creating a Terahertz Wave Source Through Nonlinear Sum Frequency Generation in a Microwave Pumped Ferroelectric Crystal

J.F. Webb, *Swinburne Univ. of Technology, MALAYSIA*

### TH3C-2

Efficiency Analysis and Optimal Design of a Circular Loop Resonant Coil for Wireless Power Transfer

H.-C. Son<sup>1</sup>, J.-W. Kim<sup>2</sup>, Y.-J. Park<sup>1</sup>, K.-H. Kim<sup>1</sup>, <sup>1</sup>Korea Electrotechnology Research Institute (KERI), REPUBLIC of KOREA, <sup>2</sup>Univ. of Science and Technology (UST), REPUBLIC of KOREA

### TH3C-3

Frequency Shift in a Single Dielectric Resonator and in a Chain of Coupled Resonators due to Time Change in Permittivity

N. Sakhnenko, A. Nerukh, *Kharkov National Univ. of Radio Electronics, UKRAINE*

### TH3C-4

Poynting Theorem for the Natural Modes of Open Dielectric Resonators with Active Regions

A.I. Nosich<sup>1</sup>, E.I. Smotrova<sup>1</sup>, V.O. Byelobrov<sup>1</sup>, R. Sauleau<sup>2</sup>, <sup>1</sup>IRE NASU, UKRAINE, <sup>2</sup>Universite de Rennes, FRANCE

### TH3C-5

Scattering by Cylindrical Objects Buried in a Dielectric Layer

F. Frezza<sup>1</sup>, L. Pajewski<sup>2</sup>, C. Ponti<sup>2</sup>, G. Schettini<sup>2</sup>, <sup>1</sup>Sapienza Univ. of Rome, ITALY, <sup>2</sup>Roma Tre Univ. of Rome, ITALY

Thursday, December 9

16:00 – 18:00

Room A (301)

Session TH4A

## Broadband and Millimeter-Wave Circuit Designs

Chairs : T. Tokumitsu, *Sumitomo Electric Industries, Ltd., JAPAN*  
R. Kagiwada, *Northrop Grumman, U.S.A.*

### TH4A-1 (Invited)

Broadband Design Techniques and Technology for Future Wireless and Wire-Line Applications

Dr. K.W. Kobayashi, K. Krishnamurthy, R. Vetury, Y. McCleary, R. Hillermeier, J.B. Shealy, *RF Micro Devices, U.S.A.*

### TH4A-2

A 60GHz High Gain Transformer-Coupled Differential Power Amplifier in 65nm CMOS

J.Y.-C. Liu<sup>1</sup>, Q.J. Gu<sup>1</sup>, T. LaRocca<sup>2</sup>, N.-Y. Wang<sup>1</sup>, Y.-C. Wu<sup>1</sup>, M.-C.F. Chang<sup>1</sup>, <sup>1</sup>UCLA, U.S.A., <sup>2</sup>Northrop Grumman Aerospace System, U.S.A.

### TH4A-3

A 60GHz Frequency Down-Converter with Divided LO Output in an 80GHz SiGe HBT Technology

G. Liu, A.C. Ulusoy, A. Trasser, H. Schumacher, *Ulm Univ., GERMANY*

### TH4A-4

A Dual-Gate Subharmonic Injection-Locked Oscillator Using 0.5 $\mu$ m GaAs pHEMT Technology

F.-H. Huang, M.-H. Tsai, H.-Y. Chang, Y.-M. Hsin, *National Central Univ., TAIWAN*

### TH4A-5

A Low DC Power High Conversion Gain Frequency Doubler IC for 22-29GHz UWB Applications

J. Sun<sup>1</sup>, Q. Liu<sup>1</sup>, Y.-J. Suh<sup>1</sup>, T. Shibata<sup>2</sup>, T. Yoshimasu<sup>1</sup>, <sup>1</sup>Waseda Univ., JAPAN, <sup>2</sup>Denso Corp., JAPAN

Room B (302)

Session TH4B

## APMC Special Session

Chairs : N. Suematsu, *Tohoku Univ., JAPAN*  
K. Ghorbani, *RMIT Univ., AUSTRALIA*

### TH4B-1 (Invited)

Digitally Enhanced Linear Power Amplifiers

Prof. B. Kim, D. Kang, J. Moon, D. Kim, *Pohang Univ. of Science and Technology, REPUBLIC of KOREA*

### TH4B-2 (Invited)

Antenna-in-Package Technology: the Key to Success of 60-GHz Radio

Prof. Y.P. Zhang, *Nanyang Technological Univ., SINGAPORE*

### TH4B-3 (Invited)

Millimeter Wave Integrated Circuit Techniques and Technology

Prof. S.K. Koul, *Indian Institute of Technology Delhi, INDIA*

Room C (303)

Session TH4C

## Electromagnetic Wave Theory 2

Chairs : A. I. Nosich, *IRE NASU, UKRAINE*  
T. Shibata, *NTT Corp., JAPAN*

### TH4C-1 (Invited)

A History of Applied Planar Electromagnetic Analysis

Dr. J.C. Rautio, *Sonnet Software, Inc., JAPAN*

### TH4C-2

WCIP Acceleration

N. Raveu<sup>1</sup>, L. Giraud<sup>2</sup>, H. Baudrand<sup>1</sup>, <sup>1</sup>Université de Toulouse, FRANCE, <sup>2</sup>INRIA Bordeaux Sud Ouest, FRANCE

### TH4C-3

Moment Method Solution Using Expansion Functions Defined in an Infinite Domain for Antenna Problems

D. Malka, H. Matzner, *Holon Institute of Technology (HIT), ISRAEL*

### TH4C-4

Bistatic Composite EM Scattering from PEC Object above Rough Surface Based on KH-EFIE

X.-M. Li<sup>1</sup>, C.-M. Tong<sup>2</sup>, S.-H. Fu<sup>1</sup>, J.-J. Li<sup>2</sup>, <sup>1</sup>Missile Institute of Air Force Engineering Univ., CHINA, <sup>2</sup>Southeast Univ., CHINA

### TH4C-5

Complex Waves on Three-Dimensional Periodic Arrays of Lossy or Lossless Magnetodielectric Spheres

R.A. Shore, A.D. Yaghjian, *Air Force Research Lab., U.S.A.*

# TECHNICAL SESSIONS

14:00 – 15:40

Thursday, December 9

## Room D (304)

### Session TH3D

#### Metamaterial Antennas

*Chairs* : Z. Shen, *Nanyang Technological Univ., SINGAPORE*  
N. Michishita, *National Defense Academy of Japan, JAPAN*

##### TH3D-1

Realization of a Composite Right / Left-Handed Leaky-Wave Antenna with Circular Polarization

Y. Dong, T. Itoh, *UCLA, U.S.A.*

##### TH3D-2

Leakage Control in the CRLH Uniform Ferrite-Loaded Open Waveguide Leaky-Wave Antenna using a Transversally Extending Evanescent Waveguide Structure

T. Kodaera<sup>1</sup>, C. Caloz<sup>2</sup>, <sup>1</sup>*Yamaguchi Univ., JAPAN*, <sup>2</sup>*École Polytechnique of Montréal, CANADA*

##### TH3D-3

Three-Dimensional Monolithic Frequency Selective Structure with Dielectric Loading

A.K. Rashid, Z. Shen, *Nanyang Technological Univ., SINGAPORE*

##### TH3D-4

Dual-Frequency Reflectarray Design Using Sandwiched FSS

J. Li<sup>1</sup>, Q. Chen<sup>1</sup>, S. Qu<sup>1</sup>, Q. Yuan<sup>2</sup>, K. Sawaya<sup>1</sup>, <sup>1</sup>*Tohoku Univ., JAPAN*, <sup>2</sup>*Sendai National College of Technology, JAPAN*

##### TH3D-5

Multifeed Triangular Lattice Dielectric EBG Antennas

C. Biancotto, P. Record, *Heriot-Watt Univ., U.K.*

## Room E (311+312)

### Session TH3E

#### Emerging Technologies on Active Circuits

*Chairs* : Y. Itoh, *Shonan Institute of Technology, JAPAN*  
T. Tsukii, *Raytheon, U.S.A.*

##### TH3E-1

An Improved Planar W-Band Mixer with a novel DC/IF Blocking Filter

W. Zhao, Y. Zhang, M. Zhan, R. Xu, Z. Wang, *Univ. of Electronic Science and Technology of China, CHINA*

##### TH3E-2

A Novel 8-Way Active Splitter for Broadband Gateway Applications

A. Noll, *M/A-COM Technology Solutions, U.S.A.*

##### TH3E-3

A Power Combining Amplifier Based on Composite Right / Left-Handed Transmission Line

J.-H. Yoo<sup>1</sup>, E.-K. Kim<sup>1</sup>, Y. Kim<sup>1</sup>, Y.-C. Yoon<sup>2</sup>, <sup>1</sup>*Kumoh National Institute of Technology, REPUBLIC of KOREA*, <sup>2</sup>*Kwandong Univ., REPUBLIC of KOREA*

##### TH3E-4

Design of a Highly Efficient CMOS Rectifier for Passive Communication Systems

J. Essel<sup>1</sup>, D. Brenk<sup>1</sup>, J. Heidrich<sup>1</sup>, G. Hofer<sup>2</sup>, G. Holweg<sup>2</sup>, R. Weigel<sup>1</sup>, <sup>1</sup>*Univ. of Erlangen-Nuremberg, GERMANY*, <sup>2</sup>*Infineon Technologies, AUSTRIA*

##### TH3E-5

RF Energy Harvesting System at 2.67 and 5.8GHz

M. Arrawatia, M.S. Baghini, G. Kumar, *Indian Institute of Technology Bombay, INDIA*

## Room F (313+314)

### Session TH3F

#### Packaging Techniques and Functional Devices

*Chairs* : R.-B. Wu, *National Taiwan Univ., TAIWAN*  
T. Kosugi, *NTT Corp., JAPAN*

##### TH3F-1

Copper Balls Interconnection Technology for 60GHz Band 3-D System-in-Package Modules

S. Yoshida, S. Tanifuji, S. Kameda, N. Suematsu, T. Takagi, K. Tsubouchi, *Tohoku Univ., JAPAN*

##### TH3F-2

Misalignment Effects in Inter-Chip Wireless Connection with Open-Ring Resonators

M. Abe, Y. Okuyama, J.-P. Ao, Y. Ohno, *The Univ. of Tokushima, JAPAN*

##### TH3F-3

Cost-Effective 60-GHz Surface-Mount Antenna-Package for Wireless File-Transfer System

R. Suga<sup>1</sup>, H. Nakano<sup>2</sup>, Y. Hirachi<sup>2</sup>, J. Hirokawa<sup>1</sup>, M. Ando<sup>1</sup>, <sup>1</sup>*Tokyo Institute of Technology, JAPAN*, <sup>2</sup>*AMMSYS, Inc., JAPAN*

##### TH3F-4

Radio-Frequency Bulk Acoustic Wave Duplexer with a Differential Receiver Port

H. Zhang, W. Pang, *Tianjin Univ., CHINA*

##### TH3F-5

Plate Wave Resonator using Rotated Y-Cut Single Crystal LiTaO<sub>3</sub> Thin Film made by Ion Implant Technology

H. Kando, T. Iwamoto, T. Yoneda, N. Hayakawa, H. Iwamoto, K. Araki, I. Hatsuda, Y. Nagao, Y. Yoshii, *Murata MFG Co., Ltd., JAPAN*

16:00 – 18:00

Thursday, December 9

## Room D (304)

### Session TH4D

#### Antennas for Wireless Systems

*Chairs* : S. Lucyszyn, *Imperial College London, U.K.*  
Y. Okano, *Tokyo City Univ., JAPAN*

##### TH4D-1 (Invited)

Design of a Compact Wideband UHF RFID Tag Antenna  
Prof. J. Choi, U. Kim, *Hanyang Univ., REPUBLIC of KOREA*

##### TH4D-2

Fractal GPS Antenna Design on Piezoelectric Substrate  
T.-C. Tang<sup>1</sup>, C.-H. Tsai<sup>1</sup>, K.-H. Lin<sup>1</sup>, Y.-T. Huang<sup>2</sup>, C.-Y. Chen<sup>2</sup>, <sup>1</sup>*National Sun Yat-San Univ., TAIWAN*, <sup>2</sup>*TAI-SAW Technology Co., Ltd., TAIWAN*

##### TH4D-3

A Planar Yagi-Uda Antenna with a Meandered Driven Dipole and a Concave Parabolic Reflector

H.-C. Huang<sup>1,2</sup>, J.-C. Lu<sup>1</sup>, P. Hsu<sup>1</sup>, <sup>1</sup>*National Taiwan Univ., TAIWAN*, <sup>2</sup>*Nokia Corp., CHINA*

##### TH4D-4

Reconfigurable Multi-Slot Multi-Port Antennas Using RF-MEMS Switches for Handheld Devices

C.-Y. Chiu, R.D. Murch, *The Hong Kong Univ. of Science and Technology, HONG KONG*

##### TH4D-5

A New Compact Filtering Antenna Using Defected Ground Resonator

C.-T. Chuang, S.-J. Chung, *Nation Chiao-Tung Univ., TAIWAN*

## Room E (311+312)

### Session TH4E

#### Advanced Technologies on Devices, Amplifiers, and Oscillators

*Chairs* : R. Pokharel, *Kyushu Univ., JAPAN*  
K. Okada, *Tokyo Institute of Technology, JAPAN*

##### TH4E-1 (Invited)

Radio-Frequency Nanoelectronics: a New Paradigm in Electronic System Design

L. Pierantoni<sup>1</sup>, F. Coccetti<sup>2</sup>, <sup>1</sup>*Universita Politecnica delle Marche, Italy*, <sup>2</sup>*LAAS-CNRS, France*

##### TH4E-2

A New Estimation Method of Efficiency for Class-E Power Amplifier Operated above Theoretical Maximum Operation Frequency

C.-C. Shen<sup>1</sup>, H.-Y. Chang<sup>1</sup>, C.-S. Chen<sup>2</sup>, <sup>1</sup>*National Central Univ., TAIWAN*, <sup>2</sup>*Industrial Technology Research Institute, TAIWAN*

##### TH4E-3

A Highly Efficient Reconfigurable 130nm CMOS-SOI RF Power Amplifier for Multi-Radio Emitter

L. Andia<sup>1,2</sup>, D. Belot<sup>1</sup>, M. Villegas<sup>2</sup>, G. Baudoin<sup>2</sup>, <sup>1</sup>*ST Microelectronics, FRANCE*, <sup>2</sup>*Université Paris Est Marne la Vallée, FRANCE*

##### TH4E-4

Microwave Transmitter Module Integrating Slot Array Antenna, Push-Push Oscillator and PSK Modulator

T. Tanaka, H. Otani, M. Aikawa, *Saga Univ., JAPAN*

##### TH4E-5

30 and 90MHz Oscillators Operating Through 450 and 470°C for High Temperature Wireless Sensors

G.E. Ponchak, M.C. Scardelletti, J.L. Jordan, *NASA Glenn Research Center, U.S.A.*

## Room F (313+314)

### Session TH4F

#### CMOS Frequency Converters

*Chairs* : N. Itoh, *Toshiba Corp., JAPAN*  
K. Suyama, *Epoch Microelectronics, Inc., U.S.A.*

##### TH4F-1

Wide-Band Direct Sampling Mixer with Complex-Pole Synthesis

H. Shiozaki, K. Araki, *Tokyo Institute of Technology, JAPAN*

##### TH4F-2

Design Optimization of a 1.4GHz Low Power Bulk-Driven Mixer

C.-H. Li, C.-N. Kuo, *National Chiao Tung Univ., TAIWAN*

##### TH4F-3

5GHz Band Low Phase Noise Si-CMOS Oscillator with Flip-Chip Mounted FBAR

T.T. Ta, K. Ando, S. Tanifuji, S. Kameda, N. Suematsu, T. Takagi, K. Tsubouchi, *Tohoku Univ., JAPAN*

##### TH4F-4

A Switched-Transformer, 76% Tuning-Range VCO in 90nm CMOS

Y. Huo<sup>1</sup>, T. Mattsson<sup>2</sup>, P. Andreani<sup>1,2</sup>, <sup>1</sup>*Lund Univ., SWEDEN*, <sup>2</sup>*ST-Ericsson AB, SWEDEN*

##### TH4F-5

Back-Gate Coupled Current-Reused QVCO with Modified STM Technique

P.-J. Chiu, K.-I. Wu, C.F. Jou, *National Chiao Tung Univ., TAIWAN*

##### TH4F-6

A Systematic Measurement Technique to Characterize Bimodal Oscillation for CMOS Quadrature LC-VCO

S.-C. Shin, S.-W. Hsiao, J.C.-H. Poh, J. Laskar, *Georgia Institute of Technology, U.S.A.*

# TECHNICAL SESSIONS

**Friday, December 10**

**8:50 – 10:30**

## Room A (301)

### Session FR1A

#### High Frequency Low Noise Amplifier

*Chairs* : I. Watanabe, *NICT, JAPAN*

H. Chiou, *National Central Univ., TAIWAN*

#### FR1A-1

A High-Gain and Low-Noise MMIC Amplifier Module for a Ku-Band Compact Active Integrated Antenna

S. Kawasaki<sup>1</sup>, H. Seita<sup>2</sup>, M. Kawashima<sup>2</sup>, M. Hori<sup>3</sup>, K. Satoh<sup>4</sup>, Y. Suzuki<sup>4</sup>, <sup>1</sup>*Japan Aerospace Exploration Agency, JAPAN*, <sup>2</sup>*Kyoto Univ., JAPAN*, <sup>3</sup>*Tokyo Univ. of Science, JAPAN*, <sup>4</sup>*NTT DoCoMo, Inc., JAPAN*

#### FR1A-2

A High-Linearity Broadband 55-77GHz Differential Low-Noise Amplifier with 20dB Gain in SiGe Technology

D. Kissinger<sup>1</sup>, K. Aufinger<sup>2</sup>, T.F. Meister<sup>2</sup>, L. Maurer<sup>3</sup>, R. Weigel<sup>1</sup>, <sup>1</sup>*Univ. of Erlangen-Nuremberg, GERMANY*, <sup>2</sup>*Infinion Technologies AG, GERMANY*, <sup>3</sup>*Danube Integrated Circuit Engineering (DICE), AUSTRIA*

#### FR1A-3

A 24-GHz 3.8-dB NF Low-Noise Amplifier with Built-In Linearizer

Y.-H. Kuo<sup>1</sup>, J.-H. Tsai<sup>2</sup>, W.-H. Chou<sup>1</sup>, T.-W. Huang<sup>1</sup>, <sup>1</sup>*National Taiwan Univ., TAIWAN*, <sup>2</sup>*National Taiwan Normal Univ., TAIWAN*

#### FR1A-4

A 24-GHz Low Power Low Noise Amplifier Using Current Reuse and Body Forward Bias Techniques in 0.18- $\mu$ m CMOS Technology

C.-C. Kuo, H. Wang, *National Taiwan Univ., TAIWAN*

#### FR1A-5

A High Performance V-Band Low Noise Amplifier Using Thin-Film Microstrip (TFMS) Lines in 0.13 $\mu$ m CMOS Technology

H.-K. Chiou, K.-Z. Lee, S.-J. Wu, *National Central Univ., TAIWAN*

## Room B (302)

### Session FR1B

#### Artificial Materials and Applications

*Chairs* : A. Sanada, *Yamaguchi Univ., JAPAN*

T. Itoh, *UCLA, U.S.A.*

#### FR1B-1

Ferromagnetic Nanowire (FMNW) Self-Biased H-Plane Resonance Isolator

H. Razavipour, L.-P. Carignan, D. Ménard, A. Yelon, C. Caloz, *École Polytechnique de Montréal, CANADA*

#### FR1B-2

Characteristics on Left-Handed Ferrite Waveguide

K. Okubo<sup>1</sup>, M. Tsutsumi<sup>2</sup>, <sup>1</sup>*Okayama Prefectural Univ., JAPAN*, <sup>2</sup>*Fukui Univ. of Technology, JAPAN*

#### FR1B-3

Manipulating Polarization of Electromagnetic Waves Through Controllable Metamaterial Absorber

B. Zhu<sup>1</sup>, C. Huang<sup>1</sup>, J. Zhao<sup>1</sup>, T. Jiang<sup>1,2</sup>, Y. Feng<sup>1,2</sup>, <sup>1</sup>*Nanjing Univ., CHINA*, <sup>2</sup>*Southeast Univ., CHINA*

#### FR1B-4

Radiation Characteristics of Waveguide-Type Zeroth-Order Resonator

K. Shimizu, H. Kubo, A. Sanada, *Yamaguchi Univ., JAPAN*

#### FR1B-5

2D Zeroth Order Resonator with Non-Planar Metamaterial Composed of Metal Rods

T. Yamamoto, A. Sanada, H. Kubo, T. Kodera, *Yamaguchi Univ., JAPAN*

## Room C (303)

### Session FR1C

#### Propagation and Interference

*Chairs* : S. Kameda, *Tohoku Univ., JAPAN*

F. Sugimoto, *NHK, JAPAN*

#### FR1C-1

Influence of Hand Tremor for 60-GHz-Band Broadband Wireless Communication Terminal Based on Advanced Kiosk Model

S. Tomita<sup>1</sup>, N.H. Tran<sup>1</sup>, Y. Miyake<sup>1</sup>, K. Komatsu<sup>1</sup>, H. Oguma<sup>2</sup>, N. Izuka<sup>3</sup>, S. Tanifuji<sup>1</sup>, S. Kameda<sup>1</sup>, N. Suematsu<sup>1</sup>, T. Takagi<sup>1</sup>, K. Tsubouchi<sup>1</sup>, <sup>1</sup>*Tohoku Univ., JAPAN*, <sup>2</sup>*Miyagi Prefectural Government, JAPAN*, <sup>3</sup>*SoftBank Telecom Corp., JAPAN*

#### FR1C-2

Connection Probability Enhancement Using Artificial Reflectors for Millimeter Wave Communications

S. Takahashi, H. Sawada, S. Kato, *Tohoku Univ., JAPAN*

#### FR1C-3

Measured Downlink Throughput Performance of Mobile Broadband Wireless Access System in Suburban Area

H. Oguma<sup>1,2</sup>, S. Kameda<sup>1</sup>, N. Izuka<sup>3</sup>, Y. Asano<sup>3</sup>, Y. Yamazaki<sup>3</sup>, N. Suematsu<sup>1</sup>, T. Takagi<sup>1</sup>, K. Tsubouchi<sup>1</sup>, <sup>1</sup>*Tohoku Univ., JAPAN*, <sup>2</sup>*Miyagi Prefectural Government, JAPAN*, <sup>3</sup>*Softbank Telecom Corp., JAPAN*

#### FR1C-4

Considerations and Experiments for Stable Ship Mobile Reception of Terrestrial Digital Television Waves

K. Haeiwa<sup>1</sup>, T. Kamio<sup>1</sup>, H. Kondo<sup>2</sup>, S. Iwaki<sup>3</sup>, T. Kotani<sup>3</sup>, T. Ueta<sup>3</sup>, <sup>1</sup>*Hiroshima City Univ., JAPAN*, <sup>2</sup>*RCC Broadcasting, JAPAN*, <sup>3</sup>*NHK Integrated Technology, JAPAN*

#### FR1C-5

Performance Evaluation of ATSC-DTV Receivers in the Presence of ISDB-T Interference Signal

S.W. Choi, H.J. Hong, *Electronics and Telecommunications Research Institute, REPUBLIC OF KOREA*

**Friday, December 10**

**10:50 – 12:30**

## Room A (301)

### Session FR2A

#### CMOS Power Amplifiers

*Chairs* : S. Tanaka, *Renesas Electronics Corp., JAPAN*

S. Shinjo, *Mitsubishi Electric Corp., JAPAN*

#### FR2A-1

Design Considerations for 60GHz CMOS Power Amplifiers

Y. He, D. Zhao, L. Li, P. Reynaert, *Katholieke Universiteit Leuven, BELGIUM*

#### FR2A-2

A 57-66GHz Medium Power Amplifier in 65-nm CMOS Technology

C.-Y. Hsieh, J.-J. Kuo, Z.-M. Tsai, K.-Y. Lin, *National Taiwan Univ., TAIWAN*

#### FR2A-3

Analysis and Design of Series Combining Transformers for Integrated Doherty Power Amplifiers

E. Kaymaksüt, B. François, P. Reynaert, *Katholieke Universiteit Leuven, BELGIUM*

#### FR2A-4

65nm and 32nm Single NMOS Amplifier Non-Linear Study for Transducer Gain Optimization and Load-Pull Measurements

R. Paulin, F. Blanchet, P. Garcia, *STMicroelectronics, FRANCE*

#### FR2A-5

Measurement of Integrated PA-to-LNA Isolation on Si CMOS Chip

R. Minami, J.-Y. Hong, D. Imanishi, K. Okada, A. Matsuzawa, *Tokyo Institute of Technology, JAPAN*

## Room B (302)

### Session FR2B

#### Advances in Coupler / Balun Technologies

*Chairs* : K. Wu, *Ecole Polytechnique, CANADA*

I. Toyoda, *NTT Corp., JAPAN*

#### FR2B-1

A Novel Compact Planar Crossover with Simple Design Procedure

X. Liu, C. Yu, Y. Liu, S. Li, F. Wu, M. Su, *Beijing Univ. of Posts and Telecommunications, CHINA*

#### FR2B-2

A Novel H-Plane Waveguide Intersection

H. Ikeuchi<sup>1</sup>, S. Matsumoto<sup>2</sup>, T. Kawai<sup>1</sup>, M. Kishihara<sup>3</sup>, I. Ohta<sup>1</sup>, <sup>1</sup>*Univ. of Hyogo, JAPAN*, <sup>2</sup>*Furuno Electric Co., Ltd., JAPAN*, <sup>3</sup>*Okayama Prefectural Univ., JAPAN*

#### FR2B-3

Development of a Defected Ground Structure Wide Bandwidth Balun on Multilayer Organic Substrate

H. Ta, A. Stameroff, A.-V. Pham, *Univ. of California, Davis U.S.A.*

#### FR2B-4

A Compact Coupler Incorporating Novel Planar Resonators for Resonant Coupling Wireless Power / Data Transfer Systems

Y. Shirakata, S. Koshikawa, J.X. Ge, H. Mizutani, *Yokowo Co., Ltd, JAPAN*

#### FR2B-5

180-Degree Substrate Integrated Waveguide Hybrid and Its Application to Broadband Millimeter-Wave Single Balanced Mixer Design

Z.-Y. Zhang, K. Wu, Y.R. Wei, *École Polytechnique de Montréal, CANADA*

## Room C (303)

### Session FR2C

#### Radar and Imaging Systems

*Chairs* : A. Hirose, *Tokyo Univ., JAPAN*

T. Kashiwa, *Furuno Electric Co., Ltd., JAPAN*

#### FR2C-1

Design of Sparse MIMO Arrays for Short Range Imaging Applications

F. Gumbmann, L.-P. Schmidt, *Univ. of Erlangen-Nuremberg, GERMANY*

#### FR2C-2

Autofocus Imaging Simulation for Through-Wall Radar by Using FDTD with Unknown Wall Characteristics

X. Gu, Y. Zhang, *Chinese Academy of Sciences (CAS), CHINA*

#### FR2C-3

Evaluation of Effective Radius Retrieved by FMCW CPR FALCON-I from Hedo Observation in 2008

J. Yamaguchi<sup>1</sup>, T. Takano<sup>2</sup>, Y. Kawamura<sup>2</sup>, H. Abe<sup>2</sup>, T. Takamura<sup>2</sup>, H. Takenaka<sup>2</sup>, G. Pandithurai<sup>3</sup>, Y. Ishizaka<sup>4</sup>, T. Kimura<sup>1</sup>, <sup>1</sup>*Japan Aerospace Exploration Agency, JAPAN*, <sup>2</sup>*Chiba Univ., JAPAN*, <sup>3</sup>*Indian Institute of Tropical Meteorology, INDIA*, <sup>4</sup>*Aichi Gakuin Univ., JAPAN*

#### FR2C-4

Millimeter Wave FMCW Radar System Simulations Including a 3D Ray Tracing Channel Simulator

M. Dudek<sup>1</sup>, R. Wahl<sup>2</sup>, D. Kissinger<sup>1</sup>, R. Weigel<sup>1</sup>, G. Fischer<sup>1</sup>, <sup>1</sup>*Friedrich-Alexander Univ., GERMANY*, <sup>2</sup>*AWE-Communications GmbH, GERMANY*

#### FR2C-5

Multi-frequency Radar Systems for Monitoring Vital Signs

L. Chioukh<sup>1</sup>, H. Boutayeb<sup>1</sup>, D. Deslandes<sup>2</sup>, K. Wu<sup>1</sup>, <sup>1</sup>*École Polytechnique de Montréal, CANADA*, <sup>2</sup>*Université du Québec À Montréal (UQAM), CANADA*



# TECHNICAL SESSIONS

8:50 – 10:30

Friday, December 10

## Room D (304)

### Session FR1D

#### Advances in Reflector and Slot Antennas

*Chairs* : Q. Yuan, *Sendai National College of Technology, JAPAN*  
N. Kuga, *Yokohama National Univ., JAPAN*

##### FR1D-1

Plane-Wave Excited Lens / Reflector Antennas Made of Uniaxially Anisotropic Metamaterials

S.-W. Qu<sup>1</sup>, J.-F. Li<sup>1</sup>, Q. Chen<sup>1</sup>, Q. Yuan<sup>2</sup>, K. Sawaya<sup>1</sup>, Z.-F. Ji<sup>3</sup>, <sup>1</sup>*Tohoku Univ., JAPAN*, <sup>2</sup>*Sendai National College of Technology, JAPAN*, <sup>3</sup>*Southeast Univ., CHINA*

##### FR1D-2

Integrated Wideband Dipole Antenna for Pulse Beam-Formability by Using 0.18 $\mu$ m CMOS Technology

N.N.M. Khanh, M. Sasaki, K. Asada, *The Univ. of Tokyo, JAPAN*

##### FR1D-3

Reflectarray Antenna Consisting of Circular Disk Elements: Design and Measurement

H. Hasani<sup>1</sup>, M. Kamyab<sup>1</sup>, A. Mirkamali<sup>2</sup>, H. Eskandari<sup>3</sup>, <sup>1</sup>*K.N. Toosi Univ. of Technology, IRAN*, <sup>2</sup>*Zanjan Univ., IRAN*, <sup>3</sup>*Urmia Univ., IRAN*

##### FR1D-4

A Novel Circular Polarization Switchable Slot-Ring Array Antenna with Orthogonal Feed Circuit

Y. Ushijima, S. Feng, E. Nishiyama, M. Aikawa, *Saga Univ., JAPAN*

##### FR1D-5

A Compact Simple Structured Filtering Antenna Utilizing Filter Synthesis Technique

C.-K. Lin, S.-J. Chung, *National Chaio Tung Univ., TAIWAN*

## Room E (311+312)

### Session FR1E

#### MIMO Systems

*Chairs* : S. K. Koul, *Indian Institute of Technology, INDIA*  
K. Nishimori, *Niigata Univ., JAPAN*

##### FR1E-1

Optimization of Diversity Antenna Directivities Based on Spherical Mode Expansion

M. Arai, M. Iwabuchi, K. Sakaguchi, K. Araki, *Tokyo Institute of Technology, JAPAN*

##### FR1E-2

Two-Element Particle Isolator to Reduce Mutual Coupling in Rod-Antenna Arrays

S. Werner<sup>1,2</sup>, L. Vietzorreck<sup>2</sup>, A. Hirose<sup>1</sup>, <sup>1</sup>*The Univ. of Tokyo, JAPAN*, <sup>2</sup>*Technische Universitat Munchen, GERMANY*

##### FR1E-3

Improving Spectral Efficiency of Multiuser-MIMO Distributed Antenna Systems by Inter-Cluster Interference Cancellation

K. Maruta, T. Maruyama, A. Ohta, J. Mashino, M. Nakatsugawa, *NTT Corp., JAPAN*

##### FR1E-4

LOS and NLOS Capacity Components in MIMO Rice Fading Channels

V.M. Vergara<sup>1</sup>, S.E. Barbin<sup>2</sup>, <sup>1</sup>*Univ. of New Mexico, U.S.A.*, <sup>2</sup>*Univ. of São Paulo, BRAZIL*

## Room F (313+314)

### Session FR1F

#### Transmission Lines and Waveguide 2

*Chairs* : Y. Isota, *Akita Prefectural Univ., JAPAN*  
C.-P. Chen, *Kanagawa Univ., JAPAN*

##### FR1F-1

A 79-GHz LTCC Differential Microstrip Line to Laminated Waveguide Transition Using High Permittivity Material

X. Wang, A. Stelzer, *Johannes Kepler Univ. of Linz, AUSTRIA*

##### FR1F-2

A Post-Wall Waveguide (SIW) Matched Load with Thin-Film Resistor

H. Uchida, M. Nakayama, A. Inoue, Y. Hirano, *Mitsubishi Electric Corp., JAPAN*

##### FR1F-3

On the Transition from Radiating to Guiding Behavior of the Half-Mode Substrate Integrated Waveguide

Q. Lai<sup>1</sup>, C. Fumeaux<sup>2</sup>, W. Hong<sup>1</sup>, <sup>1</sup>*Southeast Univ., CHINA*, <sup>2</sup>*The Univ. of Adelaide, AUSTRALIA*

##### FR1F-4

Crosstalk in Parallel Slotlines

V. Kotlan<sup>1</sup>, J. Machac<sup>1</sup>, F. Mesa<sup>2</sup>, R. Rodriguez-Berral<sup>2</sup>, <sup>1</sup>*Czech Technical Univ. in Prague, CZECH REPUBLIC*, <sup>2</sup>*Univ. of Seville, SPAIN*

##### FR1F-5

Ultra Wideband Three-Channel Rotary Joint Design Using Curved Double-Ridged Waveguide

A.R. Mallahzadeh, H. Ahmadabadi, *Shahed Univ., IRAN*

10:50 – 12:30

Friday, December 10

## Room D (304)

### Session FR2D

#### Millimeter Wave Antennas, Antenna System

*Chairs* : Y. P. Zhang, *Nanyang Technologcal Univ., SINGAPORE*  
J. Takada, *Tokyo Institute of Technology, JAPAN*

##### FR2D-1

A 60-GHz LTCC Microstrip Grid Array Antenna

M. Sun<sup>1</sup>, Y.P. Zhang<sup>2</sup>, <sup>1</sup>*Institute for Inforcomm Research, SINGAPORE*, <sup>2</sup>*Nanyang Technological Univ., SINGAPORE*

##### FR2D-2

A 60-GHz Rectangular Slot Antenna with Backed Cavity in LTCC

Y.-F. Lu<sup>1</sup>, K.-F. Hung<sup>2</sup>, Y.-C. Lin<sup>1</sup>, <sup>1</sup>*National Taiwan Univ., TAIWAN*, <sup>2</sup>*MediaTek Inc., TAIWAN*

##### FR2D-3

Analysis of Synthetic Cylindrical Array Beam-Forming in Presence of the Elements Position-Error for Semi-Anechoic Chamber Evaluation

K. Priandana<sup>1</sup>, M. Ghorraishi<sup>1</sup>, J. Takada<sup>1</sup>, M. Ameya<sup>2</sup>, S. Kurokawa<sup>2</sup>, M. Hirose<sup>2</sup>, <sup>1</sup>*Tokyo Institute of Technology, JAPAN*, <sup>2</sup>*National Institute of Advanced Industrial Science and Technology, JAPAN*

##### FR2D-4

Detection of SSR Signals in Multipath Airport Environments by a Multichannel Receiver

C. Reck<sup>1</sup>, U. Berold<sup>2</sup>, L.-P. Schmidt<sup>1</sup>, <sup>1</sup>*Univ. of Erlangen-Nuremberg, GERMANY*, <sup>2</sup>*Ad GmbH, GERMANY*

##### FR2D-5

An Experimental Study of Novel Scanning System Suitable for UWB Radar Application

F. Sakai, K. Ohta, *Sakura Tech Corp., JAPAN*

## Room E (311+312)

### Session FR2E

#### Sensing and Measurements 2

*Chairs* : H. Morishita, *National Defence Academy, JAPAN*  
M. Ameya, *National Institute of Advanced Industrial Science and Technology, JAPAN*

##### FR2E-1

An Improved Image-based Near-Field-to-Far-Field Transformation

A. Osipov<sup>1</sup>, H. Kobayashi<sup>2</sup>, H. Suzuki<sup>3</sup>, <sup>1</sup>*German Aerospace Center (DLR), GERMANY*, <sup>2</sup>*Niigata Univ., JAPAN*, <sup>3</sup>*KEYCOM Corp., JAPAN*

##### FR2E-2

ERP - EIRP Measurement of a Mobile Phone in CTL Cell Using Half-wave Dipole and Optical Link

I.-K. Cho<sup>1</sup>, U. Park<sup>2</sup>, J.-I. Mun<sup>1</sup>, S.-M. Kim<sup>1</sup>, W.-J. Byun<sup>1</sup>, C.-J. Kim<sup>1</sup>, J.-H. Yun<sup>1</sup>, <sup>1</sup>*Electronics and Telecommunications Research Institute (ETRI), REPUBLIC of KOREA*, <sup>2</sup>*Kangwon National Univ. REPUBLIC of KOREA*

##### FR2E-3

A 100GHz Grooved Circular Empty Cavity for Low Loss Dielectric Substrate Measurements in W Band

T. Shimizu<sup>1</sup>, S. Akasaka<sup>2</sup>, Y. Kawahara<sup>2</sup>, Y. Kogami<sup>1</sup>, <sup>1</sup>*Utsunomiya Univ., JAPAN*, <sup>2</sup>*Kawashima Manufacturing Co., Ltd., JAPAN*

##### FR2E-4

Preliminary Investigations of Mutual Coupling Effect on Near-Field Beam Focusing

H.-S. Lui<sup>1</sup>, H.T. Hui<sup>2</sup>, M. Persson<sup>1</sup>, <sup>1</sup>*Chalmers Univ. of Technology, SWEDEN*, <sup>2</sup>*National Univ. of Singapore, SINGAPORE*

##### FR2E-5

Electromagnetic Field Intensity on Cross-Arm Structures Caused by Electrical Arcing

A. Bojovschi, Ferry, K.L. Wong, W.S.T. Rowe, *RMIT Univ., AUSTRALIA*

## Room F (313+314)

### Session FR2F

#### Innovative Non-Planar Filter Techniques

*Chairs* : D. C. Park, *Chungnam National Univ., REPUBLIC of KOREA*  
Y. Zhang, *Ryukoku Univ., JAPAN*

##### FR2F-01

Design of Predistorted SIW Bandpass Filter with 6dB Offset

Z. Zakaria, I.C. Hunter, B.H. Ahmad, *Univ. of Leeds, U.K.*

##### FR2F-02

Stopband Improvement of Substrate Integrated Waveguide Filters Using Slotted Ground Structures

M. Salehi, E. Mehrshahi, R. Rezaiesarlak, *Shahid Beheshti Univ., IRAN*

##### FR2F-03

A Novel Coaxial-Excited FSS-Loaded Waveguide Filter with Multiple Transmission Zeros

M. Ohira<sup>1</sup>, Z. Ma<sup>1</sup>, H. Deguchi<sup>2</sup>, M. Tsuji<sup>2</sup>, <sup>1</sup>*Saitama Univ., JAPAN*, <sup>2</sup>*Doshisha Univ., JAPAN*

##### FR2F-04

Coaxial Combine Filters Using the Stepped-Impedance Resonators

H.-H. Chen<sup>1</sup>, R.-C. Hsieh<sup>2</sup>, Y.-T. Shih<sup>3</sup>, Y.-H. Chou<sup>3</sup>, M.-H. Chen<sup>1</sup>, <sup>1</sup>*National First Univ. of Science and Technology, TAIWAN*, <sup>2</sup>*JITAI Technology Co., Ltd., TAIWAN*, <sup>3</sup>*Huafan Univ., TAIWAN*

##### FR2F-05

The Suspended Stripline BPF of Cross Coupling Design Using Quasi-Lumped Approach

P.-F. Chen, M.-H. Ho, W. Hong, *National Changhua Univ. of Education, TAIWAN*

# TECHNICAL SESSIONS

Friday, December 10

14:00 – 15:40

Room A (301)

## Session FR3A

### Microwave Control Circuits

Chairs : T. Tanaka, *Saga Univ., JAPAN*  
J.J. Brogle, *M/A-COM, U.S.A.*

#### FR3A-1

Dual-Band Class III Loaded-Line Phase Shifters

X. Tang, K. Mouthaan, *National Univ. of Singapore, SINGAPORE*

#### FR3A-3

Design of a K-band Low Insertion Loss Variation Phase Shifter Using 0.18- $\mu$ m CMOS Process

C.-H. Wu<sup>1</sup>, W.-T. Li<sup>2</sup>, J.-H. Tsai<sup>1</sup>, T.-W. Huang<sup>1</sup>, <sup>1</sup>*National Taiwan Univ., TAIWAN*, <sup>2</sup>*National Taiwan Normal Univ., TAIWAN*

#### FR3A-4

A 50Watt Monolithic Surface-Mount Series-Shunt PIN Diode Switch with Integrated Thermal Sink

J.J. Brogle<sup>1</sup>, R.J. Hubert<sup>2</sup>, T.E. Boles<sup>1</sup>, <sup>1</sup>*M/A-COM Technology Solutions Inc., U.S.A.*, <sup>2</sup>*Hittite Microwave Corp., U.S.A.*

#### FR3A-5

Mathematical Analysis of Novel Low Phase Deviation Variable Attenuator

Y. Kim, S. Shim, T. Moon, G. Chaudhary, Y. Jeong, *Chonbuk National Univ., REPUBLIC of KOREA*

Room B (302)

## Session FR3B

### Multi Band Filters

Chairs : J.-T. Kuo, *Chang Gung Univ., TAIWAN*  
T. Shimizu, *Utsunomiya Univ., JAPAN*

#### FR3B-1

High Isolation, Compact Microstrip Diplexers Using Quarter-Wave Stepped-Impedance Resonators

W.-T. Hung, S.-Y. Chang, S.-Y. Chen, *National Taiwan Univ., TAIWAN*

#### FR3B-2

A Filter Synthesis Method for Quasi-Elliptic Dual-Passband Filters

H. Lee, J. Lee, Y. Lim, *Chonnam National Univ., REPUBLIC of KOREA*

#### FR3B-3

Compact Dual-Band Microstrip Bandpass Filter Using Folded Linear Tapered-Line Resonator

M.A. Nikravan, Z. Atlasbaf, *Tarbiat Modares Univ., IRAN*

#### FR3B-4

Series-Cascaded Rings Dual-Band Filter

Z.I. Khan, M.K.M. Salleh, N.Z. Zakaria, *Universiti Teknologi MARA (UiTM), MALAYSIA*

#### FR3B-5

LTCC Dual-Band Filters With Stripline and Waveguide Resonators

G.-H. Huang, C.H. Chen, *National Taiwan Univ., TAIWAN*

Room C (303)

## Session FR3C

### Microwave and Millimeter-Wave Measurement Techniques

Chairs : T. Yakabe, *UEC, JAPAN*  
K.-F. Fuh, *National United Univ., TAIWAN*

#### FR3C-1

Peak Power Measurement of UWB Transmissions using 50-MHz Bandwidth Gaussian Filter

K. Mochizuki, Y. Kimura, H. Watanabe, M. Uchino, *Anritsu Corp., JAPAN*

#### FR3C-2

A Stepped Flange Waveguide Technique for Determining Tapered R-Card Sheet Impedance

J.P. Massman<sup>1</sup>, M.J. Havrilla<sup>1</sup>, K.W. Whites<sup>2</sup>, M.W. Hyde<sup>1</sup>, <sup>1</sup>*Air Force Institute of Technology, U.S.A.*, <sup>2</sup>*South Dakota School of Mines and Technology, U.S.A.*

#### FR3C-3

Discussions on Microwave Measurement of Permittivity Anisotropy in the Plane of Dielectric Laminate Substrates

S. Wadayama<sup>1</sup>, Y. Kobayashi<sup>2</sup>, Z. Ma<sup>1</sup>, <sup>1</sup>*Saitama Univ., JAPAN*, <sup>2</sup>*SUMTEC (Inc), JAPAN*

#### FR3C-4

The Effect of Dielectric Anisotropy and Metal Surface Roughness

J.C. Rautio<sup>1</sup>, B.J. Rautio<sup>1</sup>, S. Arvas<sup>1</sup>, A.F. Horn III<sup>2</sup>, J.W. Reynolds<sup>2</sup>, <sup>1</sup>*Sonnet Software, Inc., U.S.A.*, <sup>2</sup>*Rogers Corp., U.S.A.*

#### FR3C-5

Method for Characterizing Dual-Layer Materials Using a Free Space Technique

N.H. Osman, C.E. Free, *Univ. of Surrey, U.K.*

Friday, December 10

16:00 – 18:00

Room A (301)

## Session FR4A

### Silicon Millimeter-Wave Circuits and Devices

Chairs : N. Ono, *Toshiba Corp., JAPAN*  
P. Reynaert, *Katholieke Universiteit Leuven, BELGIUM*

#### FR4A-1

A Wafer-Level-Chip-Size-Package Technique with Inverted Microstrip Lines for MM-Wave Si CMOS ICs

Y. Kawai, S. Ujita, T. Fukuda, H. Sakai, T. Ueda, T. Tanaka, *Panasonic Corp., JAPAN*

#### FR4A-2

A High Performance Integrated Balun for 60GHz Application in 65nm CMOS Technology

M. Ercoli, M. Kraemer, D. Dragomirescu, R. Plana, *CNRS; LAAS; Université de Toulouse, FRANCE*

#### FR4A-3

A Wideband Single-balanced Down-mixer for the 60GHz Band in 65nm CMOS

M. Kraemer, M. Ercoli, D. Dragomirescu, R. Plana, *CNRS; LAAS; Université de Toulouse, FRANCE*

#### FR4A-4

D-Band 3.6-dB-Insertion-Loss ASK Modulator with 19.5-dB Isolation in 65-nm CMOS Technology

U. Yodprasit<sup>1</sup>, R. Fujimoto<sup>2</sup>, M. Motoyoshi<sup>1,3</sup>, K. Takano<sup>1,3</sup>, M. Fujishima<sup>1</sup>, <sup>1</sup>*Hiroshima Univ., JAPAN*, <sup>2</sup>*Semiconductor Technology Academic Research Center (STARC), JAPAN*, <sup>3</sup>*The Univ. of Tokyo, JAPAN*

#### FR4A-5 (Invited)

Silicon D-Band Wireless Transceivers and Applications

Prof. S.P. Voinigescu<sup>1</sup>, E. Laskin<sup>1</sup>, I. Sarkas<sup>1</sup>, K.H.K. Yau<sup>1</sup>, S. Shahramian<sup>1</sup>, A. Hart<sup>1</sup>, A. Tomkins<sup>1</sup>, P. Chevalier<sup>2</sup>, J. Hasch<sup>3</sup>, P. Garcia<sup>2</sup>, A. Chantre<sup>2</sup>, B. Sautreuil<sup>2</sup>, <sup>1</sup>*Univ. of Toronto, CANADA*, <sup>2</sup>*ST Micro Electronics, FRANCE*, <sup>3</sup>*Robert Bosch GmbH, GERMANY*

Room B (302)

## Session FR4B

### Multi Mode Filters

Chairs : Z. Ma, *Saitama Univ., JAPAN*  
Y. Lim, *Chonnam National Univ., REPUBLIC of KOREA*

#### FR4B-1 (Invited)

Dual-Mode Dual-Band Ring Resonator Bandpass Filter with Transmission Zeros

Prof. J.-T. Kuo<sup>1</sup>, T.-W. Lin<sup>2</sup>, <sup>1</sup>*Chang Gung Univ., TAIWAN*, <sup>2</sup>*National Chiao Tung Univ., TAIWAN*

#### FR4B-2

A Novel Compact Triple-Mode Resonator for Microstrip Bandpass Filter Design

K.C. Lee, H.T. Su, M.K. Haldar, *Swinburne Univ. of Technology, MALAYSIA*

#### FR4B-3

Compact Substrate Integrated Waveguide (SIW) Transversal Filter with Triple-Mode Microstrip Resonator

W. Shen<sup>1</sup>, W.-Y. Yin<sup>1,2</sup>, X.-W. Sun<sup>3</sup>, J.-F. Mao<sup>1</sup>, <sup>1</sup>*Shanghai Jiao Tong Univ., CHINA*, <sup>2</sup>*Zhejiang Univ., CHINA*, <sup>3</sup>*Institute of Microsystem and Information Technology of Chinese Academy of Sciences, CHINA*

#### FR4B-4

Microstrip Dual-Mode Bandpass Filter Using CPW-Fed Triangular Loop Resonator with Controllable Attenuation Pole

X.-G. Wang<sup>1</sup>, Y.-H. Cho<sup>1</sup>, K.-J. Chun<sup>2</sup>, S.-W. Yun<sup>1</sup>, <sup>1</sup>*Sogang Univ., REPUBLIC of KOREA*, <sup>2</sup>*Seoul National Univ., REPUBLIC of KOREA*

#### FR4B-5

60GHz CPW Dual-Mode Rectangular Ring Bandpass Filter Using Integrated Passive Devices Process

H.-C. Lu, C.-S. Yeh, S.-A. Wei, Y.-T. Chou, *National Taiwan Univ., TAIWAN*

Room C (303)

## Session FR4C

### VNA Measurements and ITS Applications

Chairs : A. Ferrero, *Politecnico di Torino, ITALY*  
M. Horibe, *AIST, JAPAN*

#### FR4C-1 (Invited)

Multiport VNAs Measurements and Their Digital Applications

Prof. A. Ferrero, *Politecnico di Torino, ITALY*

#### FR4C-2

An Unconventional VNA-Based Time-Domain Waveform Load-Pull Test Bench

V. Teppati<sup>1</sup>, S. Pinarello<sup>2</sup>, A. Ferrero<sup>1</sup>, J. Mueller<sup>2</sup>, <sup>1</sup>*Politecnico di Torino, ITALY*, <sup>2</sup>*Infineon Technologies, GERMANY*

#### FR4C-3

Accurate On-Wafer Measurement of Orthogonal Four-Port Networks Using the Thru-Reflection-Unequal-Line (TRuL) Calibration Method

Y.-T. Chou, H.-C. Lu, *Nation Taiwan Univ., TAIWAN*

#### FR4C-4

Evaluation of a Multi-line De-Embedding Technique for Millimeter-Wave CMOS Circuit Design

Q.-H. Bu, N. Li, K. Bunsen, H. Asada, K. Matsushita, K. Okada, A. Matsuzawa, *Tokyo Institute of Technology, JAPAN*

#### FR4C-5

Multiline Material Parameter Extraction Method Performance Analysis

A. Rasku, H. Sillanpää, I. Hiltunen, R. Mäkinen, *Tampere Univ. of Technology, FINLAND*

# TECHNICAL SESSIONS

14:00 – 15:40

Friday, December 10

Room D (304)

## Session FR3D

### Mobile Antennas 2

*Chairs* : M.E. Bialkowski, *The Univ. of Queensland, AUSTRALIA*  
K. Ogawa, *Panasonic Corp., JAPAN*

#### FR3D-1

Study of Coupled-Fed Shorted Monopole with a Radiating Feed Structure for LTE / WWAN Laptop Computer Applications

T.-W. Kang<sup>1</sup>, K.-L. Wong<sup>1</sup>, L.-C. Chou<sup>2</sup>, <sup>1</sup>*National Sun Yat-Sen Univ., TAIWAN*, <sup>2</sup>*Yageo Corp., TAIWAN*

#### FR3D-2

Compact Broad Dual-Band PIFA Using Self-Complementary Structure for DVB-H Applications

C. Yang<sup>1</sup>, J. Kim<sup>2</sup>, C. Jung<sup>1</sup>, <sup>1</sup>*Seoul National Univ. of Technology, REPUBLIC of KOREA*, <sup>2</sup>*Mobithec Corp., REPUBLIC of KOREA*

#### FR3D-3

Study of a Hearing Aid-Compatible Internal LTE / WWAN Bar-Type Mobile Phone Antenna

S.-C. Chen, K.-L. Wong, *National Sun Yat-sen Univ., TAIWAN*

#### FR3D-5

A Study of Using Re-Radiation Wearable Antenna for Digital Terrestrial Broadcasting

Y. Nakazato, Y. Okano, *Tokyo City Univ., JAPAN*

Room E (311+312)

## Session FR3E

### Sensing and Measurements 1

*Chairs* : T. Sakamoto, *Kyoto Univ., JAPAN*  
S. Kurokawa, *National Institute of Advanced Industrial Science and Technology, JAPAN*

#### FR3E-1

A Three-Dimensional Imaging Algorithm for Airborne Downwardlooking Multi-Channel SAR with Phase Error Compensation

K.Y. Han<sup>1,2,3</sup>, W.X. Tan<sup>2,3</sup>, Y.P. Wang<sup>2,3</sup>, W. Hong<sup>2,3</sup>, <sup>1</sup>*Graduate Univ. of Chinese Academy of Sciences, CHINA*, <sup>2</sup>*The National Key Lab. of Microwave Imaging Technology, CHINA*, <sup>3</sup>*Chinese Academy of Sciences, CHINA*

#### FR3E-2

Wide Angle SAR Imaging with Missing Data Using Tuning MAPES Method

Q. Liu<sup>1,2</sup>, W. Tan<sup>1,2</sup>, Y. Wang<sup>1,2</sup>, W. Hong<sup>1,2</sup>, Y. Wu<sup>1,2</sup>, <sup>1</sup>*National Key Lab. of Microwave Imaging Technology, CHINA*, <sup>2</sup>*Chinese Academy of Sciences, CHINA*

#### FR3E-3

Compressive Sensing for High Resolution Radar Imaging

L. Anitori<sup>1,2</sup>, M. Otten<sup>1</sup>, P. Hoozeboom<sup>1,2</sup>, <sup>1</sup>*TNO Defence, Security and Safety, NETHERLANDS*, <sup>2</sup>*Technical Univ. of Delft, NETHERLANDS*

#### FR3E-4

On the Polarization Response Using Resonances for Target Recognition

H.-S. Lui<sup>1</sup>, N.V. Shuley<sup>2</sup>, <sup>1</sup>*Chalmers Univ. of Technology, SWEDEN*, <sup>2</sup>*The Univ. of Queensland, AUSTRALIA*

#### FR3E-5

Six-Port-Based Direction-of-Arrival Detection System

G. Vinci, A. Koelpin, F. Barbon, R. Weigel, *Univ. of Erlangen-Nuremberg, GERMANY*

Room F (313+314)

## Session FR3F

### MEMS and Tunable Devices

*Chairs* : T. Nishino, *Mitsubishi Electric Corp., JAPAN*  
M. Mah, *AFOSS, U.S.A.*

#### FR3F-1

RF MEMS Tunable Capacitors Based on Movable Sidewalls in 3D Micromachined Coplanar Transmission Lines

U. Shah, M. Sterner, G. Stemme, J. Oberhammer, *KTH - Royal Institute of Technology, SWEDEN*

#### FR3F-2

Integration of Microwave MEMS Reconfigurable Reflective Surfaces in Rectangular Waveguide Stubs

M. Sterner<sup>1</sup>, D. Chicherin<sup>2</sup>, J. Åberg<sup>3</sup>, R. Sauleau<sup>4</sup>, A. Räisänen<sup>2</sup>, G. Stemme<sup>1</sup>, J. Oberhammer<sup>1</sup>, *KTH - Royal Institute of Technology, SWEDEN*, <sup>2</sup>*Aalto Univ. School of Science and Technology, FINLAND*, <sup>3</sup>*CompNordic AB, SWEDEN*, <sup>4</sup>*Université de Rennes 1, FRANCE*

#### FR3F-3

Miniaturized RF MEMS Switch Cells for Crossbar Switch Matrices

K.Y. Chan<sup>1</sup>, R.R. Mansour<sup>2</sup>, R. Ramer<sup>1</sup>, <sup>1</sup>*Univ. of New South Wales, AUSTRALIA*, <sup>2</sup>*Univ. of Waterloo, CANADA*

#### FR3F-4

Dielectric Charging in Capacitive RF MEMS Switches: The Effect of Electric Stress

N. Tavassolian<sup>1</sup>, M. Koutsourelis<sup>2</sup>, G. Papaioannou<sup>2</sup>, B. Lacroix<sup>1</sup>, J. Papapolymerou<sup>1</sup>, <sup>1</sup>*Georgia Institute of Technology, U.S.A.*, <sup>2</sup>*National Kapodistrian Univ. of Athens, GREECE*

#### FR3F-5

BST Tunability Study at DC and Microwave Frequencies by Using IDC and MIM Capacitors

B. Ouagague<sup>1</sup>, H.B. El-Shaarawy<sup>1</sup>, S. Pacchini<sup>1</sup>, S. Payan<sup>2</sup>, A. Rousseau<sup>2</sup>, M. Maglione<sup>2</sup>, R. Plana<sup>1</sup>, <sup>1</sup>*CNRS; LAAS; Université de Toulouse, FRANCE*, <sup>2</sup>*ICMCB; CNRS; Université Bordeaux 1, FRANCE*

16:00 – 18:00

Friday, December 10

Room D (304)

## Session FR4D

### Wideband Antennas

*Chairs* : S.T. Kahng, *Univ. of Incheon, REPUBLIC of KOREA*  
T. Fukusako, *Kumamoto Univ., JAPAN*

#### FR4D-1 (Invited)

Sectorised Horn Antenna Array Using an RF MEMS Rotary Switch

Prof. S. Lucyszyn<sup>1</sup>, S. Pranonsatit<sup>2</sup>, A.S. Holmes<sup>1</sup>, <sup>1</sup>*Imperial College London, U.K.*, <sup>2</sup>*Kasetsart Univ., THAILAND*

#### FR4D-2

High-Gain Planar Tapered Slot Antenna for Ku-Band Applications

D.-G. Yoon<sup>1</sup>, Y.-P. Hong<sup>1</sup>, Y.-J. An<sup>1</sup>, J.-S. Jang<sup>2</sup>, U.-Y. Pak<sup>2</sup>, J.-G. Yook<sup>1</sup>, <sup>1</sup>*Yonsei Univ., REPUBLIC of KOREA*, <sup>2</sup>*Agency for Defense Development (ADD), REPUBLIC of KOREA*

#### FR4D-3

A Printed Leaky-Wave Circularly Polarized Antenna Using Exponentially Curved Slots for Broadside Radiation

S.-K. Lin, Y.-C. Lin, *National Taiwan Univ., TAIWAN*

#### FR4D-4

Printed-Circuit Antennas for 3-30GHz and 3-60GHz UWB Applications

M. Mokhtaari, J. Bornemann, *Univ. of Victoria, CANADA*

#### FR4D-5

Dual-Band Conical-Beam Antenna for IEEE 802.11 a/b/g Applications

C. Phongcharoenpanich, E. Khoomwong, *King Mongkut's Institute of Technology Ladkrabang, THAILAND*

Room E (311+312)

## Session FR4E

### Propagation

*Chairs* : W. Hong, *Southeast Univ., CHINA*  
N. Kita, *NTT Corp., JAPAN*

#### FR4E-1

Investigation of Caustics Region Using Physical Optics for Ray Tracing Simulation

Y. Kishiki<sup>1,2</sup>, J. Takada<sup>2</sup>, G.S. Ching<sup>1</sup>, H. Takao<sup>3</sup>, Y. Sugihara<sup>3</sup>, S. Matsunaga<sup>3</sup>, F. Uesaka<sup>3</sup>, <sup>1</sup>*Kozo Keikaku Engineering Inc., JAPAN*, <sup>2</sup>*Tokyo Institute of Technology, JAPAN*, <sup>3</sup>*JGC Corp., JAPAN*

#### FR4E-2

Effect of Vertical Angle Spread of Propagation Channel on MIMO OTA Measurement Method

S. Obayashi<sup>1</sup>, T. Ohishi<sup>1</sup>, Y. Karasawa<sup>2</sup>, <sup>1</sup>*Toshiba Corp., JAPAN*, <sup>2</sup>*The Univ. of Electro-Communications, JAPAN*

#### FR4E-3

Influence of Phase Noise on the Frequency Division Multiplexing Channel Sounding

M. Ghorashi, M. Kim, J. Takada, *Tokyo Institute of Technology, JAPAN*

#### FR4E-4

A Novel Site-Specific Interference Analysis Model for Wireless Personal Area Network

J.R. Oh<sup>1</sup>, H.W. Moon<sup>1</sup>, S. Kwon<sup>2</sup>, Y.J. Yoon<sup>1</sup>, <sup>1</sup>*Yonsei Univ., REPUBLIC of KOREA*, <sup>2</sup>*LIG Nex1 Corp., REPUBLIC of KOREA*

#### FR4E-5

Study of Propagation Over Two Ends of a Vessel in VHF Band

X.H. Mao, Y.H. Lee, B.C. Ng, *Nanyang Technological Univ., SINGAPORE*

#### FR4E-6

Effect of Diurnal Variations of Rainfall in Satellite Systems at Ku and Ka Band in Singapore

X.X. Zhou<sup>1</sup>, Y.H. Lee<sup>1</sup>, O.J. Teong<sup>2</sup>, <sup>1</sup>*Nanyang Technological Univ., SINGAPORE*, <sup>2</sup>*C2N Pte. Ltd., SINGAPORE*

Room F (313+314)

## Session FR4F

### Design and Implementation Techniques for Microwave Filters 3

*Chairs* : K.-L. Wu, *The Chinese Univ. of Hong Kong, HONG KONG*  
H. Kayano, *Toshiba Corp., JAPAN*

#### FR4F-1

Quarter-Wave Parallel-Coupled and Interdigital Microstrip Bandpass Filters with Generalized Chebyshev Response

Y.-W. Lin<sup>1</sup>, J.-C. Lu<sup>2</sup>, C.-Y. Chang<sup>1</sup>, C.-K. Liao<sup>3</sup>, <sup>1</sup>*National Chiao Tung Univ., TAIWAN*, <sup>2</sup>*Taiwan Semiconductor Manufacturing Company Ltd., TAIWAN*, <sup>3</sup>*Gemtek Technology Company Ltd., TAIWAN*

#### FR4F-2

Compact Microstrip Bandpass Filters Using Miniaturized Slow-Wave Quarter-Wavelength Resonators

W.-S. Chang, C.-H. Liang, C.-Y. Chang, *National Chiao Tung Univ., TAIWAN*

#### FR4F-3

Direct Synthesis of a Bandpass Filter with a Controllable Transmission Zero

Y.-C. Chen, L.-K. Yeh, H.-R. Chuang, *National Cheng Kung Univ., TAIWAN*

#### FR4F-4

Design of the Wide Stopband Microstrip Lowpass Filter with Complementary Split-Ring Resonators

C.-W. Tang, S.-C. Yang, M.-G. Chen, J.-W. Wu, C.-C. Hu, *National Chung Cheng Univ., TAIWAN*

#### FR4F-5

An Automated Design Technique for Asynchronously-Tuned Circular Waveguide Dual-Mode Filters

H. Hu, K.-L. Wu, *The Chinese Univ. of Hong Kong, HONG KONG*

#### FR4F-6

Bandpass / Bandstop Coupling Matrix Synthesis Based On Rational Representation of Scattering Parameters

A. Lamecki, M. Mrozowski, *Gdańsk Univ. of Technology, POLAND*



# OPEN FORUM (POSTER) SESSIONS

**Wednesday, December 8 15:00 – 16:30**

## Session WE3G

Room G (315)

**Chair : M. Kawashima, NTT Corp., JAPAN**

### WE3G-01

Design of Low Power High Linearity Front-End Circuit with a Novel LNA Architecture

C.-H. Wu, Y.-P. Lin, *Lunghwa Univ. of Science and Technology, TAIWAN*

### WE3G-02

Application of Genetic Algorithm to Multi-Objective Optimization in LNA Design

A. Prasad<sup>1</sup>, M. Roy<sup>2</sup>, A. Biswas<sup>1</sup>, D. George<sup>2</sup>, <sup>1</sup>*Indian Institute of Technology Kanpur, INDIA*, <sup>2</sup>*Univ. of Manchester, U.K.*

### WE3G-03

A High Dynamic Range Wide-Band Switched Gain Controlled LNA in 0.18 $\mu$ m CMOS

B. Park, J. Jung, *ETRI, REPUBLIC of KOREA*

### WE3G-04

A 4mW Current-Reused WiMAX LNA with Resistance-Feedback Topology in 0.18 $\mu$ m CMOS

C.-H. Wu<sup>1</sup>, H.-T. Chou<sup>2</sup>, Y.-G. Lyu<sup>1</sup>, <sup>1</sup>*Lunghwa Univ. of Science and Technology, TAIWAN*, <sup>2</sup>*National Central Univ., TAIWAN*

### WE3G-05

Analysis of Parasitic Effects in Ultra Wideband Low Noise Amplifier Based on EM Simulation

N. Seong, Y. Lee, Y. Jang, J. Choi, *Hanyang Univ., REPUBLIC of KOREA*

### WE3G-06

Ultra Low Phase Noise C-Band Oscillators with Combined Frequency Stabilization

N. Shtin<sup>1</sup>, J.M.L. Romero<sup>2</sup>, <sup>1</sup>*SMK Electronica, MEXICO*, <sup>2</sup>*CENAM, MEXICO*

### WE3G-07

A W-Band Cascaded Double-Stage Distributed Low-Noise Amplifier Using Feedback Transmission Line

T.T.L. Nguyen, S.-W. Moon, S.-H. Jung, M. Han, J.-K. Rhee, S.D. Kim, *Dongguk Univ., REPUBLIC of KOREA*

### WE3G-08

Gm-Boosted Balanced Colpitts Compared to Conventional Balanced Colpitts and Cross-Coupled VCOs in InGaP HBT Technology

S. Lai, D. Kuylenstierna, I. Angelov, B. Hansson, R. Kozhuharov, H. Zirath, *Chalmers Univ. of Technology, SWEDEN*

### WE3G-09

Noise Suppression Using IC Resin Package Filled with Globular Ferrite

K. Yamamoto<sup>1</sup>, K. Haeiwa<sup>2</sup>, Y. Sato<sup>1</sup>, <sup>1</sup>*Toda Kogyo Corp., JAPAN*, <sup>2</sup>*Hiroshima City Univ., JAPAN*

### WE3G-10

Low Phase Noise Push-Push VCO using Microstrip Square Open Loop Multiple Split Ring Resonator and Rat Race Coupler

J. Choi, C. Seo, *Soongsil Univ., REPUBLIC of KOREA*

### WE3G-11

Analysis of Dispersion in Intermodulation Distortion in GaN HEMT Devices

S.A. Albahrani, A.E. Parker, V. Gutta, *Macquarie Univ., AUSTRALIA*

### WE3G-12

Design Technique for MM-Wave IC Realization of the Load Network of Switched-Mode Class-E<sub>3</sub>F<sub>2</sub> Power Amplifier

M. Thian, V. Fusco, *Queen's Univ. Belfast, U.K.*

### WE3G-13

Highly Linear and Efficient Unsymmetrical Inverted Doherty Power Amplifier Employing Phase Compensation

S.-H. Kam<sup>1</sup>, M.-W. Lee<sup>1</sup>, Y.-S. Lee<sup>2</sup>, Y.-H. Jeong<sup>1</sup>, <sup>1</sup>*Pohang Univ. of Science and Technology, REPUBLIC of KOREA*, <sup>2</sup>*Samsung Electronics Co., Ltd., REPUBLIC of KOREA*

### WE3G-14

Analysis and Implementation of Inverse Class-F Power Amplifier for 3.5GHz Transmitters

Y. Xu, J. Wang, X. Zhu, *Southeast Univ., CHINA*

### WE3G-15

Design of a 40Watt Ultra Broadband Linear Power amplifier Using LDMOSFETs

M. Seol<sup>1</sup>, K. Kim<sup>1</sup>, M. Kim<sup>1</sup>, H. Kim<sup>1</sup>, J. Jeon<sup>1</sup>, J. Sim<sup>2</sup>, M. Park<sup>2</sup>, Y. Yang<sup>1</sup>, <sup>1</sup>*Sungkyunkwan Univ., REPUBLIC of KOREA*, <sup>2</sup>*Peopleworks, Inc., REPUBLIC of KOREA*

### WE3G-16

A 100Watt Ultra-Broadband Power Amplifier Using Silicon LDMOSFETs

J. Sim<sup>1</sup>, J. Lim<sup>1</sup>, M. Park<sup>1</sup>, S.-W. Seo<sup>2</sup>, B.-I. Mah<sup>2</sup>, <sup>1</sup>*Peopleworks, Inc., REPUBLIC of KOREA*, <sup>2</sup>*LIG-Nex1 Co., Ltd., REPUBLIC of KOREA*

### WE3G-17

Modeling and Implementation of High Efficient Class-F-1 Power Amplifier

J.H. Kim, G.C. Lee, J.H. Jung, *Electronics and Telecommunications Research Institute (ETRI), REPUBLIC of KOREA*

### WE3G-18

Tunable Delay Compensation Circuit in Polar Loop Transmitter for WiMAX Applications

Y.-W. Chang, C.-N. Kuo, *National Chiao-Tung Univ., TAIWAN*

### WE3G-19

Class E Dual Band PA Performances with PAPR Repartition in the Context of Nomadic Multi-Radio Architecture

A. Diet<sup>1</sup>, A. Bahi<sup>2</sup>, M. Villegas<sup>2</sup>, G. Baudoin<sup>2</sup>, <sup>1</sup>*LSS-DRE UMR8506 (CNRS, Supélec, Université Paris-Sud 11), FRANCE*, <sup>2</sup>*Université Paris-Est, FRANCE*

### WE3G-20

Efficiency Enhancement of a Tunable RF Power Amplifier by Second Harmonic Manipulation Using Thin-Film BST Varactor

F. Ali<sup>1</sup>, R. Gloeckler<sup>2</sup>, R. Weigel<sup>1</sup>, G. Fischer<sup>1</sup>, <sup>1</sup>*Univ. of Erlangen-Nuremberg, GERMANY*, <sup>2</sup>*ST-Ericsson, GERMANY*

### WE3G-21

A High Efficiency VHF GaN HEMT Class E Power Amplifier for Public and Homeland Security Applications

E. Khansalee, N. Puangngernmak, S. Chalermwisutkul, *King Mongkut's Univ. of Technology North Bangkok (KMUTNB), THAILAND*

### WE3G-22

Orthogonal Polynomial Based Hammerstein Behavioral Model for Power Amplifiers with Strong Memory Effects

O. Hammi, *King Fahd Univ. of Petroleum and Minerals (KFUPM), SAUDI ARABIA*

### WE3G-23

DC and RF Performance of AlN / GaN MOS-HEMTs

S. Taking<sup>1</sup>, D. MacFarlane<sup>1</sup>, A.Z. Khokhar<sup>1</sup>, A.M. Dabiran<sup>2</sup>, E. Wasige<sup>1</sup>, <sup>1</sup>*Univ. of Glasgow, U.K.*, <sup>2</sup>*SVT Associates Inc., U.K.*

### WE3G-24

A Dual-Band SiGe HBT Differential VCO Using a Control Voltage for Both Band-Switching and Frequency-Tuning

W. Cao, Y. Tashiro, Y. Itoh, *Shonan Institute of Technology, JAPAN*

### WE3G-25

Design a 5GHz Low Power CMOS LC VCO for IEEE 802.11a Application

M.-T. Hsu, J.-A. Huang, *National Yunlin Univ. of Science and Technonogy, TAIWAN*

### WE3G-26

A Ultra Low Power 5.4-GHz Current-Reused VCO with Internal LC Series Resonance in 0.18- $\mu$ m CMOS Technology

I.-S. Shen, H.-T. Ke, C.F. Jou, *National Chiao Tung Univ., TAIWAN*

### WE3G-27

Maximum Instability Curves of a Microwave Series-Feedback Oscillator

R.-F. Kuo, T.-H. Chu, *National Taiwan Univ., TAIWAN*

### WE3G-28

A New Low Power Voltage Controlled Oscillator Based on Bandwidth Enhancement Technique

T.N. Nguyen, J.-W. Lee, *Kyung Hee Univ., REPUBLIC of KOREA*

### WE3G-29

A Low Phase Noise Oscillator Using Spur Line Resonator for I-Band Application

B. Shrestha, R.K. Maharjan, S. Cho, K.-C. Yoon, N.-Y. Kim, *Kwangwoon Univ., REPUBLIC of KOREA*

### WE3G-30

Implementation of New SP6T Switch Achieving High Quality and Small Size at Same Time

O.C. Shin, Y.S. Kim, I.H. Jeong, *Korea Polytechnic Univ., REPUBLIC of KOREA*

### WE3G-31

Gain Stability Analysis of a Millimeter Wave Superconducting Heterodyne Receiver for Radio Astronomy

W. Shan, Z. Li, S. Shi, J. Yang, *Chinese Academy of Sciences, CHINA*

### WE3G-32

Filter-Based Low Phase-Noise Microwave Oscillators

Y.-W. Huang, C.-L. Chang, C.-H. Tseng, *National Taiwan Univ. of Science and Technology, TAIWAN*

### WE3G-33

1V 4.8mW 42.6-45.6GHz CMOS Voltage Controlled Oscillator for IEEE 802.15.3c Wireless Communication System

Z.-Y. Huang<sup>1,2</sup>, C.-C. Hung<sup>1</sup>, <sup>1</sup>*National Chiao Tung Univ., TAIWAN*, <sup>2</sup>*Industrial Technology Research Institute, TAIWAN*

### WE3G-34

A Novel 180° Microstrip Phase Shifter Based on Cascaded Branch-Line Couplers for Direct QPSK Modulation

N. Youngthanisara<sup>1</sup>, R. Phudpong<sup>2</sup>, T. Rergmaneevan<sup>1</sup>, P. Booppha<sup>1</sup>, <sup>1</sup>*Kasem Bundit Univ., THAILAND*, <sup>2</sup>*National Electronics and Computer Technology Center (NECTEC), THAILAND*

### WE3G-35

100Watt HMIC Asymmetric PIN Diode Switch

A. Rozbicki, T. Boles, J. Brogle, R. Giacchino, *M/A-COM Technology Solutions, U.S.A.*

### WE3G-36

Frequency Multiplier Using Diplexer Based on Composite Right / Left-Handed Transmission Line

Y.-W. Jung<sup>1</sup>, S.-H. Kim<sup>1</sup>, Y. Kim<sup>1</sup>, Y.-C. Yoon<sup>2</sup>, <sup>1</sup>*Kumoh National Institute of Technology, REPUBLIC of KOREA*, <sup>2</sup>*Kwandong Univ., Gangng, REPUBLIC of KOREA*

### WE3G-37

A Novel Oscillator with Very Low Phase Noise Using Double H-shape Metamaterial Resonator

D. Shin<sup>1</sup>, C. Lee<sup>1</sup>, C. Park<sup>1</sup>, Y. Moon<sup>1</sup>, J. Lee<sup>2</sup>, C. Seo<sup>1</sup>, <sup>1</sup>*Soongsil Univ., REPUBLIC of KOREA*, <sup>2</sup>*Hongik Univ., REPUBLIC of KOREA*

### WE3G-38

A Third-Order Subharmonic Injection Locked Oscillator with Wide Locking Range and Low Phase Noise

H.-S. Lee<sup>1</sup>, W.-S. Yoon<sup>1,2</sup>, S.-M. Han<sup>3</sup>, D.-M. In<sup>1</sup>, S. Pyo<sup>1</sup>, Y.-S. Kim<sup>1</sup>, <sup>1</sup>*Korea Univ., REPUBLIC of KOREA*, <sup>2</sup>*Samsung Thales., REPUBLIC of KOREA*, <sup>3</sup>*Soonchunhyang Univ., REPUBLIC of KOREA*

### WE3G-39

A Consideration on Numerical Calculation of Q-factors in Oscillation Circuit Based on Formulation of S Parameters

S. Takeda<sup>1</sup>, K. Ohue<sup>1</sup>, F. Kuroki<sup>1</sup>, T. Ohira<sup>2</sup>, <sup>1</sup>*Kure National College of Technology, Japan*, <sup>2</sup>*Toyohashi Univ. of Technology, JAPAN*



# OPEN FORUM (POSTER) SESSIONS

10:00 – 11:30

Thursday, December 9

## Session TH1G

Room G (315)

Chair : M. Kawashima, NTT Corp., JAPAN

### WE3G-40

A 24-GHz Highly Integrated Transceiver in 0.5- $\mu$ m E/D-PHEMT Process for FMCW Automotive Radar Applications

C.-H. Lin, Y.-S. Wu, Y.-L. Yeh, S.-H. Weng, G.-Y. Chen, C.-H. Shen, H.-Y. Chang, *National Central Univ., TAIWAN*

### WE3G-42

A Single-Ended Direct Conversion Front-End Transmitter with ESD Protection for WiMAX Application

C.-H. Chang, S. Wu, K. Chen, C.-C. Wang, *Industrial Technology Research Institute, TAIWAN*

### WE3G-43

A Dynamic Bias Boosting Technique for a High Efficiency Linear HBT Dual Band Power Amplifier

Z. Gu, S. Zhang, *Analog Device, U.S.A.*

### WE3G-44

A DC-20GHz CMOS Active Power Divider Design

J.-Y. Huang<sup>1</sup>, H.-I. Wu<sup>1</sup>, R. Hu<sup>1</sup>, C.F. Jou<sup>1</sup>, D.-C. Niu<sup>2</sup>, <sup>1</sup>National Chiao Tung Univ., TAIWAN, <sup>2</sup>Chun-Shan Institute of Science and Technology, TAIWAN

### WE3G-45

A Compact Flip Chip High Power Amplifier Module for Mobile Applications

C. Yuen, D. Chu, K. Laursen, H. Do, Y.-C. Pao, *Epic Communications, Inc., U.S.A.*

### WE3G-47

A 0.4-6GHz Variable-Gain Driver Amplifier for Software-Defined Radio

K.-T. Lin<sup>1</sup>, H.-K. Chen<sup>1</sup>, T. Wang<sup>2</sup>, S.-S. Lu<sup>1</sup>, <sup>1</sup>National Taiwan Univ., TAIWAN, <sup>2</sup>Chang Gung Univ., TAIWAN

### WE3G-48

A Ka-Band Receiver Front End Module

J. Chen, P. Yan, W. Hong, *Southeast Univ., CHINA*

### WE3G-49

A 60-GHz 2x2 Phased-Array Transmitter Using Injection-Locked Oscillator in 0.18 $\mu$ m CMOS Technology

F.-H. Huang, C.-C. Chen, H.-Y. Chang, Y.-M. Hsin, *National Central Univ., TAIWAN*

### WE3G-50

Flicker Noise and Power Performance of CMOS Gilbert Mixers Using Static and Dynamic Current-Injection Techniques

H.-J. Wei<sup>1</sup>, C. Meng<sup>1</sup>, H.-I. Chien<sup>1</sup>, H.-L. Lu<sup>1</sup>, J.-S. Syu<sup>1</sup>, G.-W. Huang<sup>2</sup>, <sup>1</sup>National Chiao Tung Univ., TAIWAN, <sup>2</sup>National Nano Device Lab., TAIWAN

### WE3G-51

Design of A Down / Up Conversion Mixer with Built-in Oscillator

C.-H. Wu, W.-H. Huang, *Lunghwa Univ. of Science and Technology, TAIWAN*

### WE3G-52

Low Voltage Low Power 5-GHz Double-Balanced Mixer with Active Phase Splitter

Y.-L. Liu, C.-H. Li, C.-N. Kuo, *National Chiao Tung Univ., TAIWAN*

### WE3G-53

Cold-Mode Characteristics of 90nm CMOS Device with Negative Body Bias and Highly Linear Millimeter-Wave Switch Applications

G.-Y. Chen<sup>1</sup>, H.-Y. Chang<sup>1</sup>, C.-Y. Chan<sup>1</sup>, W.-H. Tu<sup>1</sup>, C.-S. Lin<sup>2</sup>, K. Chen<sup>2</sup>, S.-H. Wu<sup>2</sup>, <sup>1</sup>National Central Univ., TAIWAN, <sup>2</sup>Industrial Technology Research Institute (ITRI), TAIWAN

### WE3G-54

24 GHz CMOS Voltage Controlled Oscillator based on the Open Loop Multiple Split Ring Resonator

S. Ko, H. Kim, J. Choi, B. Lee, J. Cho, C. Seo, *Soongsil Univ., REPUBLIC of KOREA*

### WE3G-55

A Dual Wideband and Low Phase-Noise CMOS Voltage-Controlled Oscillator with a Transformer-Based Switching Resonator

K.-C. Lu<sup>1</sup>, Y.-J. Chen<sup>1</sup>, T.-S. Horng<sup>1</sup>, J.-M. Wu<sup>2</sup>, <sup>1</sup>National Sun Yat-sen Univ., TAIWAN, <sup>2</sup>National Kaohsiung Normal Univ., TAIWAN

### WE3G-56

Evaluation of CMOS Power Amplifier for Millimeter Super Broadband Wireless Systems with Beam Forming Antenna

H. Nakase, S. Kato, *Tohoku Univ., JAPAN*

### WE3G-57

A CMOS BPSK Transmitter with a Monitoring Demodulator Embedded

H.-C. Wang<sup>1</sup>, J.-C. Juang<sup>1</sup>, C.-L. Lu<sup>2</sup>, <sup>1</sup>National Cheng Kung Univ., TAIWAN, <sup>2</sup>Kun Shan Univ., TAIWAN

### WE3G-58

A Low Power Mixer with LC Phase Shifters for a Single-End Input

R.-L. Wang<sup>1</sup>, H.-H. Chien<sup>2</sup>, C.-C. Chuang<sup>2</sup>, C.-H. Liu<sup>2</sup>, Y.-K. Su<sup>2</sup>, <sup>1</sup>National Kaohsiung Normal Univ., TAIWAN, <sup>2</sup>National Cheng Kung Univ., TAIWAN

### TH1G-01

Ultra-Wideband (UWB) Bandpass Filters with Multiple Notched Bands Using Asymmetric Dual-Line Coupling Structure

K. Song<sup>1,2</sup>, Q. Xue<sup>2</sup>, <sup>1</sup>City Univ. of Hong Kong, HONG KONG, <sup>2</sup>Univ. of Electronic Science and Technology of China, CHINA

### TH1G-02

Ultra-Wideband Band-Pass Filter with Controllable Arbitrary Notched Bands Using CRLH-TL

S. Jung, S.-I. Yang, *Soongsil Univ., REPUBLIC of KOREA*

### TH1G-03

An Improved Wide-Band Model of CRF Filters Using Two Different Approaches

W. Sahyoun, P. Benech, J.-M. Duchamp, *IMEP-LAHC Lab., FRANCE*

### TH1G-04

The Design of Wireless Express Band Pass Filter Using a Close Loop Concept

S.-S. Lee<sup>1</sup>, J.-N. Leer<sup>2</sup>, S.-S. Choi<sup>1</sup>, <sup>1</sup>Electronics and Telecommunications Research Institute, REPUBLIC of KOREA, <sup>2</sup>Hanbat National Univ., REPUBLIC of KOREA

### TH1G-05

Design a Small Ultra-Wideband Bandpass Filter on Al<sub>2</sub>O<sub>3</sub> Ceramic

C.-F. Yang<sup>1</sup>, S.-M. Wu<sup>1</sup>, M.-Y. Fu<sup>2</sup>, J.-H. Tsai<sup>2</sup>, C.-J. Huang<sup>1</sup>, C.-Y. Huang<sup>3</sup>, <sup>1</sup>National Univ. of Kaohsiung, TAIWAN, <sup>2</sup>Chinese Air Force Academy, TAIWAN, <sup>3</sup>National Kaohsiung Normal Univ., TAIWAN

### TH1G-06

A Triangular UWB Bandpass Filter with Wide Out-of-Band Rejection

A. Namsang<sup>1</sup>, P. Akkaraekthalin<sup>2</sup>, <sup>1</sup>Rajamangula Univ. of Technology Thunyaburi, THAILAND, <sup>2</sup>King Mongkut's Univ. of Technology North Bangkok, THAILAND

### TH1G-07

Quasi Multi-Mode Resonator for Wideband Filter Applications

M. Nosrati<sup>1</sup>, B. Virdee<sup>2</sup>, M. Mirzaee<sup>1</sup>, <sup>1</sup>Islamic Azad Univ., IRAN, <sup>2</sup>London Metropolitan Univ., U.K.

### TH1G-08

Wideband Balanced BPF Design for MB-OFDM Applications

C.-J. Chen<sup>1</sup>, S.-W. Wang<sup>1</sup>, C.-H. Lee<sup>1</sup>, C.-I.G. Hsu<sup>2</sup>, H.-H. Chen<sup>1</sup>, <sup>1</sup>National Changhua Univ. of Education, TAIWAN, <sup>2</sup>National Yunlin Univ. of Science and Technology, TAIWAN

### TH1G-09

A Wide-Band Bandpass Filter Using a Novel Embedded Short-Circuited Stub Resonator

D. Singwong, N. Siripon, *Chiang Mai Univ., THAILAND*

### TH1G-10

Miniaturized Dual Mode Microwave Filter

W.P. Weng, *Universiti Teknologi Petronas, MALAYSIA*

### TH1G-11

A Diplexer Using Modified Stepped-Impedance Resonators

R.-Y. Yang<sup>1</sup>, C.-Y. Hung<sup>2</sup>, C.-M. Hsiung<sup>1</sup>, C.-C. Lin<sup>1</sup>, <sup>1</sup>National Ping-Tung Univ. of Science and Technology, TAIWAN, <sup>2</sup>Tung-Fang Design Univ., TAIWAN

### TH1G-12

Design and Fabrication of a Microstrip Triple-Passband Filter

R.-Y. Yang<sup>1</sup>, C.-Y. Hung<sup>2</sup>, J.-S. Lin<sup>1</sup>, H.-W. Wu<sup>3</sup>, <sup>1</sup>National Ping-Tung Univ. of Science and Technology, TAIWAN, <sup>2</sup>Tung-Fang Design Univ., TAIWAN, <sup>3</sup>Kun-Shan Univ., TAIWAN

### TH1G-13

Novel Microstrip Diplexer Based on a Dual-Band Bandpass Filter for WLAN System

C. Zhu, L. Yao, J. Zhou, *Southeast Univ., CHINA*

# OPEN FORUM (POSTER) SESSIONS

Thursday, December 9

10:00 – 11:30

## TH1G-14

Design of a Patch Dual-Mode Bandpass Filter with Second Harmonic Suppression Using Open Stubs

B.-K. Jeon, H. Nam, K.-C. Yoon, B.-W. Jeon, Y.-W. Kim, J.-C. Lee, *Kwangwoon Univ., REPUBLIC of KOREA*

## TH1G-15

A Dual-Behavior-Resonator Structure for Designing Multi-Band Bandpass Waveguide Filters

R. Rezaiesarlak, E. Mehrshahi, M. Salehi, *Shahid Beheshti Univ., IRAN*

## TH1G-16

Two-Port Balanced Dual-Band Bandpass Filter Based on Stepped Impedance Resonators

J.-E. Lim, M.-H. Nam, H.-O. Choi, J.-H. Lee, *Chungnam National Univ., REPUBLIC of KOREA*

## TH1G-17

A Design of Size-Reduced Negative Group Delay Circuit Using a Stepped Impedance Resonator

H. Choi<sup>1</sup>, Y. Kim<sup>1</sup>, Y. Jeong<sup>1</sup>, J. Lim<sup>2</sup>, <sup>1</sup>*Chonbuk National Univ., REPUBLIC of KOREA*, <sup>2</sup>*Soonchunhyang Univ., REPUBLIC of KOREA*

## TH1G-18

Effects of the Biasing Network in a Parallel Plate Waveguide Periodic Unit Cell Featuring Switched Electromagnetic Band Gap

L. Matekovits<sup>1</sup>, A. De Sabata<sup>2</sup>, K.P. Esselle<sup>3</sup>, <sup>1</sup>*Politecnico di Torino, ITALY*, <sup>2</sup>*Politehnica Univ. of Timisoara, ROMANIA*, <sup>3</sup>*Macquarie Univ., AUSTRALIA*

## TH1G-19

I-Band High Quality Factor New Split-Ring Resonator with Broad-Side Coupling Using the Left-handed Meta-Material Technique

K.-C. Yoon , B.-K. Jeon, D.-K. Lee, J.-C. Lee, *Kwangwoon Univ., REPUBLIC of KOREA*

## TH1G-20

High-Selectivity Tunable Bandpass Filters with Low Insertion Loss

K. Hasegawa, H. Ishida, *Gunma National College of Technology, JAPAN*

## TH1G-21

Two-Stage Reconfigurable Bandpass Filter Using Two-Bit Variable-Length Transmission Line Resonator

H. Mori, J. Ohtsuka, R. Fukuda, Y. Yamao, *Univ. of Electro-Communications, JAPAN*

## TH1G-22

Ultra-Wideband Band Pass Filter with Built-In Notch Filter Configured by Multi-Layered CRLH Unit Cells

S. Ueno, K.M. Hitke, Y. Horii, *Kansai Univ., JAPAN*

## TH1G-23

A Compact Wide Stopband Microstrip Bandpass Filter Using Quarter-Wavelength Shorted Coupled-Lines

X. Luo<sup>1</sup>, H. Qian<sup>1</sup>, J.-G. Ma<sup>2</sup>, K.S. Yeo<sup>3</sup>, <sup>1</sup>*Univ. of Electronic Science and Technology of China, CHINA*, <sup>2</sup>*Tianjin Univ., CHINA*, <sup>3</sup>*Nanyang Technological Univ. (NTU), SINGAPORE*

## TH1G-24

Compact High Rejection Notch and DBR Designed with Slow-Wave Transmission Lines

A.-L. Franc, E. Pistono, N. Corrao, P. Ferrari, *Université de Savoie, FRANCE*

## TH1G-25

A Novel Flexible Filter with Enhanced Coupling Effect Using Mixed Coupling

J.-S. Kim, J.-Y. Lee, G.-B. Lee, *Korea Electronics Technology Institute, REPUBLIC of KOREA*

## TH1G-26

Short-Circuited Series Stubs for Application in Uniplanar Low-Pass Filters

R. Li<sup>1</sup>, S. Sun<sup>2</sup>, L. Zhu<sup>3</sup>, <sup>1</sup>*A\*STAR, SINGAPORE*, <sup>2</sup>*The Univ. of Hong Kong, HONG KONG*, <sup>3</sup>*Nanyang Technological Univ., SINGAPORE*

## TH1G-27

Monolithic RF WLAN Filters Design Using High Performance Passive and Active Component Technology

J. Ding<sup>1</sup>, A. Springer<sup>1</sup>, T. Bartl<sup>2</sup>, G. Hueber<sup>3</sup>, R. Hagelauer<sup>1,3</sup>, <sup>1</sup>*Johannes Kepler Univ., AUSTRIA*, <sup>2</sup>*Infineon Technologies AG, GERMANY*, <sup>3</sup>*DICE GmbH & Co KG, AUSTRIA*

## TH1G-28

Novel Topologies for Finline E-Plane Filters Using Split Ring Resonators

A. León<sup>1</sup>, A. Casanueva<sup>2</sup>, A. Mediavilla<sup>2</sup>, <sup>1</sup>*CUJAE. la Habana, CUBA*, <sup>2</sup>*Univ. of Cantabria, SPAIN*

## TH1G-29

A Microstrip LPF with Attenuation Poles Using Hairpin Structural and Inter-Digital Capacitor

T. Yasuzumi, S. Hasegawa, T. Uwano, O. Hashimoto, *Aoyama Gakuin Univ., JAPAN*

## TH1G-30

A Miniaturized V-Band Bandpass Filter Using Integrated Passive Devices Technology

W.-C. Lin, T.-M. Shen, C.-F. Chen, T.-Y. Huang, R.-B. Wu, *National Taiwan Univ., TAIWAN*

## TH1G-31

A Spurious Suppression of Microstrip Quarter-Wavelength Resonator BPF

I. Awai, T. Shirai, A. Suzuki, *Ryukoku Univ., JAPAN*

## TH1G-32

An Ultra Wide-Stopband Lowpass Filter Using Smooth Transmission Line

W. Peng, Y. Zhang, *UESTC, CHINA*

## TH1G-33

A Dielectric Resonator Band-Pass Filter with a New Excitation Structure

M.J. Kazemi, M.S. Dadash, R. Safian, *Isfahan Univ. of Technology, IRAN*

## TH1G-34

Transient Responses of Voltage and Current on Ring Resonator and Traveling-Wave Loop Directional Filters

K. Murakami<sup>1</sup>, S. Kitazawa<sup>2</sup>, <sup>1</sup>*Kinki Univ., JAPAN*, <sup>2</sup>*ATR Wave Engineering Lab., JAPAN*

## TH1G-35

Compact Low Pass Bessel Filter Using Microstrip DGS Structure

A. Kumar<sup>1</sup>, A.K. Verma<sup>2</sup>, <sup>1</sup>*Univ. of Delhi, INDIA*, <sup>2</sup>*Macquarie Univ., AUSTRALIA*

## TH1G-36

T-Shaped Non-Orthogonal Feed Input / Output Dual-Mode Bandpass Filter

C.-F. Yang<sup>1</sup>, C.-Y. Kung<sup>2</sup>, Y.-C. Chen<sup>2</sup>, S.-M. Wu<sup>1</sup>, C.-S. Hong<sup>3</sup>, R.-L. Wang<sup>3</sup>, <sup>1</sup>*National Univ. of Kaohsiung, TAIWAN*, <sup>2</sup>*National Sun Yat-sen Univ., TAIWAN*, <sup>3</sup>*National Kaohsiung Normal Univ., TAIWAN*

## TH1G-37

Using Multilayer S-Type Coupled Resonators to Realize the 2.4G Bandpass Filters

S.-M. Wu, Y.-T. Lu, M.H. Huang, K.-Y. Wang, *National Univ. of Kaohsiung, TAIWAN*

## TH1G-38

Ultra-Wideband Spurious-Free Quasi-Elliptic Function Filter

B.S. Virdee<sup>1</sup>, M. Farhat<sup>1</sup>, M.N. Moghaddasi<sup>2</sup>, <sup>1</sup>*London Metropolitan Univ., U.K.*, <sup>2</sup>*Islamic Azad Univ., IRAN*

## TH1G-39

A Novel DC/IF Blocking Structure in W-Band Rat-Race Mixer

M. Zhan, W. Zhao, R. Xu, Y. Zhang, W. Lin, *Univ. of Electronic Science and Technology of China, CHINA*

## TH1G-41

De-Embedding Transmission Lines Using a Full-wave EM-Simulated Pad Model

C.H.J. Poh , D.C. Howard, P. Cheng , J.D. Cressler, J. Papapolymerou, *Georgia Institute of Technology, U.S.A.*

## TH1G-42

Cost Effective, Mass Productive Wafer-Level Chip Size Package (WLCSP) Technology Applied to Ku-Band Frequency Converters

S. Fujita<sup>1</sup>, M. Imagawa<sup>1</sup>, T. Satoh<sup>1</sup>, T. Tokumitsu<sup>2</sup>, Y. Hasegawa<sup>1</sup>, <sup>1</sup>*Sumitomo Electric Device Innovations, Inc., JAPAN*, <sup>2</sup>*Sumitomo Electric Industries, Ltd., JAPAN*

## TH1G-43

Co-Design and Modeling of Novel Packaging Interposer with IPD Layers

S.-M. Wu<sup>1</sup>, T.-Y. Wu<sup>1</sup>, B.-H. Yu<sup>1</sup>, C.-F. Yang<sup>1</sup>, C.-C. Wang<sup>2</sup>, <sup>1</sup>*National Univ. of Kaohsiung, TAIWAN*, <sup>2</sup>*Advanced Semiconductor Engineering (ASE) Inc., TAIWAN*

## TH1G-44

Fabrication and Characterization of Ferroelectric Varactors for Tunable Wireless Front-Ends

Y.-C. Lee, Y.-C. Lin, W.-C. Chen, J.-S. Fu, *National Central Univ., TAIWAN*

## TH1G-46

Design of A Compact Rat-Race Coupler Using Dual Transmission Lines

P.-H. Tu, C.-H. Tseng, *National Taiwan Univ. of Science and Technology, TAIWAN*

## TH1G-47

Design of a Broadband Low-Loss Coupled-Line Multisection Symmetrical 3-dB Directional Coupler in Suspended Stripline Technology

S. Gruszczynski<sup>1,2</sup>, K. Wincza<sup>1,2</sup>, K. Sachse<sup>2</sup>, <sup>1</sup>*AGH Univ. of Science and Technology, POLAND*, <sup>2</sup>*Wroclaw Univ. of Technology, POLAND*

## TH1G-48

Design of Quadrature Hybrid with Closely Separated Dual-Passband Using Three-Branch Line Coupler

C.-L. Hsu, *Ta Hwa Institute of Technology, TAIWAN*

## TH1G-49

Size Reduced Marchand Balun with Integrated Microstrip to CPW Transition

S.Y. Zheng, W.S. Chan, K.F. Man, *City Univ. of Hong Kong, HONG KONG*

## TH1G-51

A Miniaturized Branch-Line Coupler Using Finger-Shape Distributed Capacitors

K.-Y. Tsai, H.-S. Yang, J.-H. Chen, Y.-J.E. Chen, *National Taiwan Univ., TAIWAN*

## TH1G-52

Balun and Power Divider Based on Multilayer Ring Resonators

S.K. Hashemi, *Univ. of Essex, U.K.*

## TH1G-53

A Compact 0-dB Coupled-Line Forward Coupler by Loading with Shunt Periodic Stubs

R. Keshavarz, M. Movahhedi, A. Hakimi, *Shahid Bahonar Univ. of Kerman, IRAN*

## TH1G-54

A Tunable Dual-Band DGS Stub Tapped Branch-Line Coupler

C.C. Leong, W.W. Choi, K.W. Tam, *Univ. of Macau, CHINA*

## TH1G-55

A Novel Microstrip Power Divider Design with Harmonic Suppression and Impedance Transformation

W.-C. Ip, K.-K.M. Cheng, *The Chinese Univ. of Hong Kong, HONG KONG*

# OPEN FORUM (POSTER) SESSIONS

15:00 – 16:30

Thursday, December 9

## Session TH3G

Room G (315)

**Chair : M. Kawashima, NTT Corp., JAPAN**

### TH1G-56

Folded Substrate-Integrated Waveguide Out-of-Phase Power Divider

K.W. Eccleston, *Univ. of Canterbury, NEW ZEALAND*

### TH1G-57

Extendable Ka-Band Power-Divider Module in LTCC Technology

T. Klein<sup>1</sup>, J. Kassner<sup>1</sup>, R. Kulke<sup>1</sup>, C. Günner<sup>1</sup>, H. Wolf<sup>2</sup>,  
<sup>1</sup>IMST GmbH, GERMANY, <sup>2</sup>EADS Astrium GmbH, GERMANY

### TH3G-01

Interferences of GPS Reception in PDA Phone

Y.H. Kao<sup>1</sup>, H.C. Yang<sup>2</sup>, <sup>1</sup>Chung Hua Univ., TAIWAN,  
<sup>2</sup>National Chiao Tung Univ., TAIWAN

### TH3G-02

Considerations on a Long-Distance-Delay-Wave-Distortion Equalizing Method in Terrestrial Digital Broadcasting

K. Kitayama<sup>1</sup>, K. Haeiwa<sup>2</sup>, Y. Kawana<sup>3</sup>, Y. Morii<sup>4</sup>, <sup>1</sup>NHK Integrated Technology, JAPAN, <sup>2</sup>Hiroshima City Univ., JAPAN, <sup>3</sup>NHK Engineering Administration Department, JAPAN, <sup>4</sup>NHK Engineering Service, JAPAN

### TH3G-03

A New RF Quadrature Undersampling Technique for an Ideal Softwaredefined Radio System

N. Matsumura, T. Toeda, M. Muraguchi, *Tokyo Univ. of Science, JAPAN*

### TH3G-04

Experimental Evaluation of Channel Prediction Based on Linear Prediction of Frequency-Domain Parameters

S. Ozawa, S. Tan, A. Hirose, *The Univ. of Tokyo, JAPAN*

### TH3G-05

Feasibility Study for LTE Wireless Broadband Network in Rural Victoria

S. Preradovic, F. Zalio, D. Vasic, I. Marks, G. Gay, *NEC Australia, AUSTRALIA*

### TH3G-06

A Coherent IR-UWB CMOS Transceiver for 3-5GHz Application

B.-J. Park<sup>1</sup>, M.-C. Ha<sup>1</sup>, J.-Y. Kim<sup>1</sup>, Y.-J. Park<sup>2</sup>, Y.-S. Eo<sup>1</sup>,  
<sup>1</sup>Kwangwoon Univ., REPUBLIC of KOREA, <sup>2</sup>Korea Electrotechnology Research Institute, REPUBLIC of KOREA

### TH3G-07

The The Generation of Shared Cryptographic Keys Through Full Duplex Channel Impulse Response Estimation at 60GHz

M.A. Forman, D. Young, *Sandia National Lab., U.S.A.*

### TH3G-08

Compensation of Path Imbalance in LINC Transmitters Using EVM and ACPR Look Up Tables

J. Lim, W. Kang, H. Ku, *Konkuk Univ., REPUBLIC of KOREA*

### TH3G-09

Investigation into Antenna Performance on Read Range Improvement of Chipless RFID Tag Reader

R. Koswatta, N.C. Karmakar, *Monash Univ., AUSTRALIA*

### TH3G-10

Moving Average Filtering Technique for Signal Processing in Digital Section of UWB Chipless RFID Reader

R. Koswatta, N.C. Karmakar, *Monash Univ., AUSTRALIA*

### TH3G-11

A Notch Filter Alignment Circuit for Wireless Communication FDD Systems

D. Bormann, A.R. Frischen, M. Schrey, S. Kaehlert, R. Wunderlich, S. Heinen, *RWTH Aachen Univ., GERMANY*

### TH3G-12

Dual-Band Receiver Using Passive Six-Port Down-Conversion Technique Suitable for Multi-Standards and SDR Applications

T. Bugo, B. Klippenstein, M. Saizew, M. Woods, M. Helaoui, *Univ. of Calgary, CANADA*

### TH3G-13

Optimization of Linear Sensor Node Array for Wireless Sensor Networks Using Particle Swarm Optimization

N.N.N.A. Malik, M. Esa, S.K.S. Yusof, S.A. Hamzah, *Universiti Teknologi Malaysia, MALAYSIA*

### TH3G-14

Microwave Components for the Lower Hybrid Transmission Line of ITER

S. Meschino<sup>1</sup>, S. Ceccuzzi<sup>2</sup>, F. Mirizzi<sup>1</sup>, L. Pajewski<sup>2</sup>, G. Schettini<sup>2</sup>, <sup>1</sup>Roma Tre Univ., ITALY, <sup>2</sup>EURATOM-ENEA Association, ITALY

### TH3G-15

Pulse Reduction Method for Circularly Polarized Synthetic Aperture Radar

V. Wissan, B. Setiadi, L. Bayuaji, J.T.S. Sumantyo, H. Kuze, *Chiba Univ., JAPAN*

### TH3G-16

Coupling Coefficient of Spiral Resonators Used for Wireless Power Transfer

I. Awai<sup>1</sup>, Y. Zhang<sup>2</sup>, T. Komori<sup>1</sup>, T. Ishizaki<sup>1</sup>, <sup>1</sup>Ryukoku Univ., JAPAN, <sup>2</sup>Panasonic Corp., JAPAN

### TH3G-17

Carbon Materials for EM Wave Absorption in V Band Applications

P.-H. Kuo<sup>1</sup>, K.-T. Lin<sup>1</sup>, T. Wang<sup>2</sup>, S.-S. Lu<sup>1</sup>, Y.-J. Yang<sup>1</sup>, S.-H. Chang<sup>1</sup>, <sup>1</sup>National Taiwan Univ., TAIWAN, <sup>2</sup>Chang Gung Univ., TAIWAN

### TH3G-18

A Fundamental Study of Microwave Liquid Heater

S. Kawasaki<sup>1</sup>, Y. Daito<sup>1</sup>, T. Kawai<sup>1</sup>, I. Ohta<sup>1</sup>, O. Amano<sup>2</sup>, Y. Matsui<sup>1</sup>, <sup>1</sup>Univ. of Hyogo, JAPAN, <sup>2</sup>TOKIWADOSEIKA, Co., Ltd, JAPAN

### TH3G-19

Connection Between Microstrip Circuits in Transmitter and Receiver of VSAT Systems

K. Nishimura, F. Kuroki, *Kure National College of Technology, JAPAN*

### TH3G-20

Mobile Wireless Power Transfer Based on Line-Coupled or Line / Resonator-Coupled Structure

K. Namikoshi, S. Yakuno, I. Awai, *Ryukoku Univ., JAPAN*

### TH3G-21

Full-Wave Modeling and Analysis of Screen Printed EMI Shield

L.B. Wang<sup>1</sup>, K.Y. See<sup>1</sup>, J.W. Zhang<sup>1</sup>, A.C.W. Lu<sup>2</sup>, S.T. Ng<sup>2</sup>,  
<sup>1</sup>Nanyang Technological Univ., SINGAPORE, <sup>2</sup>Singapore Institute of Manufacturing Technology, SINGAPORE

### TH3G-22

Surface Electric Field Distributions of Lightweight Phantom Composed of Wave Absorber for Simplified SAR Measurement

T. Watanabe, N. Michishita, Y. Yamada, *National Defense Academy, JAPAN*

### TH3G-23

Phantom-Model Experiment of Breast Cancer Detection Using Ultrashort-Pulse Radar with Compact Vivaldi Antennas

D. Zhang, A. Mase, *Kyushu Univ., JAPAN*

### TH3G-24

Feasibility Study on Microwave Stroke Detection Using a Realistic Phantom and the FDTD Method

D. Ireland, M. Bialkowski, *Univ. of Queensland, AUSTRALIA*

### TH3G-25

Basic Research of Reduction Technique for the Microwave Exposure with Conductive Cloth

A. Igarashi, Y. Okano, *Tokyo City Univ., JAPAN*

### TH3G-26

Dynamic Measurement of Temperature Dependent Permittivity of Liquid Material Using Microwaves

T. Kobayashi, Y. Nikawa, *Kokushikan Univ., JAPAN*

# OPEN FORUM (POSTER) SESSIONS

Thursday, December 9

15:00 – 16:30

## TH3G-27

Change of Electromagnetic Field Distribution in Millimeter Waves by Dental Caries Appearance

T. Takeyama, Y. Nikawa, *Kokushikan Univ., JAPAN*

## TH3G-28

Strain Imaging of Breast Using Ultra-Wideband Pulse

A.M. Abbosh, *The Univ. of Queensland, AUSTRALIA*

## TH3G-29

Self-Powered Advanced Meter Design for Smart Grid

F. Cai, D.J. Chung, E. Farantatos, A.P.S. Meliopoulos, J. Papapolymerou, *Georgia Institute of Technology, U.S.A.*

## TH3G-30

Three-Dimensional Modeling of Electromagnetic Scattering from Breast Tumor

A.M. Abbosh, A.A. Bakar, *The Univ. of Queensland, AUSTRALIA*

## TH3G-31

Iterative DEM Retrieving from Multi-Baseline Interferometric SAR with MIMO

X. Shi, Y. Zhang, *Chinese Academy of Sciences (CAS), CHINA*

## TH3G-32

Design of W-band Ultra-High Sensitivity Receiver

Z. Xiao, T. Hu, L. Wu, J. Xu, *Nanjing Univ. of Science and Technology, CHINA*

## TH3G-33

60GHz Short Range Planar RSS Localization

H.R. Fang, G.P. Cao, E.A. Gharavol, K. Tom, K. Mouthaan, *National Univ. of Singapore, SINGAPORE*

## TH3G-34

Experimental Verification for the 3D Imaging Principle of Airborne Downward-Looking SAR with a Traverse Antenna Array

Y.P. Wang<sup>2,3</sup>, K.Y. Han<sup>1,2,3</sup>, W.X. Tan<sup>2,3</sup>, W. Hong<sup>2,3</sup>, *<sup>1</sup>Graduate University of Chinese Academy of Sciences (GUCAS), CHINA, <sup>2</sup>National Key Laboratory of Microwave Imaging Technology (MITL), CHINA, <sup>3</sup>Institute of Electronics, Chinese Academy of Sciences (IECAS), CHINA*

## TH3G-35

Research on Passive Millimeter Wave Detection of Low Flying Coating Stealth Target

Y. Xing, G. Lou, X. Li, *Nanjing Univ. of Science and Technology, CHINA*

## TH3G-36

Cylindrical RCS Far-Field Transformation by Using Array-Factor

H. Suzuki<sup>1</sup>, T. Kado<sup>1</sup>, K. Saitoh<sup>1</sup>, H. Kobayashi<sup>2</sup>, *<sup>1</sup>Keycom Corp., JAPAN, <sup>2</sup>Niigata Univ., JAPAN*

## TH3G-37

Application of Information Theory Criteria in MUSIC Algorithm for Microwave Imaging

M. Pourahmadi<sup>1</sup>, M. Nakhkash<sup>2</sup>, A.A. Tadaion<sup>2</sup>, M. Babaeizadeh<sup>3</sup>, *<sup>1</sup>Islamic Azad Univ., IRAN, <sup>2</sup>Univ. of Yazd, IRAN, <sup>3</sup>Sharif Univ. of Technology, IRAN*

## TH3G-38

Fish Heart Motion Measurements with a Body-Contact Doppler Radar Sensor

N. Hafner, V. Lubecke, *Univ. of Hawaii, U.S.A.*

## TH3G-39

Digital Asynchronous Signal Interpolation and Clock Domain Crossing

B.T. Thiel, N. Zimmermann, R. Negra, *RWTH Aachen Univ., GERMANY*

## TH3G-40

On-Wafer Noise Figure Measurements of Millimeter-Wave LNA and Mixer

Y.-C. Chang<sup>1</sup>, S.-G. Lin<sup>1</sup>, H.-K. Chiou<sup>2</sup>, D.-C. Chang<sup>1</sup>, Y.-Z. Juang<sup>1</sup>, *<sup>1</sup>National Applied Research Lab., TAIWAN, <sup>2</sup>National Central Univ., TAIWAN*

## TH3G-41

Experimental Characterization of S-Matrix Reconstruction Transforms on Multiport Networks

C.-J. Chen<sup>1</sup>, T.-H. Chu<sup>2</sup>, *<sup>1</sup>National Taiwan Ocean Univ., TAIWAN, <sup>2</sup>National Taiwan Univ., TAIWAN*

## TH3G-42

On-Wafer MM-Wave V-Band Semi-Automatic Power Measurement System

H.-F. Hsiao<sup>1</sup>, S.-G. Lin<sup>1</sup>, H.-K. Chiou<sup>2</sup>, D.-C. Chang<sup>1</sup>, Y.-Z. Juang<sup>1</sup>, *<sup>1</sup>National Applied Research Lab., TAIWAN, <sup>2</sup>National Central Univ., TAIWAN*

## TH3G-44

Accuracy Investigation of the De-Embedding Technique Using Open and Short Patterns for On-Wafer RF Characterization

T. Hirano, K. Okada, J. Hirokawa, M. Ando, *Tokyo Institute of Technology, JAPAN*

## TH3G-45

Detecting Defects on Planar Circuits by Using Non-contacting Magnetic Probe

S.-M. Wu, T.-C. Wang, C.-H. Lan, *National Univ. of Kaohsiung, TAIWAN*

## TH3G-46

Electronics & Telecommunications Remote Laboratory for RF Transmitter and Power Amplifier Test

W. Kang<sup>1</sup>, H.-G. Jo<sup>2</sup>, H. Ku<sup>1</sup>, Y. Kim<sup>2</sup>, *<sup>1</sup>Konkuk Univ., REPUBLIC of KOREA, <sup>2</sup>Electronics and Telecommunications Research Institute, REPUBLIC of KOREA*

## TH3G-47

Improved Perturbation Method of Complex Permittivity Using Correction Charts for TM<sub>010</sub> and TM<sub>020</sub> Modes of a Circular Cylindrical Cavity

S. Kaneko<sup>1</sup>, H. Kawabata<sup>2</sup>, Y. Kobayashi<sup>3</sup>, *<sup>1</sup>Saitama Univ., JAPAN, <sup>2</sup>Gunma Industrial Technology Center, JAPAN, <sup>3</sup>Sumtec, JAPAN*

## TH3G-48

An Experiment Study of Gold Nano-Film's Conductivity at Microwave and Terahertz Frequencies

Y. Poo<sup>1</sup>, R.-X. Wu<sup>1</sup>, X. Fan<sup>2</sup>, J.Q. Xiao<sup>2</sup>, B.-B. Jin<sup>1</sup>, *<sup>1</sup>Nanjing Univ., CHINA, <sup>2</sup>Univ. of Delaware, U.S.A.*

## TH3G-49

Antennas, Filters and Preamplifiers Designed for the Radio Detection of Ultra-High-Energy Cosmic Rays

M. Stephan, *for the Pierre Auger Collaboration, RWTH Aachen Univ., GERMANY*

## TH3G-50

Analysis of Cylindrical Cavities to Measure Accurate Relative Permittivity and Permeability of Rod Samples

H. Kawabata<sup>1</sup>, Y. Kobayashi<sup>2</sup>, S. Kaneko<sup>2</sup>, *<sup>1</sup>Tomo Industrial Technology Center, JAPAN, <sup>2</sup>Saitama Univ., JAPAN*

## TH3G-51

A Novel Interdigital Capacitor with Accurate Model for Left-Handed Metamaterials

H.-L. Zhang, X.-Y. Zhang, B.-J. Hu, *South China Univ. of Technology, CHINA*

## TH3G-52

Effects of Wool Style and Weave on the Surface Resistivity of Conductive Textiles

H. Shimasaki, M. Tanaka, M. Akiyama, *Kyoto Institute of Technology, JAPAN*

## TH3G-53

The Anisotropic Conductivity of Unidirectional Carbon Fibre Reinforced Polymer Laminates and Its Effect on Microstrip Antennas

T.J. Seidel<sup>1,3</sup>, A. Galehdar<sup>1,3</sup>, W.S.T. Rowe<sup>1,3</sup>, S. John<sup>1,3</sup>, P.J. Callus<sup>2,3</sup>, K. Ghorbani<sup>1,3</sup>, *<sup>1</sup>MIT Univ., AUSTRALIA, <sup>2</sup>Defence Science and Technology Organisation (DSTO), AUSTRALIA, <sup>3</sup>Defence Materials Technology Centre (DMTC), AUSTRALIA*

## TH3G-54

Downsized Left-Handed Waveguides with Ridge-Shaped Stubs

M. Kishihara<sup>1</sup>, I. Ohta<sup>2</sup>, H. Ikeuchi<sup>2</sup>, T. Kawai<sup>2</sup>, S. Matsumoto<sup>3</sup>, *<sup>1</sup>Okayama Prefectural Univ., JAPAN, <sup>2</sup>Univ. of Hyogo, JAPAN, <sup>3</sup>Furuno Electric Co., Ltd., JAPAN*

## TH3G-55

Rigorous Field Analysis of Step Discontinuity Based on Mode Theory for Thin-Film Multilayered 3-D Optical Waveguide

D. Kaise, T. Hiraoka, J.-P. Hsu, T. Anada, *Kanagawa Univ., JAPAN*

## TH3G-56

Modify-T Long Microstrip Line Compose by Integrated Passive Components

S.-M. Wu, Y.-H. Chen, S.-W. Guan, C.-T. Kuo, B.-H. Yu, C.-F. Yang, *National Univ. of Kaohsiung, TAIWAN*

## TH3G-57

PEEC Modeling of the Strip-Line in High Speed Circuit Design

F. Kong, W. Sheng, H. Wang, X. Ma, *Nanjing Univ. of Science and Technology, CHINA*

## TH3G-58

Study on Construction of Cost-Effective Printed Circuits at Millimeter-Wave Frequencies

H. Kawagashira, Y. Omote, F. Kuroki, *Kure National College of Technology, JAPAN*

## TH3G-59

A Closed-Form Formula for Propagation Characteristics of Substrate Integrated Waveguide

M. Salehi, E. Mehrshahi, *Shahid Beheshti Univ., IRAN*



# OPEN FORUM (POSTER) SESSIONS

10:00 – 11:30

Friday, December 10

## Session FR1G

Room G (315)

Chair : M. Kawashima, *NTT Corp., JAPAN*

### FR1G-01

A Compact 2×2 Circularly Polarized Antenna Array for Energy Harvesting

C.S. Ong<sup>2</sup>, M.F. Karim<sup>1</sup>, L.C. Ong<sup>1</sup>, T.M. Chiam<sup>1</sup>, A. Alphones<sup>2</sup>, <sup>1</sup>*Institute for Infocomm Research, SINGAPORE*, <sup>2</sup>*Nanyang Technological Univ., SINGAPORE*

### FR1G-02

Dielectric Guide Cassegrain Antennas with Ring Focus Parabolic Reflector

A. Kezuka, K. Igarashi, G. Yoshida, *Japan Radio Co., Ltd., JAPAN*

### FR1G-03

Tunable Meander-Type Antenna Integrated with a Bluetooth Module in PCB Board

J.H. Yoon<sup>1</sup>, Y.C. Rhee<sup>2</sup>, S.M. Lee<sup>3</sup>, W.S. Kim<sup>4</sup>, <sup>1</sup>*Silla Univ., REPUBLIC of KOREA*, <sup>2</sup>*Kyungnam Univ., REPUBLIC of KOREA*, <sup>3</sup>*Jeju Univ., REPUBLIC of KOREA*, <sup>4</sup>*Korea Evaluation Institute of Industrial Technology, REPUBLIC of KOREA*

### FR1G-04

Supercompact Multiband Metamaterial Antenna Based on Composite Right / Left-Handed Transmission Line

L. He, Z. Yong, Y. Wang, *The Hong Kong Polytechnic Univ., HONG KONG*

### FR1G-05

A Novel UWB Time-Domain Antenna Based on GA

Z.-M. Xie, H.-H. Ding, *South China Univ. of Technology, CHINA*

### FR1G-06

Leaky Wave Antenna Based on Composite Right / Left Handed Substrate Integrated Waveguide

C. Jin<sup>1</sup>, A. Alphones<sup>1</sup>, O.L. Chuen<sup>2</sup>, <sup>1</sup>*Nanyang Technological Univ., SINGAPORE*, <sup>2</sup>*Institute for Infocomm Research, SINGAPORE*

### FR1G-07

Two Feed Shorted Annular Patch

L.-N. Wu<sup>1</sup>, X.-C. Zhang<sup>1</sup>, C.-M. Tong<sup>1,2</sup>, X.-T. Fang<sup>1</sup>, <sup>1</sup>*Air Force Engineering Univ, CHINA*, <sup>2</sup>*South East Univ, CHINA*

### FR1G-08

Investigation on Resonance Frequency of Circular Sector Microstrip Antenna and Estimation of It by Artificial Neural Network

S.H. Jam, M. Kalantari, *Shiraz Univ. of Technology, IRAN*

### FR1G-09

Dual-Band Patch Antenna with Electromagnetic Bandgap Structure

H.-N. Wang, F.-C. Chen, *National Chiao Tung Univ., TAIWAN*

### FR1G-10

Investigations into a Circular Ring with Variable Length Arc Element for Phasing Wideband Reflectarray

Y. Li<sup>1</sup>, M.E. Bialkowski<sup>1</sup>, K.H. Sayidmarie<sup>2</sup>, N.V. Shuley<sup>1</sup>, <sup>1</sup>*Univ. of Queensland, AUSTRALIA*, <sup>2</sup>*Univ. of Mosul, IRAQ*

### FR1G-12

Pattern Reconfigurable Micro-Strip Patch Array Antenna Using Switchable Feed-Network

H. M. Lee, *Kyonggi Univ., REPUBLIC of KOREA*

### FR1G-13

Pattern Reconfigurable Antenna for a Wireless Sensor Network Sink Node

K.S. Hwang, J. Ahn, K.-J. Kim, H.K. Yoon, Y.J. Yoon, *Yonsei Univ., REPUBLIC of KOREA*

### FR1G-14

An Inverted-L Antenna Based on Finite Ground Plane with Zigzag Structure

B. Yuan, X. Wang, N. Zheng, Y. Chen, *Shanghai Jiao Tong Univ., CHINA*

### FR1G-15

Small Monopole Antenna for UWB and Wireless LAN Application

H.-C. Tang<sup>1</sup>, K.-H. Lin<sup>1</sup>, E.-C. Lee<sup>2</sup>, <sup>1</sup>*National Sun Yat-Sen Univ., TAIWAN*, <sup>2</sup>*Air Force Institute of Technology, TAIWAN*

### FR1G-16

A Novel Beam Controlled U-Slot Microstrip Antenna with EBG Structure

H. Wang, W. Sun, X. Ma, W. Sheng, *Nanjing Univ. of Science and Technology, CHINA*

### FR1G-17

Antipodal Linearly Tapered Slot Antenna Using Unequal Half-Circular Slotted Sides for Gain Improvements

D.-M. In, S. Pyo, H.-S. Lee, M.-J. Lee, Y.-S. Kim, *Korea Univ., REPUBLIC of KOREA*

### FR1G-18

Reduced Size Harmonic Suppressed Fractal Dipole Antenna with Reconfigurable Feature

S.A. Hamzah, M. Esa, N.N.N.A. Malik, *Universiti Teknologi Malaysia, MALAYSIA*

### FR1G-20

Circular Polarized Small Antenna based Metamaterial Coplanar-Waveguide (CPW) Transmission Line

J. Choi, S. Lim, *Chung-Ang Univ., REPUBLIC of KOREA*

### FR1G-21

A Triple-Feed Y-Shaped Slot Antenna for Metallic RFID Tag Design

S.L. Chen<sup>1</sup>, K.H. Lin<sup>2</sup>, R. Mittra<sup>3</sup>, H.L. Su<sup>4</sup>, <sup>1</sup>*China Steel Corp., TAIWAN*, <sup>2</sup>*National Sun Yat-sen Univ., TAIWAN*, <sup>3</sup>*Pennsylvania State Univ., U.S.A.*, <sup>4</sup>*National Pingtung Institute of Commerce, TAIWAN*

### FR1G-22

Dual Band Circularly Polarized Antenna with CPW Feeding Structure

O.H. Hassan, S.I. Shams, A.M.M.A. Allam, *German Univ. in Cairo (GUC), EGYPT*

### FR1G-23

Design of Uniform Aperture Field Distribution with No-Grating Lobes on Traveling Type of Slit Array Antenna Made by Copper-Clad Dielectric Substrate at 60GHz

M. Nakamura, M. Okiyokota, F. Kuroki, *Kure National College of Technology, JAPAN*

### FR1G-24

A Compact Multiband Planar Antenna for DCS-1900 / PCS / UMTS / WCDMA-2000 / WLAN and WiMAX Applications

M.A. Eldewiny, S.I. Shams, A.M.M. Allam, *German Univ. in Cairo (GUC), EGYPT*

### FR1G-26

Reconfigurable Conformal Antenna Array for Non-Rigid Platforms

S.M. Jain<sup>1</sup>, S.K. Koul<sup>2</sup>, A. Basu<sup>2</sup>, M.P. Abegaonkar<sup>2</sup>, <sup>1</sup>*Aerial Delivery Res. and Dev. Estt, INDIA*, <sup>2</sup>*Indian Institute of Technology, INDIA*

### FR1G-27

Active Compact Multilayer Microstrip Quadruple Polarized Antenna

A. Abeygunasekera, C. Free, *Univ. of Surrey, U.K.*

### FR1G-28

Design of Conformal Active Coplanar Feeding Slot Antenna

Y.-M. Lee<sup>1</sup>, H.-C. Teng<sup>2</sup>, S. Cherng<sup>3</sup>, A.-C. Yeh<sup>3</sup>, S.T. Wang<sup>1</sup>, <sup>1</sup>*I-Shou Univ., TAIWAN*, <sup>2</sup>*ROC Military Academy, TAIWAN*, <sup>3</sup>*Chengshiu Univ., TAIWAN*

### FR1G-29

Frequency Tunable Zeroth-Order Resonant Antenna by Using RF MEMS on Slotted Ground Plane

Y. Jang, J. Choi, S. Lim, *Chung-Ang Univ., REPUBLIC of KOREA*

### FR1G-30

A Reconfigurable Antenna System Consisting of Post-Wall E-Plane Horns

R.-B. Hwang<sup>1</sup>, H.-Y. Yen<sup>1</sup>, C.-S. Yang<sup>1</sup>, C.-Y. Chin<sup>1</sup>, Y.-L. Tasi<sup>1</sup>, J.-D. Tseng<sup>2</sup>, Y.-D. Lin<sup>1</sup>, <sup>1</sup>*National Chiao-Tung Univ., TAIWAN*, <sup>2</sup>*National Chin-Yi Univ. of Technology, TAIWAN*

### FR1G-31

Azimuth Estimation in Periodic Linear Sparse Array by Modified Amplitude Comparison Monopulse Radar

A. Gupta, T.H. Fickenscher, R. Herschel, M. Holters, J. Hinz, *Helmut Schmidt Univ., GERMANY*

### FR1G-32

Fast Transmit Antenna Selection Scheme Employing Block Diagonalization for Multiuser MIMO System

F. Wang, M.E. Bialkowski, *The Univ. of Queensland, AUSTRALIA*

### FR1G-33

Effect of Mutual Coupling between UE Transmitted Elements on WCDMA STOB MIMO System Performance

H.-L. Peng, J.-F. Mao, W.-Y. Yin, *Shanghai Jiao Tong Univ., CHINA*

### FR1G-34

Novel Design for Reducing Mutual Coupling and Signal Correlation in Diversity Handset Antennas

A.S. Andrenko, T. Yamagajo, *Fujitsu Lab. Ltd., JAPAN*

### FR1G-35

Dual-Band Mobile Angle of Arrival Estimator

P. Sooksumrarn, M. Krairiksh, *King Mongkut's Institute of Technology Ladkrabang, THAILAND*

### FR1G-36

Investigation of Path Loss Models for Fixed WiMAX Receivers in 2360-2390MHz

M. Roslee, S.P. Thiagarajah, *Multimedia Univ., MALAYSIA*

### FR1G-37

Ka- and Ku-Band Satellite Availability and Frequency Diversity Characteristics During Rain Using State Transition Matrix

T. Teramoto<sup>1</sup>, S. Chihara<sup>1</sup>, W. Chujo<sup>1</sup>, T. Manabe<sup>2</sup>, S. Yamamoto<sup>3</sup>, A. Tsuzuku<sup>1</sup>, <sup>1</sup>*Meijo Univ., JAPAN*, <sup>2</sup>*Osaka Prefecture Univ., JAPAN*, <sup>3</sup>*NICT, JAPAN*

### FR1G-38

Analysis of Spectrum Occupation in the 3-50MHz Band in the Korean Peninsula

J. Lee<sup>1</sup>, H. Hong<sup>1</sup>, J. Lim<sup>2</sup>, G. Park<sup>3</sup>, <sup>1</sup>*ETRI, REPUBLIC of KOREA*, <sup>2</sup>*Radio Research Agency (RRA), REPUBLIC of KOREA*, <sup>3</sup>*Central Radio Management Office (CRMO), REPUBLIC of KOREA*

### FR1G-39

UWB Ranging with Antenna Proximity to the Human Head

M. Dashti<sup>1</sup>, A. Khatun<sup>2</sup>, T. Laitinen<sup>2</sup>, A.A.H. Azremi<sup>2</sup>, K. Haneda<sup>2</sup>, M. Ghoraiishi<sup>1</sup>, J. Takada<sup>1</sup>, <sup>1</sup>*Tokyo Institute of Technology, JAPAN*, <sup>2</sup>*Aalto Univ. School of Science and Technology, FINLAND*

### FR1G-40

Noise Sensitivity Analysis of Spherical Wave Modelling of Radio Channels Using Linear Scanners

A. Khatun, T. Laitinen, P. Vainikainen, *Aalto Univ. School of Science and Technology, FINLAND*

### FR1G-41

Microwave Propagation in a Surface Atmosphere Layer on Land-Sea Boundary

I. Shirokov<sup>1</sup>, Y. Gimpilevich<sup>1</sup>, G. Jandieri<sup>2</sup>, <sup>1</sup>*Sevastopol National Technical Univ., UKRAINE*, <sup>2</sup>*Georgian Technical Univ., GEORGIA*

### FR1G-42

Generation of a Field with a Laplacian-Distributed Power Azimuth Spectrum Scattered by a Single Cluster in a MIMO-OTA Test System Based on Multiple Probe Antennas

T. Laitinen<sup>1</sup>, P. Kyösti<sup>2</sup>, T. Jämsä<sup>2</sup>, P. Vainikainen<sup>1</sup>, *Aalto Univ. School of Science and Technology, FINLAND*, <sup>2</sup>*Elektröbit Oy, FINLAND*

# OPEN FORUM (POSTER) SESSIONS

Friday, December 10

15:00 – 16:30

## Session FR3G

Room G (315)

**Chair : M. Kawashima, NTT Corp., JAPAN**

### FRIG-43

Impulse Response Model for the Cubicle Environments at 60GHz

H. Sawada<sup>1</sup>, K. Fujita<sup>1</sup>, S. Kato<sup>1</sup>, K. Sato<sup>2</sup>, H. Harada<sup>2</sup>,  
<sup>1</sup>Tohoku Univ., JAPAN, <sup>2</sup>National Institute of Information and Communications Technology (NICT), JAPAN

### FRIG-44

Method of Reducing Antenna RCS Using Bionics Principle

W. Jiang, S.-X. Gong, Y. Liu, Y.-P. Li, T. Hong, Xidian Univ., CHINA

### FRIG-45

A General Layer Coordinate Transformaiton Method for Invisibility Cloak

Y. Luo<sup>1,2</sup>, L. He<sup>1</sup>, Y. Wang<sup>1</sup>, S. Zhu<sup>2</sup>, <sup>1</sup>The Hong Kong Polytechnic Univ., HONG KONG, <sup>2</sup>East China Normal Univ., CHINA

### FRIG-46

Electromagnetic Scattering from Layered Rough Surfaces with a Buried Cylinder

W.-J. Ji<sup>1</sup>, C.-M. Tong<sup>2</sup>, <sup>1</sup>Air Force Engineering Univ., CHINA, <sup>2</sup>South East Univ., CHINA

### FRIG-47

A Note on the Singularity Extraction Technique in Solving Scattering Problems for Bodies of Revolution

P. Wang, G. Xiao, Shanghai Jiao Tong Univ., CHINA

### FRIG-48

Analysis of Wireless Energy Transfer to Multiple Devices Using CMT

J.-W. Kim<sup>1</sup>, H.-C. Son<sup>2</sup>, D.-H. Kim<sup>1</sup>, K.-H. Kim<sup>2</sup>, Y.-J. Park<sup>1,2</sup>, <sup>1</sup>Univ. of Science and Technology, REPUBLIC of KOREA, <sup>2</sup>Korea Electrotechnology Research Insitute, REPUBLIC of KOREA

### FRIG-50

Debye Series Analysis of Radiation Pressure Force Exerted on a Sphere Induced by Laser-Sheet Beam

R. Li, X. Han, Z. Wu, F. Lu, Xidian Univ., CHINA

### FR3G-01

Improved Meshless Method Using Direct Shape Function for Computational Electromagnetics

H. Razmjoo, M. Movahhedi, A. Hakimi, Shahid Bahonar Univ. of Kerman, IRAN

### FR3G-02

Acceleration of Finite Difference Time Domain Method Using Cell Broadband Engine Processor

S. Watanabe, O. Hashimoto, Aoyama Gakuin Univ., JAPAN

### FR3G-03

Generalized Heat Transition Matrix for Multi-Domain Electro-Thermal Analysis

Y. Zhou, G. Xiao, J. Mao, Shanghai Jiao Tong Univ., CHINA

### FR3G-04

Development of the Nearly PML for Four-Stages Split-Step Unconditionally-Stable FDTD Method

Y.-D. Kong, Q.-X. Chu, South China Univ. of Technology, CHINA

### FR3G-05

Numerical Determination of Nuclear Magnetic Resonance Frequency of the Single-Qubit Operation in Kane's Quantum Computer

H. Mirzaei<sup>1</sup>, H.T. Hui<sup>1</sup>, H.S. Lui<sup>2</sup>, <sup>1</sup>National Univ. of Singapore, SINGAPORE, <sup>2</sup>Chalmers Univ. of Technology, SWEDEN

### FR3G-06

To Study an Accurate Method for Analysis of Substrate Integrated Waveguide

H. Sadreazami, E. Mehrshahi, E. Abaei, Shahid Beheshti Univ., IRAN

### FR3G-09

Sensor Network Installing SAW Sensors for Living and Care Environments

M. Hikita, Y. Kato, J. Hosaka, Kogakuin Univ., JAPAN

### FR3G-11

A New Approach for Radiation Pattern Measurement of RFID Tag Antenna Under Chip-Loaded Condition Using Friis Equation

F.-Y. Kuo, C.-Y. Chiang, H.-T. Hsu, T.-J. Huang, R.-S. Sung, Yuan Ze Univ., TAIWAN

### FR3G-12

The Composite Scattering of Target and Sea Surface in Near Field

X. Wang<sup>1,2</sup>, Z. Liang<sup>2</sup>, Y. Wu<sup>2</sup>, R. Li<sup>1</sup>, Z. Wu<sup>1</sup>, <sup>1</sup>Xidian Univ., CHINA, <sup>2</sup>National Key Lab. of Electromagnetical Environmental Research, CHINA

### FR3G-13

Broadband Electromagnetic Field Strength Sensors for 40-300GHz Based on Planar Log Per Antennas and High-Speed Schottky Diodes

M. Salhi, T.K. Ostmann, T. Schrader, Physikalisch-Technische Bundesanstalt (PTB), GERMANY

### FR3G-15

A Circularly-Polarized Microstrip Grid Array Antenna for 60GHz Radios

B. Zhang, Y.P. Zhang, Nanyang Technological Univ., SINGAPORE

### FR3G-17

Design of a Miniature Dual-Band CPW Monopole Ceramic Antenna

K.-H. Chen<sup>1</sup>, Y.-T. Hsieh<sup>2</sup>, C.-M. Cheng<sup>2</sup>, C.-F. Yang<sup>3</sup>, Z.-W. Jhang<sup>2</sup>,  
<sup>1</sup>Tung Fang Institute of Technology, TAIWAN, <sup>2</sup>Southern Taiwan Univ., TAIWAN, <sup>3</sup>National Univ. of Kaohsiung, TAIWAN

### FR3G-18

Dual-Band Aperture-Coupled Patch Antenna for RFID Mobile Terminal Applications

F.-Y. Kuo, P.-H. Pan, C.-Y. Chiang, H.-T. Hsu, H.-T. Chou, Yuan Ze Univ., TAIWAN

### FR3G-19

Ultra-Wideband Planar Monopole Antenna

Y. Gao, Z. Zhang, W. Chen, Z. Feng, Tsinghua Univ., CHINA

### FR3G-20

Low Cost 24GHz Patch Array Antenna for High Sensitivity EM Sensor

Y.-B. Jung<sup>1</sup>, D.-Y. Park<sup>2</sup>, C.W. Jung<sup>2</sup>, <sup>1</sup>Electronics and Telecommunications Research Institute (ETRI), REPUBLIC of KOREA, <sup>2</sup>Seoul National Univ. of Technology, REPUBLIC of KOREA

### FR3G-21

Novel Design of Planar Multi-Band U-Shaped Monopole Antenna with Compact Operation for WiMAX Application

J.-H. Lu, W.-C. Chou, National Kaohsiung Marine Univ., TAIWAN

### FR3G-22

Compact Printed Hepta-Band Monopole Antenna for Mobile Devices

Y.-J. Chi, F.-C. Chen, National Chiao Tung Univ., TAIWAN

### FR3G-23

Creating Multiple Band Notches in An Extremely Wideband Printed Monopole Antenna

J. Liu<sup>1</sup>, K.P. Esselle<sup>1</sup>, S. Zhong<sup>2</sup>, <sup>1</sup>Macquarie Univ., AUSTRALIA, <sup>2</sup>Shanghai Univ., CHINA

### FR3G-24

Application of Lebesgue Fractal Structures for Multiband and Circularly Polarized Microstrip Antennas

H. Oraizi, S. Hedayati, Iran Univ. of Science and Technology, IRAN

### FR3G-25

Quad-Band PIFA Design Using Folded and Parasitic Strips

C. Hsieh, C.-H. Lee, K. Huang, C.-C. Hung, T. Chiu, National Central Univ., TAIWAN

### FR3G-26

Printed a Compact Dual-Band Monopole Antenna on Ceramic Substrate

S.-M. Wu<sup>1</sup>, C.-F. Yang<sup>1</sup>, J.-H. Tsai<sup>2</sup>, M.-Y. Fu<sup>2</sup>, C.-M. Cheng<sup>3</sup>, C.-Y. Huang<sup>4</sup>, <sup>1</sup>National Univ. of Kaohsiung, TAIWAN, <sup>2</sup>Chinese Air Force Academy, TAIWAN, <sup>3</sup>Southern Taiwan Univ., TAIWAN, <sup>4</sup>National Kaohsiung Normal Univ., TAIWAN

### FR3G-27

Compact Tri-Band Antenna with a Parasitic Loop Strip

K. Huang, S.-Y. Wu, C. Hsieh, C.-C. Hung, T. Chiu, National Central Univ., TAIWAN

### FR3G-28

Internal Mobile Antenna for LTE / DCN / US-PCS

W.Y. Lee<sup>1</sup>, Y.S. Jeong<sup>2</sup>, S.H. Lee<sup>1</sup>, J.R. Oh<sup>1</sup>, K.S. Hwang<sup>1</sup>, Y.J. Yoon<sup>1</sup>, <sup>1</sup>Yonsei Univ., REPUBLIC of KOREA, <sup>2</sup>LG Electronics, REPUBLIC of KOREA

### FR3G-29

A Compact Wide-Band Triple-Band Two-Strip Monopole Antenna for Wireless Handsets

J.-F. Li, Q.-X. Chu, South China Univ. of Technology, CHINA

### FR3G-30

A Novel RFID Tag Antenna for Matching Complex Impedances on 915MHz and 2.45GHz Bands

W. Lin, Q.-X. Chu, South China Univ. of Technology, CHINA

### FR3G-31

Internal MIMO Antenna to Selectively Control Isolation Characteristic by Isolation Aid in Multiband Including LTE Band

S. Lee, J.W. Lee, Karam Solution, REPUBLIC of KOREA

# OPEN FORUM (POSTER) SESSIONS

15:00 – 16:30

Friday, December 10

---

**FR3G-32**

Compact Textile Patch Antenna for Wearable Fabric Applications

S. Ha<sup>1</sup>, S. Lee<sup>2</sup>, H.-J. Yoo<sup>2</sup>, C. Jung<sup>1</sup>, <sup>1</sup>*Seoul National Univ. of Technology, REPUBLIC of KOREA*, <sup>2</sup>*Korea Advanced Institute of Science and Technology (KAIST), REPUBLIC of KOREA*

---

**FR3G-33**

A Compact Coupled-Fed Penta-band Antenna for Mobile Phone Application

C.-L. Tang<sup>1</sup>, J.Y. Sze<sup>2</sup>, Y.F. Wu<sup>2</sup>, <sup>1</sup>*Auden Techno Corp., TAIWAN*, <sup>2</sup>*National Defense Univ., TAIWAN*

---

**FR3G-34**

Design of a Novel Chipless RFID Tag Using a Simple Bandstop Resonator

T. Kim, U. Kim, J. Kwon, J. Choi, *Hanyang Univ., REPUBLIC of KOREA*

---

**FR3G-36**

Compact UWB Diversity Antenna for Mobile Phone Applications

S. Seo, B. Lee, *Kwangwoon Univ., REPUBLIC of KOREA*

---

**FR3G-37**

Compact Square Quadrifilar Spiral Antenna with Circular Polarization for UHF Mobile RFID Reader

W.-I. Son<sup>1</sup>, H.-L. Lee<sup>1</sup>, M.-Q. Lee<sup>2</sup>, S.-B. Min<sup>3</sup>, J.-W. Yu<sup>1</sup>, <sup>1</sup>*Korea Advanced Institute of Science and Technology (KAIST), REPUBLIC of KOREA*, <sup>2</sup>*Univ. of Seoul, REPUBLIC of KOREA*, <sup>3</sup>*Actenna Corp., REPUBLIC of KOREA*

---

**FR3G-38**

Simultaneous Switching Noise (SSN) Suppression with a New Embedded Uniplanar Compact Electromagnetic Bandgap (EUCBEG) Structure

M. Arghiani, *Ferdowsi Univ. of Mashhad, IRAN*

---

**FR3G-39**

6.8-10GHz Frequency Synthesizer for Software-Defined-Radio

H.-C. Chen<sup>1</sup>, S.-S. Lu<sup>2</sup>, <sup>1</sup>*National Taiwan Univ. of Science and Technology, TAIWAN*, <sup>2</sup>*National Taiwan Univ., TAIWAN*

---

**FR3G-40**

A 3.26-to-4.38GHz Divide-by-3 Injection-Locked Frequency Divider

P.-C. Ke, Y.-C. Chiang, *National Chung Hsing Univ., TAIWAN*

---

**FR3G-41**

Non-Linear AC/DC Mixed-Mode RF Simulation to Estimate EVM Temperature Drift of a GaAs pHEMT Wideband IQ Modulator IC

K. Ihara, *Olympus Communication Technology of America, U.S.A.*

---

**FR3G-42**

A Chargepump with Enhanced Current Matching and reduced Clock-Feedthrough in Wireless Sensor Nodes

M. Jung, A. Ferizi, R. Weigel, *Univ. of Erlangen-Nuremberg, GERMANY*

---

**FR3G-43**

A DC to 4GHz Fully Differential Wideband digitally Controlled Variable Gain Amplifier

T.B. Kumar, K. Ma, K.S. Yeo, S. Mou, M. Nagarajan, J. Gu, K.M. Lim, Y. Lu, H. Yu, *Nanyang Technological Univ., SINGAPORE*

---

**FR3G-44**

Large Signal Model and CAD Implementation of Impact Ionization for FET Devices

I. Angelov, M. Ferdahl, *Chalmers Univ., SWEDEN*

---

**FR3G-46**

Robust MM-Wave Large-Signal Time-Domain FET Model

S. Asadi, M.C.E. Yagoub, *Univ. of Ottawa, CANADA*

---

**FR3G-47**

Nonlinear Behavior Characterization of RF Active Devices Using Impedance-Dependence X-parameters

C.-S. Chiu<sup>1</sup>, S.-Y. Lin<sup>1</sup>, B.-Y. Chen<sup>1</sup>, K.-M. Chen<sup>1</sup>, G.-W. Huang<sup>1,2</sup>, <sup>1</sup>*National Nano Device Lab., TAIWAN*, <sup>2</sup>*National Chiao Tung Univ., TAIWAN*

---

**FR3G-49**

Characterization of Left-Handed Traveling-Wave Field Effect Transistors

S. Nakagawa, K. Narahara, *Yamagata Univ., JAPAN*

---

**FR3G-50**

Complete Electromagnetic Simulation of HEMT Switch Circuit

Y. Zhu, C. Wei, G. Nohra, C. Zhang, O. Klimashov, H. Yin, D. Bartle, *Skyworks Solutions Inc., U.S.A.*

---

**FR3G-52**

An Important Relation for Determining a High-Efficiency RF-DC Conversion Circuit

S. Imai, K. Fujimori, M. Sanagi, S. Nogi, *Okayama Univ., JAPAN*

---

**FR3G-53**

High-Frequency Characterization of CMOS Active Inductors

C. Andrei, *NXP Semiconductors, FRANCE*

# WORKSHOPS

**Tuesday, December 7 9:00 – 12:00**

**Room C (303)**

## WS1C

### Progress and Prospects of RF-MEMS

*Organizer:* Hiroshi Okazaki, *NTT DOCOMO, INC., JAPAN*

*Chair:* Hiroshi Okazaki, *NTT DOCOMO, INC., JAPAN*

MEMS devices have been expected to provide a major impact on RF architectures by reducing size and power dissipation, and adding new functions, such as reconfigurability. Because filters and switches are key devices for RF-MEMS utilization, they are selected to be present in this work shop.

The first and second talks are related to filters. The first one will present FBAR technology that has been widely used as filters and duplexers in the mobile phone. It also presents a coupled resonator filter that shows promise as a low phase noise device with tunability for VCO applications.

The second talk will present a methodology for designing and implementing tunable cavity-based RF-MEMS filters. The filters are based on evanescent-mode cavities that can be tuned by MEMS diaphragms appropriately placed over their capacitive posts. Analog tuning ratios of over 2:1 can be realized in this technique while maintaining a quality factor above 400-650.

The third and last talks are related to switches. The third one will present a unique RF-MEMS switch. The original mechanical structure based on a simply supported membrane enhances reliability by active restoring force and controlled positive/negative out of plane moving. Detailed results and advantages will be exposed concerning hot switching and lifetime. The last talk will present a commercialized ohmic contact RF MEMS SPDT switch, which has a low insertion loss of 1.0 dB and a high isolation of 40 dB, up to 10 GHz, and is packaged in  $5.2 \times 3.0 \times 1.8$  mm<sup>3</sup>. The technology developed for the switch will be presented.

WS1C-1 Applications of FBAR and CRF to the Field of Time and Frequency  
Rich Ruby, *Avago Technologies, U.S.A.*

WS1C-2 New Directions in MEMS for RF Front-Ends and Sensors  
Dimitrios Peroulis, *Purdue Univ., U.S.A.*

WS1C-3 A New Mechanical Structure to Enhance Reliability of RF MEMS Switches  
Karim Segueni, *DelfiMEMS, FRANCE*

WS1C-4 OMRON's Ohmic Contact RF MEMS Switch  
Tomonori Seki, *OMRON, JAPAN*

**Tuesday, December 7 9:00 – 12:00**

**Room D (304)**

## WS1D

### Channel Modeling and Simulator for Mobile Communications

*Organizers:* Teruya Fujii, *Softbank Mobile Corp., JAPAN*

Ryo Yamaguchi, *NTT DOCOMO, INC., JAPAN*

*Chair:* Koich Ogawa, *Panasonic Corp., JAPAN*

Multi-Input Multi-Output (MIMO) is one of the hottest technologies for mobile radio systems. In order to evaluate the performance of MIMO terminal accurately, we must use actual antennas mounted on the mobile terminal in actual multipath-rich propagation environments.

There are two types of OTA (Over-The-Air) schemes to create the environments equivalent to actual multipath-rich propagation environments in a test bed. One is a radio echoic chamber named "reverberation chamber" surrounded by 6-plate metallic walls. The other is a fading emulator which arranges a number of actual radiation antennas representing scattering objects. Both schemes have merits and demerits with regard to their accuracy, feasibility and cost for examples.

In this workshop, we present two types of OTA schemes from various points of view and show the performances of MIMO terminal which were obtained in a test bed by using the OTA schemes and in a real field test.

WS1D-1 MIMO-OTA Measurement Schemes for User Terminal Evaluation: Fading Emulator vs. Reverberation Chamber  
Yoshio Karasawa, *The Univ. of Electro-Communications, JAPAN*

WS1D-2 Spatial Correlation Characteristics to be observed in Spatial Channel Emulator for MIMO-OTA Testing  
Tetsuro Imai and Yoshiki Okano, *NTT DOCOMO, INC., JAPAN*

WS1D-3 Over the Air Testing of Multi-Antenna Terminals  
Pekka Kyösti, *Elektrobit, FINLAND*

WS1D-4 Effectiveness of a Fading Emulator Using a Dual-Band Handset MIMO Antenna by Comparison with a Propagation Test  
Atsushi Yamamoto, *Panasonic Corp., JAPAN*

**Tuesday, December 7 13:30 – 16:30**

**Room A (301)**

## WS2A

### Recent Trends and Prospects of Wide Bandgap Semiconductor Devices

*Organizers:* Masaaki Kuzuhara, *Fukui Univ., JAPAN*

Shoichi Narahashi, *NTT DOCOMO, INC., JAPAN*

*Chair:* Shoichi Narahashi, *NTT DOCOMO, INC., JAPAN*

Today, semiconductor devices play an important role to support highly-organized infrastructures such as internet or mobile communication systems where people can get necessary information whenever and wherever they want.

Wide bandgap semiconductor devices are expected to provide superior performances in RF signal processing fields as well as power switching applications compared with silicon-based semiconductor devices from the standpoint of higher operating frequency, higher breakdown voltage, and higher power density.

In particular, gallium nitride (GaN) devices have been developed for diversifying applications such as mobile base stations, automobile power units and millimeter-wave ICs; however, there still remain technical issues to extract their full potential.

This workshop introduces recent research and development



# WORKSHOPS

activities on GaN-based devices, including wireless power transmission application and large-signal device modeling. This workshop also discusses future prospects and challenges of wide bandgap semiconductor devices.

**WS2A-1** Application of GaN Devices to Wireless Power Transmission  
Yasuo Ohno, *Univ. of Tokushima, JAPAN*

**WS2A-2** On the Compact Equivalent Circuit Modeling of GaN FET  
Iltcho Angelov, *Chalmers Univ. of Technology, SWEDEN*

**WS2A-3** New Circuit Technologies for GaN HEMT Devices  
Koji Yamanaka, *Mitsubishi Electric Corp., JAPAN*

**WS2A-4** Advances in GaN HEMT MMIC Amplifiers  
Satoshi Masuda, *Fujitsu Ltd., JAPAN*

**Tuesday, December 7 13:30 – 16:30**

**Room B (302)**

## WS2B

### Recent Progress in Filters and Couplers

*Organizer:* Zhewang Ma, *Saitama Univ., JAPAN*

*Chair:* Zhewang Ma, *Saitama Univ., JAPAN*

With the constant evolution in telecommunication field, there are always strong technical and market demands for high performance microwave filters and couplers. This workshop presents recent progress in both the design methods and fabrication techniques of microwave filters and couplers.

The first talk focuses on two-dimensional design techniques of waveguide-type directional couplers, including substrate integrated waveguide (SIW) couplers and PTFE-filled waveguide couplers. The second talk provides discussions on many important aspects in the design and manufacturing of SIW filters, such as the choice of filter topologies and substrates, fabrications on various substrates, and tradeoffs between the efficient design and performance of SIW filters.

In the third talk, after multiple solutions of dual-band filters are described, a general design method of N-band planar filters is presented in order to develop multi-band filters in multi-mode/multi-band communication systems. The final talk introduces first a measurement method of the conductivity of interface between a metal film and a dielectric substrate. Then, examples are provided to show how to use the correctly evaluated interface conductivities to improve the fabrication process of conductor films in low temperature co-fired ceramics (LTCCs) and to better the design and performance of LTCC filters.

**WS2B-1** A Recent Trend in Waveguide-Type Directional Couplers —Focusing on Two-Dimensional Design Techniques—  
Isao Ohta<sup>1</sup> and Mitsuyoshi Kishihara<sup>2</sup>, <sup>1</sup>*Univ. of Hyogo*, <sup>2</sup>*Okayama Prefectural Univ., JAPAN*

**WS2B-2** Systematic Overview of Substrate Integrated Waveguide (SIW) Filters: Design and Performance Tradeoffs  
Xiao-Ping Chen and Ke Wu, *Ecole Polytechnique, CANADA*

**WS2B-3** N-Band Planar Filter  
Cedric Quendo, *Univ. of Brest, FRANCE*

**WS2B-4** Measurement Method of Interface Conductivity and Effect of Interface Conductivity on LTCC Filters  
Akira Nakayama and Hiromichi Yoshikawa, *KYOCERA Corp., JAPAN*

**Tuesday, December 7 13:30 – 16:30**

**Room C (303)**

## WS2C

### Tunable RF-Components and their Applications to Wireless Systems

*Organizer:* Makoto Taromaru, *Fukuoka Univ., JAPAN*

*Chair:* Makoto Taromaru, *Fukuoka Univ., JAPAN*

Necessity for tunable RF components is growing up as software defined radio (SDR) and reconfigurable radio technologies are being studied and developed toward “ubiquitous network society.”

This is because it is difficult for an analogue-to-digital converter to process the received signal in RF, IF, or even in baseband stage before the channel selection filter and the AGC amplifier due to the wide dynamic range of the signal. In other words, a tunable or switchable filter is necessary to suppress unwanted signals in the spectrum received.

This workshop presents some recent advancements of tunable components, especially on capacitors and filters, as well as exploring their technical practicability and pragmatic application for radio transceivers and systems.

**WS2C-1** Reconfigurable Front-End Utilizing Digitally Tunable Capacitors  
Rodd Novak, *Peregrine Semiconductor Corp., U.S.A.*

**WS2C-2** RF-MEMS Tunable Capacitor for Cellular Phones  
Tamio Ikehashi, *Toshiba Corp., JAPAN*

**WS2C-3** Tunable SAW/BAW Filters: Dream or Reality?  
Ken-ya Hashimoto, *Chiba Univ, JAPAN*

**WS2C-4** Research and Development on Tunable RF Devices for Reconfigurable  
Hiroshi Harada, *NICT, JAPAN*

**Tuesday, December 7 13:30 – 16:30**

**Room D (304)**

## WS2D

### Short-Range Wireless Communications and Technologies

*Organizer:* Kenjiro Nishikawa, *NTT Corp., JAPAN*

*Chair:* Tomohiro Seki, *NTT Corp., JAPAN*

Short-range / Near-field wireless communication systems and technologies have been rapidly evolving and exhibited many benefits for several applications such as; chip-to-chip interconnect, high-speed wireless data transmission, and wireless delivery of energy. These technologies provide cost-reduction of LSI / memory packaging, compactness, higher wireless transmission speed, and so on.

# WORKSHOPS

This workshop highlights recent achievements and discusses the challenges in this technical field.

Topics include, ThruChip Interface (TCI) technology which is an emerging wireless data link between stacked chips in a package, CMOS-based Large-Scale Radiating Integrated (LSRI) circuits and its application to Near-Field Direct Antenna Modulation (NFDAM), Short-range MIMO technology and its application to ultra-high-speed wireless link, and wireless power and information transmission technology for medical applications.

WS2D-1 ThruChip Interface  
Noriyuki Miura, *Keio Univ., JAPAN*

WS2D-2 Large-Scale Radiating Integrated Circuits  
Aydin Babakhani, *Rice Univ., U.S.A.*

WS2D-3 Short Range MIMO Technologies  
Kentaro Nishimori, *Niigata Univ., JAPAN*

WS2D-4 Wireless Power Delivery and Data Transmission for Miniature Medical Implants  
Ada Poon, *Stanford Univ., U.S.A.*

# SHORT COURSES

**Tuesday, December 7 9:00 – 12:00**

Room A (301)

## SC1A

### Modeling and Design Techniques for High Power Amplifiers and their Performance

*Organizers:* Kazutomi Mori, *Mitsubishi Electric Corp., JAPAN*

Koji Yamanaka, *Mitsubishi Electric Corp. JAPAN*

*Chairs:* Kazutomi Mori, *Mitsubishi Electric Corp., JAPAN*

Koji Yamanaka, *Mitsubishi Electric Corp. JAPAN*

SC1A-1 Linear Power Amplifier Design for Mobile Communication—From the Device to the Circuit—  
Bumman Kim, *Pohang Univ. of Science and Technology, KOREA*

PAs for the next generation wireless communication systems should be efficient as well as linear.

To introduce design technique of the linear PA, the nonlinear characteristics of transistors, i.e., FET and Bipolar are discussed.

Then, the linear PA design procedure is described. The highly efficient switching/saturated PAs become very important technology since advanced architectures can deliver the required linearity while preserving the efficiency.

Those PAs and transmitter architectures are also introduced. To cover the broad area of the PAs, it is assumed that audience has a basic knowledge of the PA design.

After ten years of intense research activities, metamaterials have become one of the most vibrant and promising field of radio science and technology. Following the discovery of novel electromagnetic concepts, such as negative refraction, super-resolution imaging and cloaking, an impressive number of novel metamaterial component, antenna and system concepts and applications have been developed over the past few years.

This course will present an up-to-date overview of metamaterial science and technology. It will first introduce the fundamentals of metamaterials, including basic definitions, historical milestones, an intuitive description of the main metamaterial properties, and the genesis of modern metamaterials.

Next, it will present the two classes of “conventional” metamaterials, the resonant-particle and the transmission-line metamaterials, showing their fundamental differences and similarities, and establishing their theoretical foundations, with a particular emphasis on composite right/left-handed (CRLH) transmission line metamaterials, which have lead to the most significant microwave applications of the field. Upon this basis, a suite of applications will be overviewed, including enhanced-bandwidth and multi-band components, tight broadband couplers, agile power combiners, real-time Fourier devices, smart leaky-wave and resonant antennas, active beam-shaping systems, refractors, meta-substrates and non-reciprocal radomes.

Finally, the novel concept of multi-scale metamaterials, believed by the author to prelude the next generation of metamaterials, will be discussed. Such materials are structured at different scales, the micro, nano and atomic scales, and their simultaneous exploitation of several of these scales leads to unprecedented opportunities for unprecedented microwave devices based on material dispersion, anisotropy and quantum engineering.

This next-generation metamaterials will be illustrated by the example of ferromagnetic nanowire metamaterials, whose unique properties of double ferromagnetic resonance, self-biasing, spin-torque and related novel applications will be briefly presented. Concluding remarks will summarize the course and discuss future directions of the field.

Room B (302)

## SC1B

### Electromagnetic Metamaterials and their Microwave Applications

*Organizer:* Atsushi Sanada, *Yamaguchi Univ., JAPAN*

*Chair:* Atsushi Sanada, *Yamaguchi Univ., JAPAN*

SC1B-1 Electromagnetic Metamaterials and their Microwave Applications  
Christophe Caloz, *École Polytechnique of Montréal, CANADA*

# EXHIBITION

Microwave Exhibition 2010 will be held in association with the 2010 Asia-Pacific Microwave Conference (APMC 2010) at the Exhibition Hall A and B in Pacifico Yokohama, the venue of the conference, from Wednesday, December 8 to Friday, December 10, 2010. More than 300 microwave-related companies from all over the world will display their latest products and services including systems, sub-systems, components, parts, materials, instruments and CAD softwares. The main language in the Exhibition Hall is Japanese. At the same time, the following attractive programs are also featured:

- Technical seminars on the new technologies and products presented by the exhibitors.
- Tutorial lectures related to foundations for microwave semiconductor devices, active and passive circuits, and mobile & fixed telecommunication systems, provided

in Japanese by Japanese authorities.

- The historical exhibition of microwave technologies in Japan, where more than 100 panels as well as products with respect to antennas, semiconductors, filters and systems will be displayed.
- The university exhibition, where more than twenty universities will demonstrate their unique research activities in the field of microwaves.

This exhibition is open to all visitors with no entrance fee. In order to enter, you need to show your participant badge, which is given to you after the free registration at the reception desk in the Exhibition Hall. The Conference participants in APMC 2010 can also enter the exhibition hall freely by showing the registration name tag. All visitors will be provided with a free guidebook.

## EXHIBITORS

(Following is the list of exhibiting companies as of August 31, 2010, and those who exhibited in 2009)

ADMOTEC INC.  
ADVANTEST CORP.  
AET, INC.  
AGILENT TECHNOLOGIES JAPAN, LTD.  
AI ELECTRONICS LTD.  
AMT, INC.  
AMTECHS CORP.  
ANRITSU CORP.  
ANSOFT JAPAN K.K.  
ARUMOTEC CORP.  
ASNICS CO., LTD.  
AT COMMUNICATIONS K.K.  
ATN JAPAN, LTD.  
AWR JAPAN K.K.  
CANDOX SYSTEMS, INC.  
CASCADE MICROTECH JAPAN  
CHRONIX INC.  
COMCRAFT CORP.  
CORNES DODWELL LTD.  
DAIKEN CHEMICAL CO., LTD.  
DEVICE CO., LTD.  
DIGITAL SIGNAL TECHNOLOGY, INC.  
E&C ENGINEERING K.K.  
ELECTRONIC NAVIGATION RESEARCH  
INSTITUTE  
EPOCH MICROELECTRONICS, INC.  
E-SONG EMC CO., LTD.  
ETS-LINDGREN JAPAN, INC.  
FARAD CORP.  
FRONTLYNK TECHNOLOGIES INC.  
FUJI DENKA INC.  
FUJITSU LTD.  
FURUKAWA C&B CO., LTD.  
FUSOH SHOJI CO., LTD.  
G. T. ELECTRONICS CORP.  
HIRAI SEIMITSU KOGYO CORP.  
HISOL, INC.  
HITACHI, LTD.  
HI-TECHNOLOGY TRADING, INC.  
HITTITE K.K.  
IDAQS CO., LTD.  
INNERTRON CO., LTD.  
INTERTEC CORP.  
ITOCHU TECHNO-SOLUTIONS CORP.

JUNKOSHA INC.  
KANSAI DENSHI INDUSTRY CO., LTD.  
KANTO ELECTRONIC APPLICATION  
DEVELOPMENT INC.  
KAWASHIMA MANUFACTURING CO., LTD.  
KEISOKU ENGINEERING SYSTEM CO., LTD.  
KEYCOM CORP.  
KODEN ELECTRONICS CO., LTD.  
KOZO KEIKAKU ENGINEERING INC.  
LPKF JAPAN CO., LTD.  
MAJ CO., LTD.  
MAYCOM JAPAN CO., LTD.  
MEL INC.  
MICRO DENSHI CO., LTD.  
MICROWAVE ABSORBERS INC.  
MICROWAVE FACTORY CO., LTD.  
MIDORIYA ELECTRIC CO., LTD.  
MINI-CIRCUITS YOKOHAMA, LTD.  
MITS ELECTRONICS  
MITSUBISHI ELECTRIC CORP.  
MITSUBISHI ELECTRIC METECS CO., LTD.  
MITSUBISHI ELECTRIC TOKKI SYSTEMS  
CORP.  
MITSUHIRO CO., LTD.  
MITSUNAMI CO., LTD.  
MIYAZAKI ELECTRIC WIRE & CABLE CO.,  
LTD.  
MORITA TECH CO., LTD.  
MPDEVICE CO., LTD.  
M-RF CO., LTD.  
NAGASE & CO., LTD.  
NAKA & CO., LTD.  
NAKAO CORP.  
NATIONAL INSTRUMENTS JAPAN CORP.  
NEC ELECTRONICS CORP.  
NET COMSEC CO., LTD.  
NETWELL CORP.  
NEW METALS AND CHEMICALS CO., LTD.  
NIHON DEMPY KOGYO CO., LTD.  
NIHON DENGYO KOSAKU CO., LTD.  
NIHON KOSHUHA CO., LTD.  
NIHON RADIAL K.K.  
NIPPON AIRCRAFT SUPPLY CO., LTD.  
NIPPON PILLAR PACKING CO., LTD.  
NPS, INC.  
NXP SEMICONDUCTORS JAPAN LTD.  
OMRON CORP.  
ORIENT MICROWAVE CORP.  
OSHIMA PROTOTYPE ENGINEERING CO., LTD.

PTM CORP.  
PTT CO., LTD.  
PVJ INC.  
R&K CO., LTD.  
RENESAA ELECTRONICS CORP.  
REPIC CORP.  
REPRORISE INC.  
RFTESTLAB CO., LTD.  
RICHARDSON ELECTRONICS, K.K.  
RIKEI CORP.  
RIKEN DENGU SEIZO CO., LTD.  
RIKEN ENVIRONMENTAL SYSTEM CO.,  
LTD.  
ROGERS JAPAN INC.  
ROHDE & SCHWARZ JAPAN K.K.  
SAIKA TECHNOLOGICAL INSTITUTE  
FOUNDATION  
SANKEN CORP.  
SEIKOH GIKEN CO., LTD.  
SEKI TECHNOTRON CORP.  
SHINKO PHOTO SERVICE INC.  
SHOSHIN CORP.  
SONNET GIKEN CO., LTD.  
SPC ELECTRONICS CORP.  
STACK ELECTRONICS CO., LTD.  
SUMITOMO ELECTRIC INDUSTRIES, LTD.  
SUSS MICROTEC K. K.  
SYSTEC RESEARCH INC.  
TAKITEK K. K.  
TAMA DEVICE CO., LTD.  
TAMAGAWA ELECTRONICS CO., LTD.  
TECDIA CO., LTD.  
TECHNOPROBE CO., LTD.  
TOKIN EMC ENGINEERING CO., LTD.  
TOKO TRADING INC.  
TOKODENSHI CO., LTD.  
TOKYO KEIKI INC.  
TOSHIBA CORP.  
TOYAMA DENKI BUILDING CO., LTD.  
TOYO CORP.  
TOYO MEDIC CO., LTD.  
TSS JAPAN CORP.  
U.S.HI-TECH INDUSTRIES JAPAN CORP.  
VEGA TECHNOLOGY INC.  
WAKA MANUFACTURING CO., LTD.  
WAKOH COMMUNICATION INDUSTRIAL  
CO., LTD.  
WAVE TECHNOLOGY INC.  
WIN SEMICONDUCTORS CORP.

# EXHIBITION

WIPL-D(JAPAN), INC.  
Y. K. CO., LTD.  
YOKOHAMA DENSHI SEIKO CO., LTD.  
YOKOWO CO., LTD.  
YUETSU SEIKI CO., LTD.

(The list of overseas exhibitors with Japanese Agent in 2009)

ACTENNA INC.  
ADVANCED CONTROL COMPONENTS INC.  
ADVANCED ELECTRONICS TECHNOLOGY ASSOCIATES, INC.  
ADVANCED MICROWAVE, INC.  
ADVANCED SEMICONDUCTOR  
ADVANCED SEMICONDUCTOR BUSINESS INC.  
ADVANCED TECHNICAL MATERIALS, INC.  
AEROFLEX/INMET  
AEROFLEX/KDI-INTEGRATED PRODUCTS  
AEROFLEX/WEINSCHL  
AEROTEK CO., LTD.  
AKON, INC.  
ALDETEC, INC.  
ALTRONIC RESEARCH, INC.  
AMCOM COMMUNICATIONS, INC.  
AMERICAN TECHNICAL CERAMICS CORP.  
AML COMMUNICATIONS INC.  
AMPLICAL CORP.  
ANADIGICS INC.  
ANADYNE, INC.  
ANAREN MICROWAVE, INC.  
ANTENNA RESEARCH ASSOCIATES, INC.  
APOLLO MICROWAVES LTD.  
APPLIED RESEARCH & PHOTONICS  
APPLIED SYSTEMS ENGINEERING, INC.  
ARRA, INC.  
ARRIS CXM  
ARTECH HOUSE, INC.  
ASB INC.  
ATLANTIC MICROWAVE CORP./COBHAM DEFENSE ELECTRONIC SYSTEMS  
ATLANTIC MICROWAVE LTD.  
ATLANTIC POSITIONING SYSTEMS/  
COBHAM DEFENSE ELECTRONIC SYSTEMS  
AVAGO TECHNOLOGIES LTD.  
AZIMUTH SYSTEMS, INC.  
BABCOCK, INC.  
BLUEGIGA TECHNOLOGIES OY  
BLUETEST AB  
BOONTON ELECTRONICS  
BOWEI INTEGRATED CIRCUITS CO., LTD.  
BSC FILTERS LTD.  
B&Z TECHNOLOGIES  
CALIFORNIA TUBE LABORATORY  
CAP WIRELESS, INC.  
CARLISLE INTERCONNECT TECHNOLOGIES  
CENTELLAX INC.  
CERAGON NETWORK LTD.  
CERNEX, INC.  
CHANNEL MICROWAVE CORP.  
CHARTER ENGINEERING, INC.  
COBHAM ANTENNA SYSTEMS, MICROWAVE ANTENNAS  
COBHAM DES ATLANTIC MICROWAVE CORP.  
COBHAM DES ATLANTIC POSITIONING SYSTEMS  
COBHAM DES CONTINENTAL MICROWAVE DIVISION

COBHAM DES M/A-COM INC.  
COBHAM DES NURAD TECHNOLOGIES  
COBHAM DES REMEC DEFENSE & SPACE, INC.  
COBHAM DES SENSORS AND ANTENNA SYSTEMS, LANSDALE  
COLBY INSTRUMENTS, INC.  
COLEMAN MICROWAVE CO.  
COMOTECH CORP.  
COMPEX CORP.  
COMSOL AB  
COMTECH PST CORP.  
CONTINENTAL MICROWAVE/COBHAM DEFENSE ELECTRONIC SYSTEMS  
COOPER BUSSMANN  
CORNELL DUBILIER ELECTRONICS, INC.  
CREE INC.  
CST-COMPUTER SIMULATION TECHNOLOGY AG  
C-TECH CO., LTD.  
CTT INC.  
CUMING CORP.  
CUSTOM MICROWAVE COMPONENTS, INC.  
CUSTOM MICROWAVE, INC.  
CYNERGY3 COMPONENTS LTD.  
DAICO INDUSTRIES, INC.  
DBM  
DIAMOND ANTENNA & MICROWAVE CORP.  
DIELECTRIC LABORATORIES INC.  
DIVERSIFIED TECHNOLOGIES, INC.  
DORADO INTERNATIONAL CORP.  
DOW-KEY MICROWAVE CORP.  
DUCOMMUN TECHNOLOGIES, INC.  
E2V TECHNOLOGIES  
ECLIPSE MICROWAVE, INC.  
EKSPLA  
ELVA-1 LTD.  
EM RESEARCH, INC.  
EM SOFTWARE & SYSTEMS  
EMCORE BROADBAND  
EMERSON & CUMING MICROWAVE PRODUCTS, INC.  
EMERSON (JOHNSON COMPONENTS, INC.)  
EMPOWER RF SYSTEMS, INC.  
ENDWAVE CORP.  
ENSIGN POWER SYSTEMS, INC.  
ENVIRO MENTOR AB  
EUVIS, INC.  
EW SIMULATION TECHNOLOGY LTD.  
EXCELICS SEMICONDUCTOR, INC.  
FARRAN TECHNOLOGY LTD.  
FARRAN TECHNOLOGY, LTD. (A SMITHS DETECTION CO.)  
FASTLAX LTD.  
FLXCO MICROWAVE INC.  
FRACTUS S.A.  
FREESCALE SEMICONDUCTOR JAPAN LTD. (FORMERLY MOTOROLA JAPAN LTD. SEMICONDUCTOR PRODUCTS SECTOR)  
GC RFLAB CO., LTD.  
GENERAL DYNAMICS SATCOM TECHNOLOGIES  
GENESIS MICROWAVE INC.  
GIGALANE CO., LTD.  
GIGATECH CO., LTD.  
GIGA-TRONICS, INC.  
GLACIER MICROELECTRONICS  
HEATWAVE LABS, INC.  
HEI, INC.

HERLEY GENERAL MICROWAVE ISRAEL CORP.  
HERLEY-CTI  
HITTITE MICROWAVE CORP.  
HNL, INC.  
HUBER+SUHNER AG  
HVVI SEMICONDUCTORS, INC.  
HXL, LLC  
IEEE-PRESS  
IF ENGINEERING CORP.  
IHP  
INDEXSAR LTD.  
INFINEON  
INTER-CONTINENTAL MICROWAVE, C.E. PRECISION ASSEMBLIES, INC.  
IQE RF LLC  
IRONCAD LLC  
I&TECH CO., LTD.  
IW (INSULATED WIRE, INC.)  
J MICRO TECHNOLOGY  
JFW INDUSTRIES, INC.  
JOHANSON MANUFACTURING CORP.  
JOHN WILEY & SONS, LTD.  
KEMET  
KEVLIN CORP./COBHAM DEFENSE ELECTRONIC SYSTEMS  
KJ COMTECH CO., LTD.  
K&L MICROWAVE, INC.  
KMIC TECHNOLOGY, INC.  
KRYTAR  
L-3 COMMUNICATIONS, ELECTRON DEVICES  
L-3 COMMUNICATIONS, NARDA MICROWAVE-EAST  
L-3 COMMUNICATIONS, NARDA MICROWAVE-WEST  
LABTECH LTD.  
LIEDER DEVELOPMENT INC.  
LINEAR PHOTONICS, LLC  
LINK MICROTEK LTD.  
LINX TECHNOLOGIES, INC.  
LOGUS MICROWAVE CORP.  
LPKF LASER & ELECTRONICS AG  
LUCIX CORP.  
LUN' TECH  
M/A-COM.  
MAGUS(PHY) LTD.  
MARKI MICROWAVE INC.  
MAURY MICROWAVE CORP.  
MBF MICROWAVE, INC.  
MCL, INC.  
MEGA INDUSTRIES, LLC  
MEGAPHASE LLC  
MERRIMAC INDUSTRIES, INC.  
MESL MICROWAVE LTD.  
MI TECHNOLOGIES, LLC  
MICA MICROWAVE CORP.  
MICRO CRYSTAL S.A.  
MICRO LAMBDA WIRELESS, INC.  
MICRO-COAX, INC.  
MICROLAB/FXR  
MICRONETICS, INC.  
MICROPHASE CORP.  
MICROSEMI POWER PRODUCTS GROUP (PPG)  
MICROSOURCE, INC.  
MICRO-TRONICS, INC.  
MICROWAVE AMPLIFIERS LTD.  
MICROWAVE CIRCUITS, INC.  
MICROWAVE COMMUNICATIONS LABORATORIES, INC.(MCLI)



# EXHIBITION

MICROWAVE DEVELOPMENT  
LABORATORIES, INC.  
MICROWAVE DEVICE TECHNOLOGY  
MICROWAVE DYNAMICS  
MICROWAVE ENGINEERING CORP.  
MICROWAVE INNOVATIONS  
MICROWAVE RESOURCES CORP.  
MICROWAVE SOLUTIONS, INC.  
MICROWAVE TECHNOLOGY, INC.  
MILLIMETER WAVE PRODUCTS, INC.  
MILLIREN TECHNOLOGIES, INC.  
MIMIX BROADBAND INC.  
MINI-CIRCUITS  
MINI-CIRCUITS LABORATORY, INC.  
MINI-SYSTEMS, INC.  
MITEQ, INC.  
MODCO, INC.  
MODELITHICS INC.  
MPDEVICE CO., LTD.  
M-PULSE MICROWAVE INC.  
MUEGGE ELECTRONIC GMBH  
NEARFIELD SYSTEMS, INC.  
NEL FREQUENCY CONTROLS, INC.  
NEXTEC MICROWAVE & RF INC.  
NICOMATIC  
NITRONEX CORP.  
NOISECOM  
NORDEN MILLIMETER, INC.  
NORTHROP GRUMMAN SPACE TECHNOLOGY  
MICROELECTRONIC PRODUCTS &  
SERVICES  
NURAD TECHNOLOGIES, INC./COBHAM  
DEFENSE ELECTRONIC SYSTEMS  
OHMITE  
OLESON MICROWAVE LABS.  
OMNIYIG, INC.  
ORBIT/FR ENGINEERING LTD.  
OSCILLOQUARTZ SA  
PASSIVE-PLUS, INC.  
PASTERNAK ENTERPRISES, INC.  
PENDULUM, INC.  
PENN ENGINEERING COMPONENTS  
PEREGRINE SEMICONDUCTOR, INC.  
PHASE ONE MICROWAVE, INC.  
PHOTLINE TECHNOLOGIES  
PILKOR ELECTRONICS CO., LTD.  
PLANAR MONOLITHICS INDUSTRIES, INC.  
POLYPHASER CORP.  
PRESIDIO COMPONENTS, INC.  
PULSAR MICROWAVE CORP.  
QPAR ANGUS LTD.  
QWED SP. Z O.O.  
RADAR TECHNOLOGY, INC.  
RADIALL INC.  
RALTRON ELECTRONICS CORP.  
REACTEL, INC.  
RELCOMM TECHNOLOGIES, INC.  
REMEC DEFENSE & SPACE, INC./COBHAM  
DEFENSE ELECTRONIC SYSTEMS  
RESIN DESIGNS, LLC  
RESOTECH, INC.  
RF COAX INC.  
RFHIC CORP.  
R.F. HITEC, INC.  
RFIC SOLUTIONS, INC.  
RFIC TECHNOLOGY CORP.  
RF MICRO DEVICES, INC.  
RH LABORATORIES, INC.  
ROSENBERGER  
RS MICROWAVE COMPANY, INC.

SAGE LABORATORIES INC.  
SAIREM  
SANGSHIN ELECOM CO., LTD.  
SAS LANSDALE/COBHAM DEFENSE  
ELECTRONIC SYSTEMS  
SCIENTIFIC MICROWAVE CORP.  
SECTOR MICROWAVE INDUSTRIES, INC.  
SEMIFLEX, INC.  
SHENGLU TELECOMMUNICATION TECH.  
CO.  
SIERRA MICROWAVE TECHNOLOGY  
SIRIT INC.  
SKYCROSS, INC.  
SKYWORKS SOLUTIONS, INC.  
SONNET SOFTWARE, INC.  
SONOMA INSTRUMENT  
SONOMA SCIENTIFIC, INC.  
SOPHIA WIRELESS, INC.  
SOUTHWEST MICROWAVE, INC.  
SPACEK LABS, INC.  
SPECTRUM CONTROL, INC.  
SPECTRUM MICROWAVE, INC.  
SPIRENT COMMUNICATIONS PERFORMANCE  
ANALYSIS, WIRELESS  
SPIRENT COMMUNICATIONS POSITIONING  
TECHNOLOGY  
STANFORD RESEARCH SYSTEMS, INC.  
STANGENES INDUSTRIES, INC.  
STATE OF THE ART, INC.  
STC MICROWAVE SYSTEMS, ARIZONA  
(旧 SIGNAL TECHNOLOGY CORP. ARIZONA)  
STC MICROWAVE SYSTEMS, OLEKTRON  
(旧 SIGNAL TECHNOLOGY CORP. OLEKTRON)  
STEALTH MICROWAVE, INC.  
STRATEDGE CORP.  
SUMMITEK INSTRUMENTS, INC.  
SUNNY ELECTRONICS  
SV MICROWAVE INC.  
SYFER TECHNOLOGY, LTD.  
TACONIC CO., LTD.  
TECHTROL CYCLONETICS, INC.  
TECOM INDUSTRIES, INC.  
TEGAM, INC.  
TELEDYNE COAX SWITCHES  
TELEDYNE MICROWAVE  
TELEDYNE RELAYS  
TELEDYNE STORM PRODUCTS CO.  
TEMEX  
THE FERRITE CO., INC.  
THE FERRITE COMPONENTS, INC.  
THE MCGRAW-HILL CO.  
THE PHOENIX COMPANY OF CHICAGO,  
INC.  
TIMES MICROWAVE SYSTEMS  
TLC PRECISION WAFER TECHNOLOGY,  
INC.  
TRAK MICROWAVE CORP.  
TRAK MICROWAVE LTD.  
TRANSCOM, INC.  
TRANS-TECH, INC.  
T-RAY SCIENCE INC.  
TRIQUINT(INCLUDING WJ COMMUNICATIONS)  
TROICOM, INC.  
TRONSER INC.  
TRU CORP.  
TT ELECTRONICS SEMELAB LTD.  
UNITED MONOLITHIC SEMICONDUCTORS  
S.A.S.  
UNIVERSAL MICROWAVE TECHNOLOGY,  
INC.

UNIVERSAL SWITCHING CORP.  
VECTOR TELECOM PTY LTD.  
VECTRON INTERNATIONAL  
VERTEX MICROWAVE PRODUCTS, INC.  
VIDA PRODUCTS, INC.  
VIRGINIA DIODES INC.  
VIVA TECH LTD.  
VUBIQ, INC.  
V $\mu$ BIQ, INC.  
WAVECONTROL GMBH  
WEINSCHEL ASSOCIATES  
WERLATONE, INC.  
WIDE BAND SYSTEMS, INC.  
WINCHESTER ELECTRONICS CORP.  
WIPL-D D.O.O.  
W.L.GORE&ASSOCIATES, INC.  
XICOM TECHNOLOGY, INC.  
XSYS ELECTRONICS INC.  
YANTEL CORP.  
ZELAND SOFTWARE, INC.  
アイ電子(株)  
(株)エディックシステムズ  
(有)清田製作所  
(株)テレパワ

# APMC 2010 COMMITTEE OFFICERS

## ORGANIZING COMMITTEE

### Chair:

Masayoshi AIKAWA      Saga University

### Vice Chairs:

Kiyomichi ARAKI      Tokyo Institute of Technology  
Masahiro MURAGUCHI      Tokyo University of Science  
Noriharu SUEMATSU      Tohoku University

### Members:

Makoto ANDO      Tokyo Institute of Technology  
Eisuke FUKUDA      Fujitsu Laboratories Ltd.  
Kazuo HAGIMOTO      NTT Corp.  
Yasuo HIRATA      ATR  
Shigekazu HORI      Alpine Electronics, Inc.  
Hideharu IEKI      Murata Mfg. Co., Ltd.  
Osami ISHIDA      Okinawa National College of Technology  
Hiroshi KONDOH      EHF Consulting  
Keiichi KUBOTA      NHK  
Hiroshi KUMAGAI      NICT  
Toshio MASAKI      Toshiba Corp.  
Tatsuro MASAMURA      Japan Radio Co., Ltd.  
Yoshihiko MIYANO      Hitachi, Ltd.  
Atsushi MORITA      Mitsubishi Electric Corp.  
Shigeru NAKAJIMA      Sumitomo Electric Industries, Ltd.  
Kazunori NAKAMURA      Furukawa Electric Co., Ltd.  
Toshio NOJIMA      Hokkaido University  
Isao OHTA      University of Hyogo  
Junjiro ONODA      JAXA  
Seizo ONOE      NTT DOCOMO, INC.  
Takashi SEKINO      Advantest Corp.  
Shigeki SUYAMA      NEC Corp.  
Tadashi TAKAGI      Tohoku University  
Akira TAKAHASHI      Sharp Corp.  
Makoto TSUTSUMI      Fukui University of Technology  
Masaharu UCHINO      Anritsu Corp.  
Yoshiki UENO      Genesis Research Institute, Inc.  
Masaaki UMESHIMA      Agilent Technologies Japan, Ltd.  
Katsuya WATANABE      Ministry of Internal Affairs and Communications

### Secretary:

Takao KUKI      NHK  
Kenjiro NISHIKAWA      NTT Corp.

## ADVISORS

Ikuo AWAI  
Yasutake HIRACHI  
Jui-Pang HSU  
Masanobu ITOH  
Masataka KAWAUCHI  
Susumu KITAZUME  
Yoshio KOBAYASHI  
Nobuaki KUMAGAI  
Kazuhiro MIYAUCHI  
Koji MIZUNO  
Shizuo MIZUSHINA  
Makoto NAGAO  
Yoshiyuki NAITO  
Sogo OKAMURA

Shigebumi SAITO  
Keiji TACHIKAWA  
Tsukasa YONEYAMA

## AUDITORS

Iwao MATSUMOTO      Tokyo Institute of Technology  
Yoichiro TAKAYAMA      The University of Electro-Communications

## INTERNATIONAL STEERING COMMITTEE

### Chair:

Noriharu SUEMATSU      Tohoku University

### Vice Chairs:

Hiroshi OKAZAKI      NTT DOCOMO, INC.  
Atsushi SANADA      Yamaguchi University

## STEERING COMMITTEE

### Chair:

Kiyomichi ARAKI      Tokyo Institute of Technology

### Vice Chairs:

Osamu HASHIMOTO      Aoyama Gakuin University  
Takashi OHIRA      Toyohashi University of Technology

### Members:

Kunio AKADA  
Mitsuo HASEGAWA  
Kanna IBE      Rohde & Schwarz Japan K.K.  
Kazufumi IGARASHI      Japan Radio Co., Ltd.  
Hiroshi ISHIMURA      Toshiba Corp.  
Yoshihiro ISHITA      JEPICO Corp.  
Nobuyuki ITOH      Okayama Prefectural University  
Tadashi KAWAI      University of Hyogo  
Hirokaki KAWANO      Panasonic Mobile Communications Co., Ltd.  
  
Hiroyuki KAYANO      Toshiba Corp.  
Atsushi KEZUKA      Japan Radio Co., Ltd.  
Toshihide KIKKAWA      Fujitsu Laboratories Ltd.  
Masayuki KIMISHIMA      Advantest Corp.  
Yoshinori KOGAMI      Utsunomiya University  
Takao KUKI      NHK  
Hiromichi KURODA      Toshiba Corp.  
Ken-ichi MARUHASHI      NEC Corp.  
Moriyasu MIYAZAKI      Mitsubishi Electric Corp.  
Kazutomi MORI      Mitsubishi Electric Corp.  
Shoichi NARAHASHI      NTT DOCOMO, INC.  
Yoshio NIKAWA      Kokushikan University  
Kenjiro NISHIKAWA      NTT Corp.  
Shiro OHARA      Sumitomo Electric Industries, Ltd.  
Hiroshi OKABE      Renesas Electronics Corp.  
Satoshi OKABE      NHK  
Hiroshi OKAZAKI      NTT DOCOMO, INC.  
Kensuke OKUBO      Okayama Prefectural University  
Naoko ONO      Toshiba Corp.  
Kei SAKAGUCHI      Tokyo Institute of Technology  
Atsushi SANADA      Yamaguchi University  
Kouji SHIBATA      Hachinohe Institute of Technology  
Tsugumichi SHIBATA      NTT Corp.  
Hitoshi SHIMASAKI      Kyoto Institute of Technology  
Yasunori SUZUKI      NTT DOCOMO, INC.  
Jun-ichi TAKADA      Tokyo Institute of Technology

# APMC 2010 COMMITTEE OFFICERS

Ken TAKEI	Hitachi, Ltd.
Masaharu TAKEI	Sumiden Device Expert Service, Inc.
Yukio TAKIMOTO	Kokushikan University
Satoshi TANAKA	Renesas Electronics Corp.
Eiji TANIGUCHI	Mitsubishi Electric Corp.
Nobuyuki TENNO	Murata Mfg. Co., Ltd.
Osamu TSUJII	Agilent Technologies Japan, Ltd.
Hiromitsu UCHIDA	Mitsubishi Electric Corp.
Shigeru YANAGAWA	Toshiba Corp.
Naofumi YONEDA	Mitsubishi Electric Corp.

## TECHNICAL PROGRAM COMMITTEE

### Chair:

Masahiro MURAGUCHI Tokyo University of Science

### Vice Chairs:

Kazukiyo JOSHIN	Fujitsu Laboratories Ltd.
Masashi NAKATSUGAWA	NTT Corp.
Yo YAMAGUCHI	NTT Corp.

### Members:

Morishige HIEDA	Mitsubishi Electric Corp.
Masayuki KIMISHIMA	Advantest Corp.
Masaaki KUZUHARA	Fukui University
Keren LI	NICT
Zhewang MA	Saitama University
Kazutomi MORI	Mitsubishi Electric Corp.
Koichi MURATA	NTT Corp.
Shoichi NARAHASHI	NTT DOCOMO, INC.
Kenjiro NISHIKAWA	NTT Corp.
Toshihiro NOMOTO	Tohoku Institute of Technology

Hiroshi OKAZAKI	NTT DOCOMO, INC.
Kensuke OKUBO	Okayama Prefectural University
Atsushi SANADA	Yamaguchi University
Tomohiro SEKI	NTT Corp.
Ken TAKEI	Hitachi, Ltd.
Makoto TAROMARU	Fukuoka University
Ichihiko TOYODA	NTT Corp.
Ryo YAMAGUCHI	NTT DOCOMO, INC.
Koji YAMANAKA	Mitsubishi Electric Corp.

## OVERSEAS TECHNICAL PROGRAM COMMITTEE

### Members:

Arokiaswami ALPHONES	Nanyang Technological University
Mazlina ESA	Universiti Teknologi Malaysia
Kamran GHORBANI	RMIT University
Manas K. HALDAR	Swinburne University of Technology
Wei HONG	Southeast University
Tzyy-Sheng Jason HORNG	National Sun Yat-Sen University
Tatsuo ITOH	UCLA
Bumman KIM	Pohang University of Science and Technology
Shiban Kishen KOUL	Indian Institute of Technology Delhi
Hai-Young LEE	Ajou University
Joshua Le-Wei LI	National University of Singapore
Kin-Lu WONG	National Sun Yat-sen University
Ruey-Beei WU	National Taiwan University

## AWARDS COMMITTEE

### Chair:

Masami AKAIKE Tokyo University of Science

### APMC 2010 Secretariat

c/o Real Communications Corp.  
3F Shimmatsudo S Bldg., 1-409 Shimmatsudo,  
Matsudo 270-0034, Japan E-mail: mweapmc@io.ocn.ne.jp

**<http://www.apmc2010.org/>**



## MAP OF YOKOHAMA BAY AREA



## ACCESS TO PACIFICO YOKOHAMA

By Air	Haneda Airport	Airport Limousine Bus							30min.
		Airport Limousine Bus	30min.	Yokohama Station YCAT Yokohama City Air Terminal	by Taxi	Minato Mirai Line	3min.	Minato Mirai Station	on foot 3min.
	Keikyu Express	24min.							
	Narita Airport	Airport Limousine Bus	90min.						
JR Narita Express		90min.							
By Train	Shibuya Station	Tokyu Toyoko Line : Limited Express							
	Tokyo Station	JR Tokaido Line	(Direct link to Minato Mirai Line) 25min.						
	Shin Yokohama Station	JR Yokohama Line	3min.	Kikuna Station	Tokyu Toyoko Line				
		JR Yokohama Line			JR Keihin-Tohoku Line				
		Yokohama Municipal Subway							
By Car	Metropolitan Expressway	Toward Yokohama Park, Kanagawa Route K-1					Minato Mirai Exit	3min.	
		Toward Yokohama ( via Bay Bridge), Bay Shore Route B ▶ K-1							
		Toward Yokohama K-1							
		Toward Yokohama K-1							
	Tomei Expressway	Hodogaya Bypass	10min.	▶	Kariba IC	▶	Metropolitan Expressway	10min.	
	Yokohama Machida IC								

## LOCATION OF YOKOHAMA

