

SATU

Presidents' Forum

of Southeast and South Asia and Taiwan Universities
台灣與東南亞暨南亞大學校長論壇

陳男生

☎ : National Cheng Kung University
No. 1, University Road,
701 Tainan City, Taiwan
☎ : +886-6-2099250
☎ : +886-6-2373551
✉ : satu@email.ncku.edu.tw
🌐 : http://conf.ncku.edu.tw/satu

2016 SATU Joint Research Scheme Program

Host Application Form

Date: 2016 / 4 / 20 (year /month/day)

1. Host University

National Taipei University of Technology

2. Host Unit

Department of Electronic Engineering

3. Joint Research Project Title

Novel Rectenna Configurations for Ambient RF Energy Harvesters: Optimized Circuit Design and Scalable Rectenna Arrays

4. Principal Investigator

Passport Name	Yen-Sheng Chen		
Nationality	Republic of China	Gender	<input checked="" type="checkbox"/> M <input type="checkbox"/> F
Address	1, Sec. 3, Zhongxiao E. Rd., Taipei 10608 Taiwan, R.O.C.		
Telephone	(Office) (886-2) 2771-2171 #2281 (Home / Mobile) (886) 0919-058-788		
Fax Number	(886-2) 2731-7120	E-mail	yschen@ntut.edu.tw

5. Co- PI from the same unit – If any

Passport Name			
Nationality		Gender	<input type="checkbox"/> M <input type="checkbox"/> F
Address			
Telephone	(Office)	(Home / Mobile)	
Fax Number		E-mail	

6. Project Details

Project Description	<p>This research project aims at developing novel rectenna structures for radio-frequency (RF) energy harvesting systems based on what this field really needs. The study starts by investigating the theoretical framework of RF energy harvesting, solving the</p>
---------------------	--

SATU Presidents' Forum

of Southeast and South Asia and Taiwan Universities
台灣與東南亞暨南亞大學校長論壇

☎ : National Cheng Kung University
No. 1, University Road,
701 Tainan City, Taiwan
☎ : +886-6-2099250
☎ : +886-6-2373551
✉ : satu@email.ncku.edu.tw
🌐 : http://conf.ncku.edu.tw/satu

numerical solution of power conversion efficiency (PCE), which is the function of input power, resonant frequency, filtering capacitance, and loading resistance. After casting this expression into a constrained programming problem, an optimization technique is applied to determine the upper limit of the PCE. In order to approach the maximized PCE, novel rectenna structures will be proposed. In particular, a portable and scalable rectenna array using a RF combining network will be developed. In contrast to the conventional arrays whose aperture size is fixed, the number of elements in this rectenna array can be expanded. A higher-layer array leads to soaring PCE and much greater output power because not only the antenna gain but also the aperture size is enhanced. Furthermore, higher-layer elements are not integrated to the array until the output power is found to be insufficient. Besides, the rectenna elements can be disassembled into several pieces, leading to an easily portable design. The peak gains, half-power beam widths, and radiation patterns versus the number of layers are investigated preliminarily. We will fabricate the novel rectenna structures and test the PCE, output power, and antenna performances in several practical situations, showing that these designs make RF energy harvesting for mobile devices possible.

7. Acknowledgement (Signed by the President or SATU representative to show recognition)

Name *Chaochin Su*
title *Dean of R&D Center*



(signature)

Date: *2016 / 04 / 27* (yyyy/mm/dd)

Please email satu@email.ncku.edu.tw before 2016.4. 29(Fri.) for application with the subject line: <2016 SATU JRS host application –School Name>. Thank you.