



WCEL

Wireless Communications Engineering Laboratory

upwireless.ph

*Electrical and Electronics Engineering Institute
University of the Philippines, Diliman*

WHAT IS WCEL?

The Wireless Communications Engineering Laboratory (WCEL) is a research and instructional facility engaged in the **design, integration, analysis, and testing of wireless communication devices, circuits, and systems**. It is equipped with state-of-the-art radio frequency (RF) and microwave test equipment and simulation software, digital microwave radios, antennas, and RF amplifiers for use in various applications such as rural connectivity, emergency response, and public safety.

THE FACULTY



Joel Joseph S. Marciano Jr.
Professor
joel.marciano@eee.upd.edu.ph



Paul Jason Co
Assistant Professor
paul.co@eee.upd.edu.ph



Neil Irwin Bernardo
Assistant Professor
neil.bernardo@eee.upd.edu.ph



Steven Matthew Cheng
Assistant Professor
steven.cheng@eee.upd.edu.ph



Charleston Dale Ambatali
Assistant Professor
charleston.ambatali@eee.upd.edu.ph



Adrian Vidal
Assistant Professor
adrian.vidal@eee.upd.edu.ph



Bernalyn Decena
Teaching Fellow
bernalyn.decena@eee.upd.edu.ph



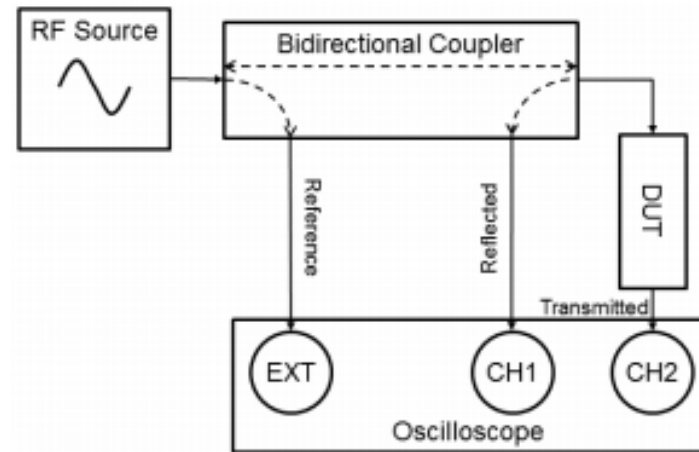
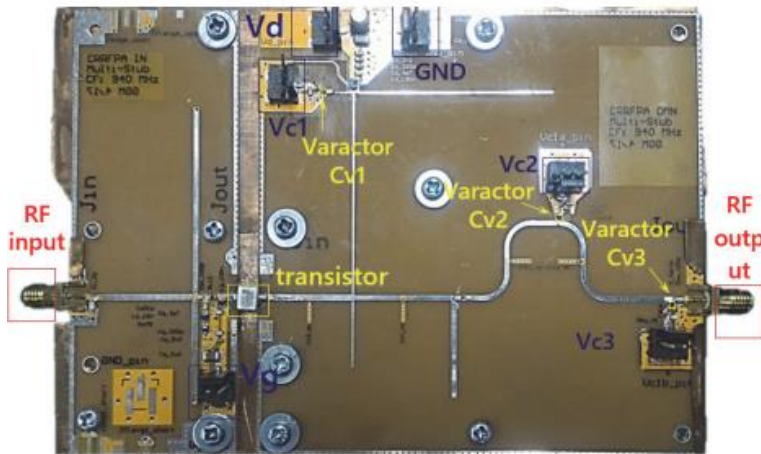
Reine Jiana Reynoso
Teaching Associate
reine.reynoso@eee.upd.edu.ph



Loren Angelou Cruz
Teaching Associate
loren.angelou.cruz@eee.upd.edu.ph

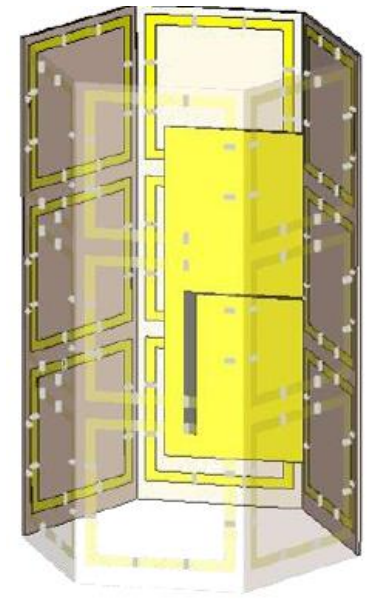
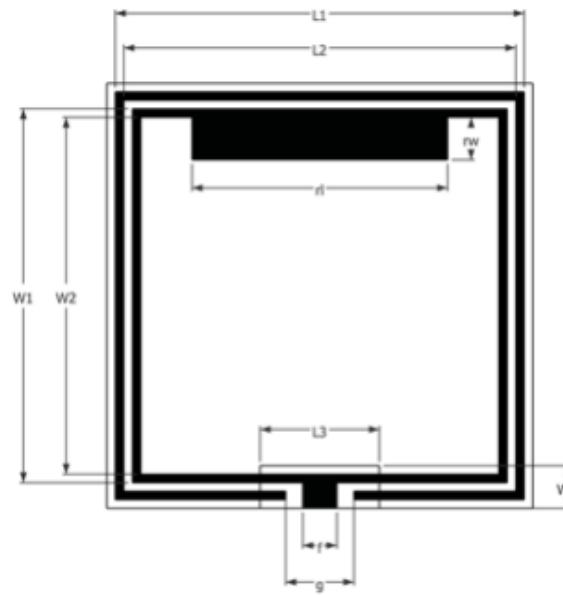
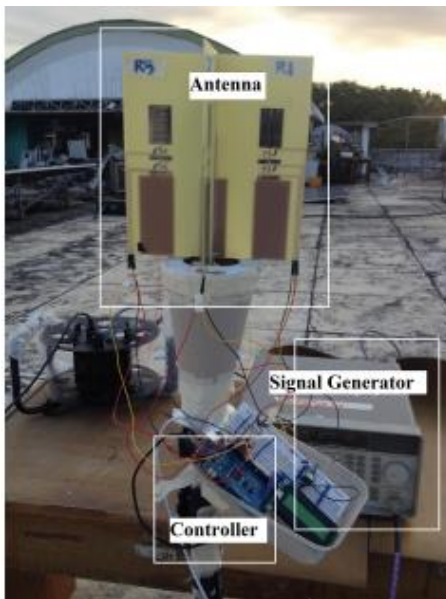
- *RF Systems and Circuits*

- ❑ RF Input-Output Linearization
- ❑ RF Power Amplifier
- ❑ Self-Interference Cancellation for Full-Duplex Radios
- ❑ Bi-Directional Amplifiers
- ❑ TV White Space



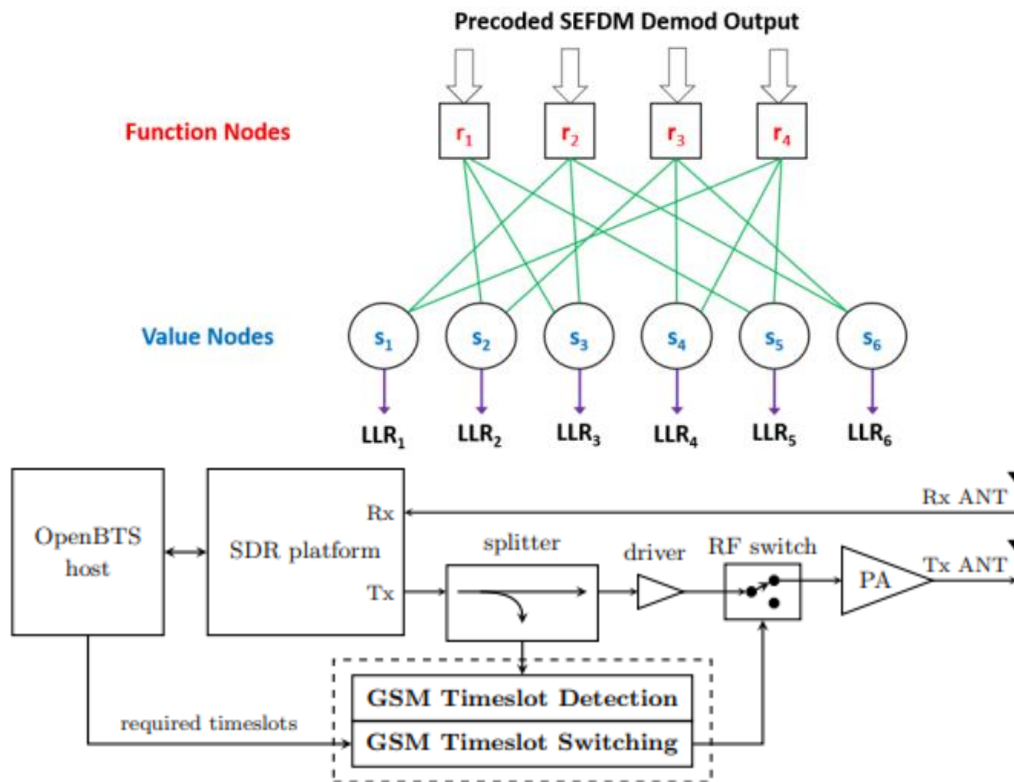
- *Antenna Systems and Measurement*

- ❑ Reconfigurable Antennas
- ❑ Near-field Antenna Design and Measurement
- ❑ Wearable and Textile Antennas
- ❑ Low-Profile Antennas for Cube Satellites
- ❑ Antenna Beam Automation



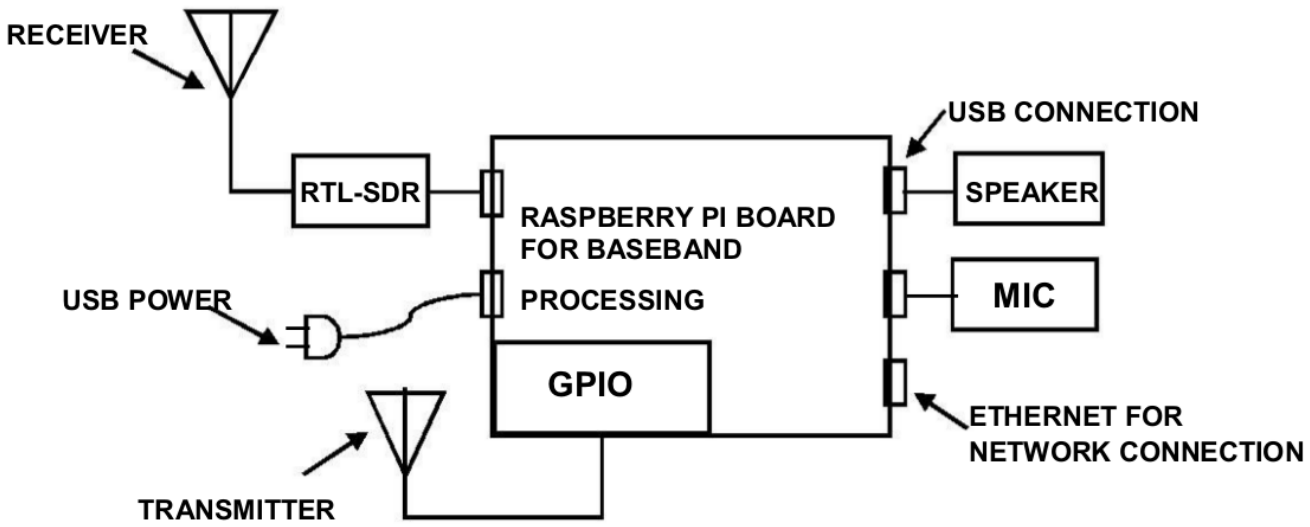
- *Wireless Standards & Schemes*

- ❑ Dynamic Spectrum Access
- ❑ Transmission Schemes
- ❑ Cooperative Cellular Networks

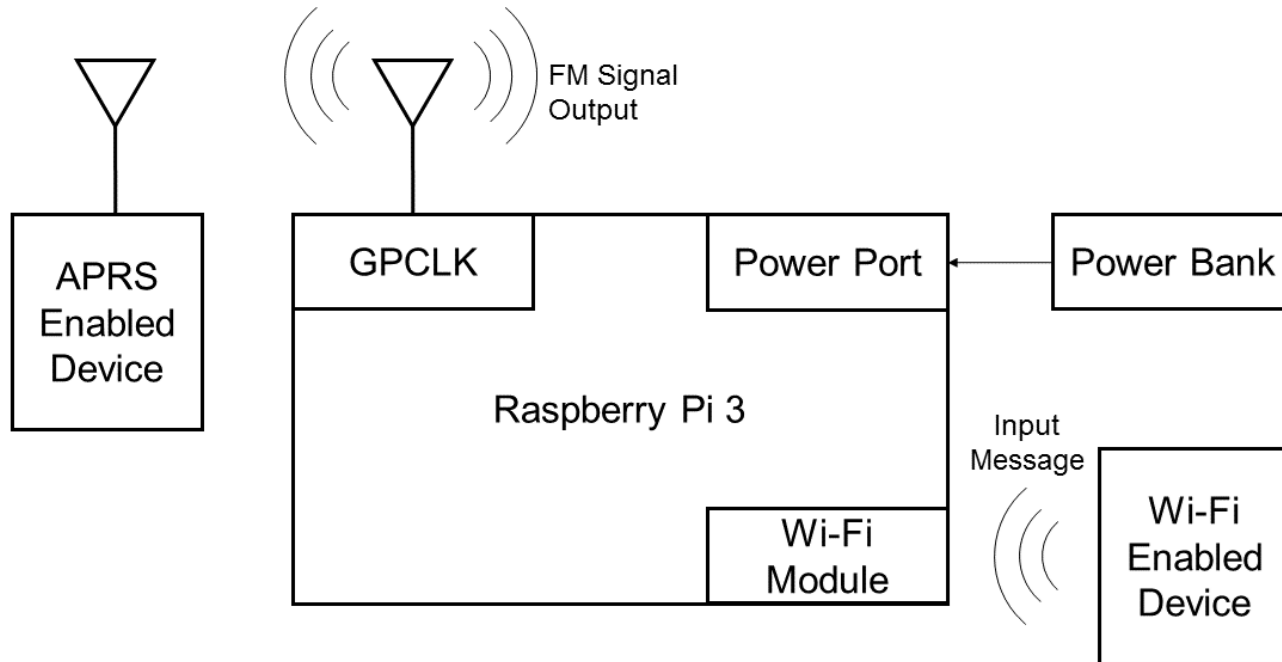


- *Amateur Radio Using Raspberry Pi*

- ❑ Receive FM signal using the RTL-SDR (\$20)
- ❑ Transmit FM signal using GPCLK0



- *Amateur Radio Using Raspberry Pi*
 - Test Setup

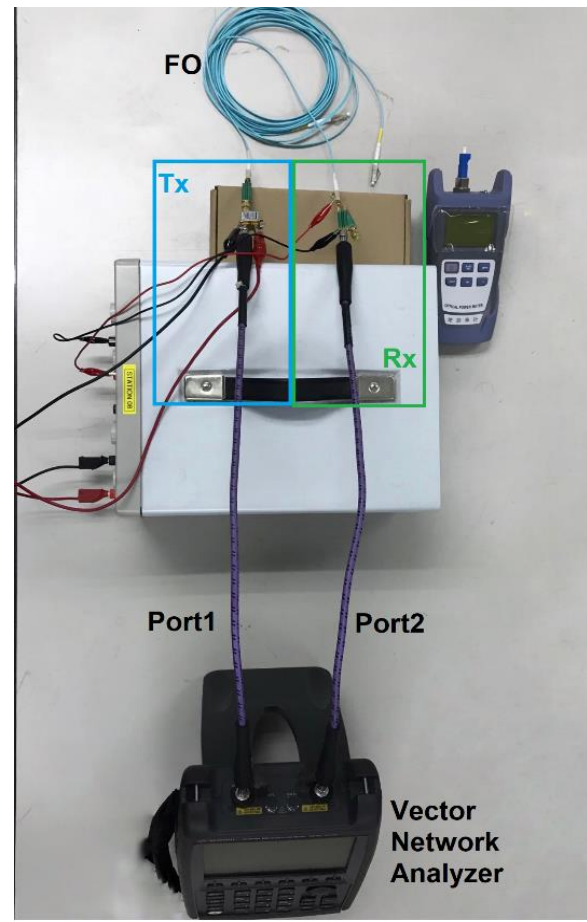
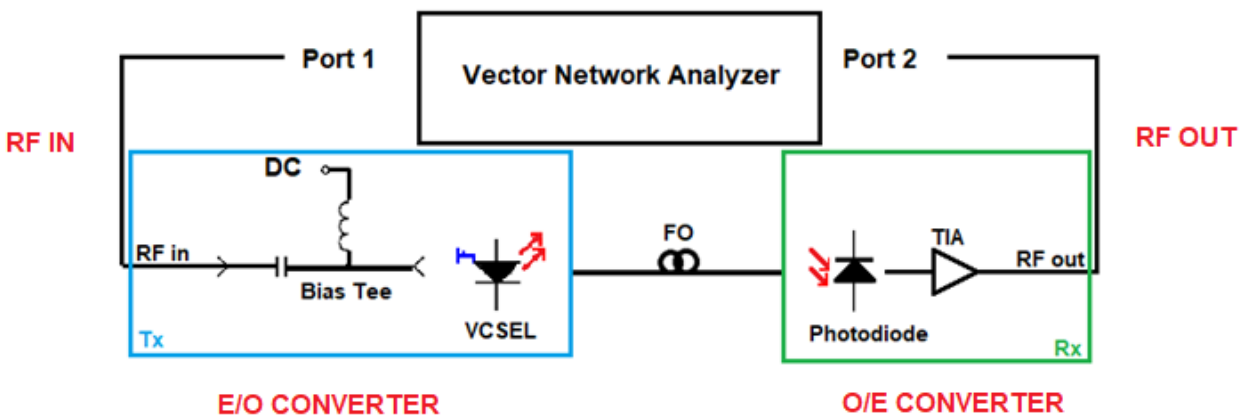


- *Microwave Photonics*

- Radio-over Fiber (ROF)
 - It combines the robustness, reliability and cost-effectiveness of the optical fiber technology and the wideband capabilities of the radio frequency (RF) communications systems
 - Integration of fiber optic technology to RF wireless communications systems lead to high capacity, high data rate and mobility solution with less cost compared to the conventional wireless or wired system.



- ROF Link Characterization*



PUBLICATIONS

- [1] A. Vidal, N. I. Bernardo and J. Joseph Marciano, "Cooperative Mobile Sensing for Dynamic Spectrum Access in Community Cellular Networks," *2019 16th International Symposium on Wireless Communication Systems (ISWCS)*, Oulu, Finland, 2019, pp. 709-713.
- [2] S. C. Perez Ballon, G. Y. Toledo, M. T. D. Cunanan and S. M. Cheng, "Automatic Antenna Beam Selection for Optimal Cellular User Coverage," 2019 International Workshop on Antenna Technology (iWAT), Miami, FL, USA, 2019, pp. 169-172.
- [3] S. M. Cheng, M. C. Purisima, M. Podolsky, E. Brewer and C. A. Festin, "Design of a Mobile Adapter to Address Frequency Regulations for Rural Cellular Operators," 2018 IEEE International RF and Microwave Conference (RFM), Penang, Malaysia, 2018, pp. 299-302.
- [4] N. I. Bernardo, "Improving Error Resiliency of Sparse Code Multiple Access Using Precoding and Non-orthogonal Signaling Techniques," 2018 11th International Symposium on Communication Systems, Networks & Digital Signal Processing (CSNDSP), Budapest, 2018, pp. 1-6.
- [5] C. D. M. Ambatali, "Implementation of an Oscilloscope Vector Network Analyzer for Teaching S-Parameter Measurements," 2018 IEEE Region 10 Humanitarian Technology Conference (R10-HTC), Malambe, Sri Lanka, 2018, pp. 1-6.
- [6] G. G. Mendoza and M. C. Purisima, "Mode-Reconfigurable RF Power Amplifier with Independently Controllable Fundamental and Second Harmonic Output Impedances," 2018 Asia-Pacific Microwave Conference (APMC), Kyoto, 2018, pp. 980-982.
- [7] B. Decena, P. L. Hilario and G. Tapang, "Three Dimensional Wavefront Engineering Using a Phase-only Spatial Light Modulator for Microwave Metamaterials," TENCON 2018 - 2018 IEEE Region 10 Conference, Jeju, Korea (South), 2018, pp. 0287-0290.
- [8] M. F. D. De Guzman, C. A. G. Hilario and J. J. S. Marciano, "Empirical Measurements of Antenna Polarization Mismatch and Misalignment Due to Angular Motion," TENCON 2018 - 2018 IEEE Region 10 Conference, Jeju, Korea (South), 2018, pp. 1749-1752.
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