KYUIL(BERNARD) HWANG

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Summary

Analytical RF and Hardware Engineering professional with extensive experience in all phases of development life cycle. Effectively analyzes, designs and implements mobile device, semiconductor and automotive market. Proven success enhancing existing systems with new features and performance improvements. Core strengths in:

- RF and microwave wideband active and passive circuits design(up to 118GHz)
- RFIC and MMIC Design(up to 10GHz)
- Remote sensing(passive and active radar system)
- Linearized power amplifier and solid state power amplifier
- Envelope tracking characterization with digital pre-distortion
- Antenna and EM simulation
- Wireless communication(CDMA/GSM/WCDMA/LTE/GPS)
- WiFi and Bluetooth system
- Firmware(packet switched data service and rf calibration)
- Product conception, design & specification
- Automotive wireless device(infotainment system)
- Lead advanced manufacturing
- Cross-function communication
- Troubleshooting & problem solving

Experience

NCAR(National Center for Atmospheric Research) / Boulder **Dec 2015 – Present**

Remote Sensing Radar Engineer III

1. Airbourne Phased Array Radar(5.4GHz)
   - Transmitter/Receiver Module redesign: optimized individual stage and cascaded Performances for V- and H- polarization
   - PCB Layout with Altium
   - Beamformer design with digital attenuator and phase shifter(AESA)
   - Evaluate and verify RF Devices

- Pulsed s-parameter measurements
- PCB impedance control: developed coupon

2. W-band HCR(94.4GHz):
   - Radar calibration and operation: noise and rx
   - Signal processing for field and environment data with Matlab
   - Research for solid state power amplifier
   - Field campaign with Gulf Stream V
   - Redesign wiring for GPS, SDN500 and C-MIGITS
   - Circuit design of power detection
3. S-Pol Radar(2.9GHz)
   - Radar calibration and operation: noise, rx and differential reflectivity; using Python
   - Troubleshooting of operation problems such as arching
4. 35GHz Ka-band Radar Refurbishment
   - Technical leader
   - Optimized receiver performance (noise figure and H and V channel gain)
   - Verified and tuned magnetron: peak power and operational frequency
   - Investigated arcing issue: used N2 and SF6 with pressurization; matching with antenna; compared to theoretical and practical breakdown voltage
   - Receiver calibration
   - RF component evaluation
5. RF simulation:ADS, SystemVue, HFSS and GRASP; circuit and EM simulation are capable
6. Xilinx FPGA low level design and floor planning with VIVADO and Spartan

Amazon Lab126 / Cupertino and Sunnyvale **Sept 2013 – Aug 2015**

RF System Hardware Engineer

1. Wireless Area Network
   - Broadband matching network and trade-off performances
   - Characterized ET(envelope tracking): Pin/Pout/ACLR/RGI
   - Optimized power amplifier by Maury load-pull system
   - Link Budget analysis for Tx and Rx
   - Analysis of desense and co-existence(WAN vs. WLAN, WAN to WAN includes GPS)
   - Current profiling for GSM, WCDMA, and LTE(TS.09)
   - PCB layout review for heat transfer and signal Integrity
   - Measured individual Rx band noise and provided reference level to the team

- Owner of TD-LTE B41 and FD-LTE B5 and B8

2. BT and WLAN for Fire TV Remote and Game Controller
   - Link budget analysis includes desense and co-existence.
   - Optimize rf performance(EVM/ACLR/Tx Power/PER/Frequency Error/CCDF/etc) per data rate and modulation with LitePoint IQxel.
   - Qualitatively and quantatively measured latency(button response), rf communication range and data throughtput by sniffer for non-android device which does not support TCP/IP. Audio quality monitored in user perspective.
   - PCB layout to mitigate desense from high speed digital signal
   - ADS Momentum simulation with Cadence Allegro
   - Support compliance(FCC/CE/JP) testing and problem analysis
   - WiFi direct device for game and remote control
   - Component evaluation and selection
   - Build test and validation plan
   - Build factory test requirement and test fixture validation
   - Bring-up prototype and evaluation board includes chipset and component
   - Actively work with vendor for debugging
   - Create concept idea and prototype with new technologies
   - Risk management for shipping schedule and problems

LG Electronics / Seoul, Korea **Jan 2004 – Jul 2011**

Chief Research Engineer

1. Mobile Device[Android / Windows Mobile]
   - Developed rx/tx circuits for CDMA/GSM/WCDMA/LTE
   - Developed MIMO scheme for LTE and proposed its scheme to FCC
   - Improved efficiency and linearity of power amplifier.
   - Improved TRP/TIS for antenna
   - FCC submission
   - Familiar with CCF and GCF specification
   - Analyzed field performances by over the air(OTA)

2. Telematics device[General Motors and Onstar]
   - Projects: Gen7.0L/Gen7.05L/Gen7.1L/Gen8.0L/Gen9.0L
   - Successfully developed 6Watts power amplifier of cellular and AMPS mode
   - Developed switching GPS(AGPS for E911 and SiRF GPS for Navigation)

- Analyzed rf calibration over temp(-40C~+125C) to improve PA stabilization
- Analyzed rf budget for automotive application
- Designed PCB layout for automotive application
- Responsible for field interoperability testing(FIT) & field quality analysis
- Responsible for FMEA(failure mode and effects analysis)
- Responsible for RFI and RFQ
- Built EMC(RE/RI/Transient/ESD) environment by GMW3172
- Responsible for FCC(part 22, 24, 15B) and IC(RSS 129, 133 and 210) preparation and approval
- Stationed at Verizon Wireless site in NJ, NY, NC, TX and CA for 3 years and Telus in Toronto area.

Firmware Engineer

1. Development of Android Smartphone
   - Responsible for RIL(radio interface layer for packet switched data service): protocol for HSDPA, HSUPA and circuit switched data): GSM and WCDMA
   - Responsible for rf firmware(driver and interface): CDMA and LTE
   - Programmed GPS application and service
   - Familiar with Linux environment
   - Member of Qualcomm Joint Lab
   - Function leader of design for productivity
2. Development of Windows Mobile Smartphone
   - Responsible for RIL(radio interface layer for packet switched data service): protocol for HSDPA, HSUPA and circuit switched data
   - Model: GM730f: GSM and WCDMA
3. Familiar with various equipments and sw tools(spectrum analyzer, signal generator, oscilloscope, power meter, labview, matlab, vector network analyzer, Agilent TAS, Spirent, UDM and Qualcomm tools, base station emulator(8960/CMU) and so on)

Motorola Korea Technology Center / Seoul, Korea Aug 2002 – Jan 2004

Junior RF Engineer

1. Developed receiver path of Racetrack II(celluar and GPS band)
2. Developed receiver path of C333 and C343(celluar, US PCS, and GPS for VZW)
3. Supported T760's Phase0 of VZW
4. Total Radiated Power, Total Input Sensitivity, and Surface Absorption Rate measurement

from Motorola's Antenna Chamber

Tyco Electronics M/A-COM/ Seoul, Korea & Lowell, MA Feb 2001 - Aug 2002

RFIC Design Engineer

1. Participated in the training course of RFIC design in Lowell, MA
2. Translated Libra with ADS for simulation
3. Translated FAB II(Colorado Fab.) with FAB VI(Roanock Fab.)
4. Designed and shipped up-converter and driver amplifier with GaAs E/D MESFET(MD59-0062,MD59-0048)
5. Designed and shipped up-converter and driver amplifier for Samsung's WCDMA handset
6. Designed and shipped low noise amplifier and down-converter with GaAs PHEMT
7. Designed and shipped voltage variable attenuator and digital attenuator with GaAs E/D MESFET(AM55-0027 and AM55-0029)

Joint Project & Internship

Millitron Inc. / Chun-Ahn, Korea Apr 2000 - Dec 2000

1. Developed and shipped point-to-point, point-to-multipoint 26GHz up-converter and down-converter module for Eltel, Italy
2. Developed and shipped 44 GHz 2 watts solid state power amplifier(SSPA) for Korean satellite
3. Multiplier(12GHz to 24GHz)
4. 10GHz DRO
5. Participated in Ku-band Low Noise Block(developed mixer)
6. Developed coaxial to waveguide transition

United Satcom Inc./ Long Island, NY Sep 1998 – May 1999

1. Developed and shipped over 1000 units for 20 watts SSPA of PCS repeater(provided High Gain Telecom for LG Telecom)
2. Developed WLL(2.4GHz) 20 watts SSPA

Education

Aug 2011 – Aug 2013 / University of Colorado at Boulder / Master of Science

Major: Electromagnetics and Remote Sensing

Research Interests: microwave system/antenna/RFIC & MMIC Design/Radar/Remote Sensing

Research Advisor: Albin J. Gasiewski

Course Work: Antenna and Propagation/Environmental Signal Processing/Transmission Line and Waveguide/Radar and Remote Sensing/Semiconductor/Active Microwave Circuit and MMIC/Electromagnetic Absorption, Scattering and Propagation

Term Projects

1. Design of 5-Bits 15dB 100MHz-3GHz wideband digital attenuator using Triquint 0.5um PHMT process with ADS(Spring 2013) – Prof. Zoya Popovic
2. Microwave scattering and absorption properties of small particles(Spring 2013) – Prof. Albin Gasiewski
3. Design of log periodic folded slot antenna with HFSS(Summer 2012) – Prof. Albin Gasiewski
4. Simulation of FMCW radar transceiver with ADS(Spring 2012) – Prof. Albin Gasiewski
5. Design of quadrifilar helix antenna with FEKO(Fall 2011) – Prof. Filipovic

Projects

1. Design of 8 Channel IF(100MHz – 6500MHz) Carrier for 118GHz Cube-Sat Radiometer – Capstone and NASA Space Grant
2. ISM Band Android Based Mobile Radar(Independent Study)
3. 500MHz Log Periodic Folded Slot Antenna for Cryobot(Independent Study)

Aug 1998 - Aug 2000 / Kwang-Woon University – Seoul, Korea/ Master of Science

Major: RF and Microwave Engineering

Research Interests: active circuit design such as LNA/Mixer/DRO/SSPA/Multiplier for Microwave and Millimeter-wave applications

Research Advisor: Keukhwan Ra

Course Work: Energy Conversion/High Power Semiconductor Application/ Theory of Microwave/MMIC Design/Microwave Communication/RFIC Application & Design/Microwave Devices/ High Power-Semiconductor

Mar 1992 - Feb 1998 / Hong-Ik University – Seoul, Korea / Bachelor Science

Major: Electronic Engineering

Publications

1. Effective Improvement of Thermal Runaway Phenomenon in SSPA by Optimized Resistance (KEES)
2. Design of Reflection Type Variable Phase Shifter Included of Slit Structure(KICS)
3. Design and Fabrication of Pre-distortion for W-CDMA Communication(KICS)

4. Up-converter/Driver Amplifier for WCDMA Handset (M/A-COM Engineering Conference 2001)
5. Simulation of Mixed Mode Scattering Parameters with Differential Mode and Common Mode(Motorola Engineering Conference 2003)
6. Invited Paper: CubeSat Based Sensors for Global Weather Observation(IGARSS 2013)
7. The Next Generation of Airborne Polarimetric Doppler Weather Radar: NCAR/EOL Airborne Phased Array Radar (APAR) Development(EGU 2017)
8. The Next Generation of Airborne Polarimetric Doppler Weather Radar: NCAR/EOL Airborne Phased Array Radar(APAR) Development(AOGS 2017)
9. The NCAR Phased Array Radar Line Replacement Unit(LRU): Integration, characterization and performance(AMS 2017)

Training

1. GaAs E/D MESFET RFIC Design at M/A-COM
2. Electromagnetic Energy Training from Motorola
3. Understanding SAM Profiler and SAM Profiler Operation
4. Antenna Chamber Training for TRP and TIS Measurement
5. Digital Six Sigma(DMAIC and DMADV)
6. Xilinx FPGA Design: Flooring
7. Pulsed S-parameter Measurement(Keysight)
8. Modern T/R Module Design for Radar System

Honors and Awards

1. Six sigma green belt at LGE
2. Good performances and design award from M/A-COM
3. Teaching assistant fellowship(1999)
4. Research assistant fellowship(2000)

Membership

IEEE Antenna and Propagation Society

IEEE Geoscience and Remote Sensing Society