

Active Microwave Circuits and Antennas

Peter Gardner School of EECE The University of Birmingham



Some Recent Achievements:

- SAT: Spin out company based on multiband and switched band antenna IP. One antenna for all functions in a 4G handset.
- NICs:
 - Highest reported NIC frequency, ~ 2GHz.
 - Successful strategy developed for stability.
 - First reported non-linearity measurements.
 - New single transistor higher frequency version subject to current patent action
 - Young Engineer Prize for O.O. Tade at EuMC 2012
- Final Year Projects on RF power harvesting

Negative Impedance Converters:

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- New single transistor higher frequency version subject to current patent action
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http://www.birmingham.ac.uk/university/colleges/eps/epscommunity/news/student/young-engineer.aspx



EuMC Young Engineer Prize



Novel Fully-Planar Extended-Composite Right/Left Handed Transmission Line based on Substrate Integrated Waveguide for Multi-Band Applications M. Durán-Sindreu^{1,2}, J. Bonache¹, F. Martín¹, T. Itoh²

¹GEMMA/CIMITEC, Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, Spain

²Department of Electrical Engineering, University of California, Los Angeles, United States



Negative Impedance Converters for Broadband Antenna Matching O. O. Tade, P. Gardner, P. S. Hall School of Electronics, Electrical and Computer Engineering, University of Birmingham, United Kingdom

NIC

- NIC Negative Impedance Converter
- Two port active device
- Consists of two transistors
- It is reciprocal
- It is symmetric
- Stability Problems







- Chassis Antenna
- 100mm X 40mm
- Radiation Element is 40mm x 5mm x 7mm
- Centre Fed





Matching Antennas with NIC



NIC Realisation





Substrate – Taconic TLY -5 ϵ_r – 2.2 tan δ – 0.009 t = 1.57mm

Capacitor – AVX 3.9pF

Transistor – NXP BFS -17 (SOT-23) Biased at 5V, 20mA

Results



SAT: Smart Antenna Technology Ltd

- Spin out company based on multiband and switched band antenna IP.
- Prize winner at 2 competitions



http://smartantennatech.com/news/index.html#b

BEng FYP: RF Rectifier Module



Relevant selected publications:

- Hall, P.S. ; Gardner, P. ; Faraone, A. "Antenna Requirements for Software Defined and Cognitive Radios." Proc IEEE. 100, 7. pp 2262 – 2270. 2012.
- Tade, O.O. ; Gardner, P. ; Hall, P.S. "Negative impedance converters for broadband antenna matching." 42nd EuMC, pp: 613 – 616. 2012
- Hu, Z.H. ; Hall, P.S. ; Gardner, P. "Reconfigurable dipole-chassis antennas for small terminal MIMO applications." Electronics Letters. 47, 17. pp: 953 – 955. 2011.

