

---

**ELECTROMAGNETIC  
WAVES                      PIERL 20**

---

**Progress**

**In**

**Electromagnetics**

**Research Letters**

© 2011 EMW Publishing. All rights reserved.

No part of this publication may be reproduced. Request for permission should be addressed to the Publisher.

All inquiries regarding copyrighted material from this publication, manuscript submission instructions, and subscription orders and price information should be directed to: EMW Publishing, P. O. Box 425517, Kendall Square, Cambridge, Massachusetts 02142, USA.

E-ISSN 1937-6480

---

**ELECTROMAGNETIC  
WAVES**                      **PIERL 20**

---

**Progress**

**In**

**Electromagnetics**

**Research Letters**

**Chief Editor: Weng Cho Chew**

EMW Publishing

Cambridge, Massachusetts, USA



## CONTENTS

### **BANDWIDTH ENHANCEMENT DESIGN OF PLANAR F-SHAPED TAG ANTENNA WITH PARASITIC STRIPS**

*J.-H. Lu and J.-J. Wu*

1	Introduction . . . . .	1
2	Antenna Design and Results . . . . .	2
3	Conclusion . . . . .	8

### **BANDPASS FILTER USING MINIATURIZED SCRLH MZOR**

*J.-K. Wang, Y.-J. Zhao, W. Liu, Q. Sun, and Q. Li*

1	Introduction . . . . .	11
2	Theoretical Analysis . . . . .	12
3	Measured Results . . . . .	16
4	Conclusion . . . . .	17

### **FDTD ANALYSIS OF CHIRAL DISCONTINUITIES IN WAVEGUIDES**

*D.-A. Cao and Q.-X. Chu*

1	Introduction . . . . .	19
2	Formulation . . . . .	20
3	Numerical Results . . . . .	22
4	Conclusion . . . . .	24

### **LARGE SIGNAL EQUIVALENT CIRCUIT MODEL FOR PACKAGE ALGaN/GaN HEMT**

*L. Sang, Y. Xu, Y. Chen, Y. Guo, and R. Xu*

1	Introduction . . . . .	27
2	Small-signal Equivalent Circuit Model . . . . .	28
3	Large-signal Equivalent Circuit Model . . . . .	31
4	Power Amplifier Circuit Design . . . . .	33
5	Conclusion . . . . .	35

**A NOVEL PRINTED DIPOLE ANTENNA USING IN HIGH LATITUDES FOR INMARSAT**

*L. Wang, H. C. Yang, and Y. Li*

1	Introduction . . . . .	37
2	Design and Structure . . . . .	38
3	Result . . . . .	41
4	Conclusions . . . . .	43

**A QUASI-STATIC THEORY FOR DIELECTRIC-COATED THIN-WIRE ANTENNA STRUCTURES**

*A. I. Mowete, A. Ogunsola, and L. Sandrolini*

1	Introduction . . . . .	46
2	The Quasi-static Model . . . . .	47
3	Simulation and Results . . . . .	48
4	Conclusion . . . . .	53

**DEVELOPMENT OF LOW COST MEASUREMENT SYSTEM FOR RADIATED EMISSION EVALUATION**

*Z. Huang, W. Chen, Z. Feng, K. Teshima, and K. Toyama*

1	Introduction . . . . .	55
2	Proposed Method . . . . .	57
3	Results and Verifications . . . . .	63
4	Conclusions . . . . .	66

**DESIGN OF A HIGH-GAIN CAVITY-BACKED SLOT ANTENNA WITH MUSHROOM CELLS AND BENT GROUND WALLS**

*A. A. Eldek*

1	Introduction . . . . .	69
2	Initial Antenna Geometry . . . . .	70
3	Gain and Size Optimization . . . . .	70
4	Conclusions . . . . .	74

**A NOVEL G-SHAPED SLOT ULTRA-WIDEBAND BANDPASS FILTER WITH NARROW NOTCHED BAND**

*L.-N. Chen, Y.-C. Jiao, H.-H. Xie, and F.-S. Zhang*

1	Introduction . . . . .	77
2	Design of UWB Band Notch Bandpass Filter . . . . .	78

3	Simulated and Experimental Results . . . . .	84
4	Conclusion . . . . .	85

**THE NONLINEAR ABSORPTION OF A STRONG ELECTROMAGNETIC WAVES CAUSED BY CONFINED ELECTRONS IN A CYLINDRICAL QUANTUM WIRE**

*H. D. Trien and N. V. Nhan*

1	Introduction . . . . .	87
2	The Nonlinear Absorption Coefficient of a Strong EMW in a CQW . . . . .	88
3	Numerical Results and Discussions . . . . .	91
4	Conclusion . . . . .	94

**EFFECT ON TUMORAL CELLS OF LOW INTENSITY ELECTROMAGNETIC WAVES**

*V. Kalantaryan, R. Martirosyan, L. Nersesyan, A. Aharonyan  
I. Danielyan, H. Stepanyan, J. Gharibyan, and N. Khudaverdyan*

1	Introduction . . . . .	98
2	Materials and Methods . . . . .	99
3	Results and Discussion . . . . .	101
4	Conclusion . . . . .	102

**NOVEL PRINTED YAGI-UDA ANTENNA WITH HIGH-GAIN AND BROADBAND**

*S. Lin, G.-L. Huang, R.-N. Cai, and J.-X. Wang*

1	Introduction . . . . .	108
2	Antenna Simulation and Analysis . . . . .	108
3	Design and Measurement of the Antenna Operating at 3.5 GHz . . . . .	113
4	Conclusion . . . . .	116

**HIGH POWER VHF FREQUENCY-HOPPING FILTERS WITH HIGH SUPPRESSION OF SECOND HARMONIC**

*Z.-Y. Zhao, P.-H. Li, K.-L. Cheng, W.-Q. Cao, and K.-H. Chen*

1	Introduction . . . . .	120
2	Theory . . . . .	121
3	Helical Filter Implementation . . . . .	124
4	Experimental Results and Discussion . . . . .	125
5	Conclusion . . . . .	127

**BROADBAND MICROSTRIP ANTENNAS USING COPLANAR FEED-LINE**

*H. Wang, K. Yang, Z. Lei, and C. Li*

1	Introduction . . . . .	129
2	Antenna Design and Experimental Results . . . . .	130
3	Conclusion . . . . .	135

**A WIDEBAND PLANAR DIPOLE ANTENNA WITH PARASITIC PATCHES**

*R. Zhang, G. Fu, Z.-Y. Zhang, and Q.-X. Wang*

1	Introduction . . . . .	137
2	Antenna Design . . . . .	138
3	Results and Discussion . . . . .	139
4	Conclusion . . . . .	144

**SINGLE-FEEDING CIRCULARLY POLARIZED  $TM_{21}$ -MODE ANNULAR-RING MICROSTRIP ANTENNA FOR MOBILE SATELLITE COMMUNICATION**

*X. Chen, G. Fu, S. X. Gong, Y. L. Yan, and Z. Y. Zhang*

1	Introduction . . . . .	147
2	Antenna Configuration and Design . . . . .	149
3	Results and Discussions . . . . .	151
4	Conclusion . . . . .	154

**A NOVEL DOUBLE-PETAL LOOP ELEMENT FOR BROADBAND REFLECTARRAY**

*L.-S. Ren, Y.-C. Jiao, F. Li, J.-J. Zhao, and G. Zhao*

1	Introduction . . . . .	157
2	The Phase Characteristics of the Proposed Element . . . . .	158
3	Reflectarray Design and Performance . . . . .	160
4	Conclusion . . . . .	162

**COMPACT CPW-FED SQUARE SLOT ANTENNA FOR DUAL-BAND OPERATION**

*W. Hu, Y.-Z. Yin, S.-T. Fan, J.-Y. Deng, and M. Zhang*

1	Introduction . . . . .	165
2	Antenna Design . . . . .	166
3	Parametric Study . . . . .	167

4	Experimental Results . . . . .	168
5	Conclusion . . . . .	171

**A BROADBAND DOUBLY BALANCED MONOLITHIC RING MIXER WITH A COMPACT INTERMEDIATE FREQUENCY (IF) EXTRACTION**

*Y.-C. Lee, C.-M. Lin, S.-H. Hung, C.-C. Su, and Y.-H. Wang*

1	Introduction . . . . .	175
2	Circuit Design . . . . .	176
3	Circuit Implementation and Results . . . . .	179
4	Conclusion . . . . .	183

**ANALYSIS ON SHIELDING PERFORMANCE OF METALLIC RECTANGULAR CASCADED ENCLOSURE WITH APERTURES**

*G. Wu, X.-G. Zhang, Z.-Q. Song, and B. Liu*

1	Introduction . . . . .	185
2	Theoretical Model . . . . .	187
3	Mathematical Formulation . . . . .	187
4	Numerical Results . . . . .	191
5	Conclusion . . . . .	194