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# References

- [1] First Report and order, "Revision of part 15 of the commission's Rule Regarding Ultra-Wideband Transmission System FCC 02-48," Federal Communications Commission, 2002.
- [2] T.S. Rappaport, Ketan Mandke, Haewoon Nam, Lasya Yerramneni, and Christian Zuniga, "The Evolution of UWB and IEEE 802.15.3a for Very High Data Rate WPAN", EE 381K-11 Wireless Communications UWB Group, May 2003.
- [3] M. Ghavami, L. B. Michael and R. Kohno, "Ultra Wideband Signals and Systems in Communication Engineering", Second Edition, John Wiley & Sons, Ltd., 2007.
- [4] Boris Lembrikov, "Ultrawideband", Sciyo, Rijeka, Croatia, 2010.
- [5] I. J. Bahl, and P. Bhartia, "Microstrip Antennas," Artech House, Boston, 1980.
- [6] W. Stohr, "Broadband Ellipsoidal Dipole Antenna," US. Patent 3, 364, 491, January 16, 1968.
- [7] F. Lalezari et al, "Broadband Notch Antenna", US. Patent 4, 843, 403, June 27, 1989.
- [8] M. Thomas et al, "Wideband Arrayable Planar Radiator", US. Patent 5, 319, 377 June 7, 1994.
- [9] Honda, S., et al., "A disc Monopole Antenna with 1:8 impedance BW and Omnidirectional Radiation pattern," Proc. ISAP, Sapporo, Japan, 1992, pp.1145-1148.
- [10] Hammound, M., P.Poey, and F Colombel, "Matching the input Impedance of Broadband Disc Monopole," *Elect.Lett.*, vol. 29, pp. 406-407, Feb. 1993.
- [11] N.P. Agrawall, G. Kumar, and K.P. Ray, "Wide-Band Planar Monopole Antennas," *IEEE Trans. Antennas Propag.*, vol. 46 no.2 pp. 294-295, Feb. 1998.
- [12] Girish Kumar and K. P. Ray "Broadband Microstrip Antennas," Artech House, Boston, 2003.
- [13] Anders Bondeson, Thomas Rylander, and Par Ingelstrom, "Computational Electromagnetics", Springer, USA, 2005.
- [14] K. Seol, J. Jung and J. Choi, "Multi-band monopole antenna with inverted U-shaped parasitic plane" *Elect.Lett.*, vol. 42, no. 15, 20<sup>th</sup> July 2006.
- [15] Joong Han Yoon "Fabrication and Measurement of Rectangular Ring with Openended CPW-Fed Monopole Antenna for 2.4/5.2-Ghz WLAN Operation", *Microw. Opt. Technol. Lett.*, vol. 48, no. 8, pp. 1480-1483, August 2006.
- [16] Chien-Yuan Pan, Tzyy-Sheng Horng, Wen-Shan Chen, and Chien-Hsiang Huang "Dual Wideband Printed Monopole Antenna for WLAN/WiMAX Applications", *IEEE Antennas Wireless Propag. Lett.*, vol.6, pp. 149-151, 2007.

- 
- [17] H.Wang and M.Zheng, "Tripple-band wireless local area network monopole antenna," *IET Microw. Antennas Propag.*, vol. 2, no. 4, pp. 367–372, 2008.
- [18] Hsien-Wen L, Chia-Hao Ku and Chang-Fa Yang, "Novel CPW-Fed Planar Monopole Antenna for WiMAX/WLAN Application," *IEEE Antennas Wireless Propag. Lett.*, vol. 9, pp. 240–243, 2010.
- [19] Bahadir Yildirim "Multiband and Compact WCDMA/WLAN Antenna for Mobile Equipment" *IEEE Antennas Wireless Propag. Lett.*, vol. 10, pp. 14-16, 2011.
- [20] Veeresh G. Kasabegoudar, Dibyant S. Upadhyay, and K. J. Vinoy, "Design Studies of Ultra-Wideband Microstrip Antennas with a Small Capacitive Feed", *International Journal of Antennas and Propagation*, pp. 1-8, 2007.
- [21] Robert A. Moody and Satish K. Sharma, "Investigations On Co-Planar Waveguide Fed Pentagon Shape Planar Monopole Ultra-Wide Bandwidth (UWB) Antenna On Foam Substrate Providing Invariant Radiation Patterns", *IEEE Antennas propag. Soc., International Sympo. (APSURSI)*, pp. 1-4, 2010
- [22] V. Shrivastava and Y. Ranga, "Ultra wide band CPW-fed printed pentagonal antenna with modified ground plane for UWB applications", *IET International Conference on Wireless , Mobile and Multimedia Network*, pp. 1-8, Jan., 2008.
- [23] Mostafa ,A. Abdel Fattah, A. M. M. A. Allam, Shoukry I. Shams, "Irregular Pentagon Monopole Structured Antenna for Ultra-wideband Communication Systems", *IEEE APS, Middle East Conference on Antennas and Propagation (MECAP)*, Cairo, Egypt, pp .1-4, Oct. 2010.
- [24] Jianxin Liang, Choo C. Chiau, Xiaodong Chen, and Clive G. Parini, "Study of a Printed Circular Disc Monopole Antenna for UWB Systems" *IEEE Trans. Antennas Propag.*, vol. 53, no. 11, pp. 3500-3504, Nov. 2005.
- [25] K. P. Ray and Y. Ranga, "Ultrawideband Printed Elliptical Monopole Antennas", *IEEE Trans. Antennas Propag.*, vol. 55, no. 4, pp.1189-1192, April 2007.
- [26] Amin M. Abbosh and Marek E. Bialkowski, "Design of Ultrawideband Planar Monopole Antennas of Circular and Elliptical Shape" *IEEE Trans. Antennas Propag.*, vol. 56, no. 1, pp. 17-23, Jan. 2008.
- [27] J.-P. Zhang, Y.-S. Xu and W.-D. Wang, "Ultra-wideband microstrip-fed planar elliptical dipole antenna", *Elect.Lett.*, vol. 42, No. 3, 2<sup>nd</sup> Feb. 2006.
- [28] Ntsanderh C. Azenui and H. Y. D. Yang, "A Printed Crescent Patch Antenna for Ultrawideband Applications", *IEEE Antennas Wireless Propag. Lett.*, vol.6, pp. 113-116, 2007.
- [29] G. M. Yang, R. H. Jin, G. B. Xiao, C. Vittoria, V. G. Harris, and N. X. Sun, "Ultrawideband (UWB) Antennas With Multiresonant Split-Ring Loops", *IEEE Trans. Antennas Propag.*, vol. 57, no. 1, pp. 256-259, Jan. 2009.
-

- [30] B. Allen, M. Dohler, E.E. Okon, W.Q. Malik, A.K. Brown, D.J. Edwards, "Ultra-wideband Antennas and Propagation for communications, Radar and Imaging", John Wiley & Sons, Ltd., England, 2007.
- [31] Nikolay Telzhensky and Yehuda Leviatan, "Proposed Planar Differential Elliptical UWB Antenna Optimization," *IEEE Trans. Antennas Propag.*, vol. 54, no. 11, pp. 3400-3406, Nov. 2006.
- [32] K. George Thomas, N. Lenin, and R. Sivaramkrishnan, "Ultrawideband Planar Disc Monopole," *IEEE Trans. Antennas Propag.*, vol. 54, no. 4, pp. 1339-1341, April 2006.
- [33] Wen-Chung Liu and Ping-Chi Kao, "CPW-Fed Triangular Monopole Antenna for Ultra-Wideband Operation", *Microw. Opt. Technol. Lett.*, vol. 47, no. 6, pp. 580-582, December 2005.
- [34] Xian-Ling Liang, Shun-Shi Zhong, and Wei Wang, "Tapered CPW-Fed Printed Monopole Antenna", *Microw. Opt. Technol. Lett.*, vol. 48, no. 7, pp. 1411- 1413 July 2006.
- [35] X.-L. Liang, S.-S. Zhong and W. Wang, "Elliptical planar monopole antenna with extremely wide bandwidth", *Elect.Lett.*, vol. 42, no. 8, 13<sup>th</sup> April 2006.
- [36] Xian-Ling Liang, Shun-Shi Zhong, and Wei Wang, "UWB Printed Circular Monopole Antenna", *Microw. Opt. Technol. Lett.* vol. 48, no. 8, pp. 1532-1534, August 2006.
- [37] Sheng-Bing Chen, Yong-Chang Jiao, Wei Wang, and Qi-Zhong Liu, "Wideband CPW-FED Uniplanar Sleeve-Shaped Monopole Antenna", *Microw. Opt. Technol. Lett.* vol. 47, no. 3, pp. 246-247, Nov. 2005.
- [38] Y.J. Ren and K. Chang, "Ultra-wideband planar elliptical ring antenna", *Elect.Lett.*, vol. 42, no. 8, 13<sup>th</sup> April 2006.
- [39] M. Koohestani, M. Golpour, "U-shaped microstrip patch antenna with novel parasitic tuning stubs for ultra wideband applications," *IET Microw. Antennas Propag.*, vol. 4, pp. 938-946, 2010.
- [40] Kun Song, Ying-Zeng Yin, and Li Zhang, "A Novel Monopole Antenna with A Self-Similar Slot for Wideband Applications", *Microw. Opt. Technol. Lett.* vol. 52, no. 1, pp. 95-97, January 2010.
- [41] K.P. Ray S. Tiwari, "Ultra wideband printed hexagonal monopole antennas", *IET Microw. Antennas Propag.*, vol. 4, iss. 4, pp. 437-445, 2010.
- [42] K.-H. Kim, Y.-J. Cho, S.-H. Hwang and S.-O. Park, Band-notched UWB planar monopole antenna with two parasitic patches *Elect.Lett.*, vol.41, no. 14, 2005.
- [43] Ki-Hak Kim and Seong-Ook Park, Analysis of the Small Band-Rejected Antenna with the Parasitic Strip for UWB, *IEEE Trans. Antennas Propag.*, vol. 54, pp. 1688-1692, 2006.

- [44] Wang-Sang Lee, Dong-Zo Kim, Ki-Jin Kim, and Jong-Won Yu, "Wideband Planar Monopole Antennas with Dual Band-Notched Characteristics" *IEEE Trans. Microw. Theory and Tech.*, vol. 54, no. 6, pp. 2800-2806, June 2006.
- [45] Chong-Yu Hong, Ching-Wei Ling, I-Young Tarn, and Shyh-Jong Chung, "Design of a Planar Ultrawideband Antenna With a New Band-Notch Structure", *IEEE Trans. Antennas Propag.*, vol. 55, no. 12, pp. 3391-3397, Dec. 2007.
- [46] Jin-Ping Zhang, Yun-Sheng Xu, and Wei-Dong Wang, "Microstrip-Fed Semi-Elliptical Dipole Antennas for Ultrawideband Communications", *IEEE Trans. Antennas Propag.*, vol. 56, no. 1, pp. 241-244, Jan. 2008.
- [47] Reza Zaker, Changiz Ghobadi, and Javad Nourinia, "Novel Modified UWB Planar Monopole Antenna with Variable Frequency Band-Notch Function", *IEEE Antennas Wireless Propag. Lett.*, vol. 7, pp. 112-114, 2008.
- [48] Kenny Seungwoo Ryu, Student Member, IEEE, and Ahmed A. Kishk, "UWB Antenna With Single or Dual Band-Notches for Lower WLAN Band and Upper WLAN Band", *IEEE Trans. Antennas Propag.*, vol. 57, no. 12, pp. 3942-3950, Dec. 2009.
- [49] Raha Eshtiaghi, Javad Nourinia, and Changiz Ghobadi, Electromagnetically Coupled Band-Notched Elliptical Monopole Antenna for UWB Applications, *IEEE Trans. Antennas Propag.*, vol. 58, pp.1397–1402, April 2010.
- [50] Ke Zhang, Yuanxin Li, Member, IEEE, and Yunliang Long, "Band-Notched UWB Printed Monopole Antenna with a Novel Segmented Circular Patch", *IEEE Antennas Wireless Propag. Lett.*, vol. 9, pp.1209-1212, 2010.
- [51] Hui Zhao, Fu-Shun Zhang, Xiao-Kuan Zhang, Y. Zhu, "Design of a Simple and Compact Monopole UWB Antenna with Controllable Band-notched Function", International Sympo. *Antennas Propag. and EM Theory*, pp. 170-172, 29 Nov-2 Dec.2010
- [52] R. Movahedinial M.N. Azarmanesh1, "Ultra-wideband band-notched printed monopole antenna", *IET Microw. Antennas Propag.*, vol. 4, Iss. 12, pp. 2179–2186, 2010.
- [53] B. Rahmati H.R. Hassani, "Multi-notch slot loaded wide band planar plate monopole antenna", *IET Microw. Antennas Propag.*, 2010, Vol. 4, Iss. 12, pp. 2160–2165
- [54] Mohammad Yazdi and Nader Komjani, "Design of a Band-Notched UWB Monopole Antenna by Means of an EBG Structure", *IEEE Antennas Wireless Propag. Lett.*, vol.10, pp. 170-173, 2011.
- [55] Trang Dang Nguyen, Dong Hyun Lee, and Hyun Chang Park, "Design and Analysis of Compact Printed Tripple Band-Notched UWB Antenna", *IEEE Antennas Wireless Propag. Lett.*, vol.10, pp. 403–406, 2011.
- [56] H. Karimi,<sup>1</sup> Ch. Ghobadi,<sup>1</sup> J. Nourinia,<sup>1</sup> and M. Ojaroudi, "Enhanced Bandwidth Small E-Shaped Monopole Antenna For Uwb Applications With Variable Frequency Band-Notch Function", *Microw. Opt. Technol. Lett.* vol. 54, no. 1, pp. 267-271, January 2012.

- [57] D. Zhou, S. Gao, F. Zhu, R. A. Abd-Alhameed, and J. D. Xu, "A Simple And Compact Planar Ultra Wide-Band Antenna With Single Or Dual Band-Notched Characteristics", *Progress In Electromagnetics Research*, vol. 123, pp. 47-65, 2012.
- [58] Shi-Wei Qu, Jia-Lin Li, and Quan Xue, "A Band-Notched Ultrawideband Printed Monopole Antenna", *IEEE Antennas Wireless Propag. Lett.*, vol.5, pp. 495-498, 2006.
- [59] Wen-Shan Chen and Kai-Cheng Yang, "CPW-fed Planar Ultra-wideband Antenna having a frequency Band-Rejected function", *IEEE Region 10 Conference*, 30 Oct.-2 Nov., 2007.
- [60] Qing-Xin Chu and Ying-Ying Yang, "A Compact Ultrawideband Antenna With 3.4/5.5 GHz Dual Band-Notched Characteristics," *IEEE Trans. Antennas Propag.*, vol. 56, no. 12, pp. 3637-3644, Dec. 2008.
- [61] Dan-Hong Bi, Zhi-Yuan Yu, "A CPW-Fed Staircase shape Antenna with Dual Stopband Characteristic for UWB Communications", *International Sympo. Antennas Propag. and EM Theory*, pp. 140-143, 2-5 Nov. 2008.
- [62] Fei YU, Chunhua WANG, "A CPW-Fed Novel Planar Ultra-Wideband Antenna with a Band-Notch Characteristic", *Radioengineering*, vol. 18, no. 4, pp. 551-555, Dec. 2009.
- [63] Dang Trang Nguyen, Dong Hyun Lee, and Hyun Chang Park, "Very Compact Printed Triple Band-Notched UWB Antenna with Quarter-Wavelength Slots", *IEEE Antennas Wireless Propag. Lett.*, vol. 11, pp. 411-414, 2012.
- [64] I. Pele, A. Choussenaud and S. Toutain, "Simultaneous modeling of impedance and radiation pattern antenna for UWB pulse modulation," *IEEE. Antennas Propag., Society Int. Symp.*, pp. 1871-1874, 20-25 June, 2004.
- [65] B. Allen, Dohler, Okon, Malik, Brown, Edwards, "Ultra-wideband Antennas and Propagation", John Wiley and Sons, Ltd., 2007.
- [66] Sunghun Kim, Junho Choi, and Youngsik Kim, "CPW-Fed Broadband G-Shaped Monopole Antenna for WLAN Applications", *Microw. Opt. Technol. Lett.* vol. 48, no. 11, pp. 2310-2311, Nov. 2006.
- [67] M. Tecpoyotl-Torres and J. G. Vera-Dimas, "Dual band Pentagonal Microstrip Antenna for Wi-Fi Applications", *Electronics, Robotics and Automotive Mechanics Conference*, pp. 255-258, 2010.
- [68] Meng-Ju Chiang, Tian-Fu Hung, Jia-Yi Sze, and Sheau-Shong Bor, "Miniaturized Dual Band CPW-Fed Annular Slot Antenna Design With Arc-Shaped Tuning Stub", *IEEE Trans. Antennas Propag.*, vol. 58, no. 11, pp. 3710-3715, Nov. 2010.
- [69] Wei Hu, Ying-Zeng Yin, Peng Fei, and Xi Yang, "Compact Triband Square-Slot Antenna With Symmetrical L-Strips for WLAN/WiMAX Applications", *IEEE Antennas Wireless Propag. Lett.*, vol.10, pp. 462-465, 2011.

- [70] Hala Elsadek, and Dalia M. Nashaat, "Multiband and UWB V-Shaped Antenna Configuration for Wireless Communications Applications", *IEEE Antennas Wireless Propag. Lett.*, vol.7, pp. 89-91, 2008.
- [71] Jia-Yi Sze, and Kin-Lu Wong, "Bandwidth Enhancement of a Microstrip-Line-Fed Printed Wide-Slot Antenna", *IEEE Trans. Antennas Propag.*, vol. 49, no. 7, pp. 1020-1024, July 2001.
- [72] Horng-Dean Chen, "Broadband CPW-Fed Square Slot Antennas With a Widened Tuning Stub", *IEEE Trans. Antennas Propag.*, vol. 51, no. 8, pp. 1982-1986, Aug. 2003.
- [73] Jyh-Ying Chiou, Jia-Yi Sze, and Kin-Lu Wong, "A Broad-Band CPW-Fed Strip-Loaded Square Slot Antenna", *IEEE Trans. Antennas Propag.*, vol. 51, no. 4, pp. 719-721, April 2003.
- [74] Jen-Yea Jan and Jia-Wei Su, "Bandwidth Enhancement of a Printed Wide-Slot Antenna With a Rotated Slot," *IEEE Trans. Antennas Propag.*, vol. 53, no. 6, pp. 2111–2114, June. 2005.
- [75] Y.Sung, "Bandwidth Enhancement of a Microstrip Line-Fed Printed Wide-Slot Antenna With a Parasitic Center Patch," *IEEE Trans. Antennas Propag.*, vol. 60, no. 4, pp. 1712–1716, April 2012.
- [76] A. Dastranj, Ali Imani and Mohammad, "Printed Wide-Slot Antenna for Wideband Applications," *IEEE Trans. Antennas Propag.*, vol. 56, no. 10, pp. 3097–3102, Oct. 2008.
- [77] A. Dastranj and Habibollah Abiri, "Bandwidth Enhancement of Printed E-shaped Slot Antennas Fed by CPW and Microstrip Line," *IEEE Trans. Antennas Propag.*, vol. 58, no. 4, pp. 1402–1407, Oct. 2010.
- [78] Rezaul Azim, Mohammad T. Islam and N. Misran, "Compact Tapered-Shaped Slot Antenna for UWB Applications," *IEEE Antennas Wireless Propag. Lett.*, vol. 10, pp. 1190–1193, 2011.
- [79] Shi Cheng, Paul Hallbjörner, and Anders Rydberg, "Printed Slot Planar Inverted Cone Antenna for Ultrawideband Applications", *IEEE Antennas Wireless Propag. Lett.*, vol.7, pp. 18-21, 2008.
- [80] R. Chair, A. A. Kishk, and K. F. Lee, "Ultrawide-band Coplanar Waveguide-Fed Rectangular Slot Antenna", *IEEE Antennas Wireless Propag. Lett.*, vol. 3, pp. 227-229, 2004.
- [81] T. Yang and W. A. Davis, "Planar Half-Disk Antenna Structures for Ultra-Wideband Communications", *IEEE Antennas Propag., Society Int. Symp.*, vol.3, pp.2508-2511, 2004
- [82] Abdelnasser A. Eldek, Atef Z. Elsherbeni, and Charles E. Smith, "Design Of Ultra Wideband Coplanar Waveguide Fed Rectangular Slot Antenna With Tuning Stub", *IEEE Antennas Propag., Society Int. Symp.*, pp. 676-679, 2005.

- [83] D.C. Chang, J.C. Liu and M.Y. Liu, "Improved U-shaped stub rectangular slot antenna with tuning pad for UWB applications", *Elect.Lett.*, vol. 41, no. 20, Sep. 2005.
- [84] P. Jearapraditkul, W. Kueathaweekun, N. Anantrasirichai, Sangaroon and T. Wakabayashit, "Bandwidth Enhancement of CPW-Fed Slot Antenna with Inset Tuning Stub", *International Symposium on Communications and Information Technologies*, pp. 14-17, (ISCIT 2008).
- [85] B. Purahong<sup>1</sup>, P. Jearapradikul, T. Archevapanich, N. Anantrasirichai, O. Sangaroon, "CPW-Fed Slot Antenna with Inset U-Strip Tuning Stub for Wideband" *International Conference on Control, Automation and Systems*, COEX, Seoul, Korea, pp. 1781-1784 Oct. 14-17, 2008.
- [86] N. Arsusiri, O. Sangaroon, S. Puntheeranurak, N. Anantrasirichai, "Trapezoid-Stub Fed Rectangular Slot Antenna for WLAN and WiMAX Applications", *International Conference on Control, Automation and Systems 2010*, KINTEX, Gyeonggi-do, Korea, pp. 2206-2209, Oct. 27-30, 2010.
- [87] Shih-Hsun Hsu and Kai Chang, "Ultra-Thin CPW-Fed Rectangular Slot Antenna for UWB Applications" *IEEE Antennas Propag., Society Int. Symp.*, pp. 2587-2590, 2006.
- [88] X. Chen, W. Zhang, R. Ma, J. Zhang and J. Gao, "Ultra-wideband CPW-fed antenna with round corner rectangular slot and partial circular patch", *IET Microw. Antennas Propag.*, vol. 1, no. 4, pp. 847-851, Aug. 2007.
- [89] Boonchai Kaewchan, W. Naktong, Amnoiy Ruengwaree, "T -shape slot in rectangular slot antenna to enlarge bandwidth for broadband communication", *International Sympo. Antennas Propag. and EM Theory*, pp. 282-285, 29 Nov.-2 Dec.2010.
- [90] Pengcheng Li, Jianxin Liang, and Xiaodong Chen, "Study of Printed Elliptical/Circular Slot Antennas for Ultrawideband Applications", *IEEE Trans. Antennas Propag.*, vol. 54, no. 6, pp. 1670-1675, JUNE 2006.
- [91] Evangelos S. Angelopoulos, Argiris Z. Anastopoulos, Dimitra I. Kaklamani, Antonis A. Alexandridis, Fotis Lazarakis, and Kostas Dangakis, "Circular and Elliptical CPW-Fed Slot and Microstrip-Fed Antennas for Ultrawideband Applications", *IEEE Antennas Wireless Propag. Lett.*, vol. 5, pp. 294-297, 2006.
- [92] W.J. Lui, C.H. Cheng and H.B. Zhu, "Frequency notched printed slot antenna with parasitic open-circuit stub", *Elect.Lett.*, vol. 41, no. 20, Sep. 2005.
- [93] Yi-Cheng Lin, and Kuan-Jung Hung, "Compact Ultrawideband Rectangular Aperture Antenna and Band-Notched Designs", *IEEE Trans. Antennas Propag.*, vol. 54, no. 11, pp. 3075- 3081, Nov. 2006.
- [94] Chia-Shan Li and Chien-Wen Chiu, "A' CPW-Fed Band-Notched Slot Antenna for UWB Applications" *IEEE Antennas Propag., Society Int. Symp.*, pp. 1-4, 5-11 July 2004.

- [95] X. Qing and Z.N. Chen, "Compact coplanar waveguide-fed ultra-wideband monopole-like slot antenna", *IET Microw. Antennas Propag.*, vol. 3, Iss. 5, pp. 889–898, 2009.
- [96] M. Naser-Moghadasi, R.A. Sadeghzadeh, L. Asadpor, S. Soltani and B.S. Virdee, "Improved band-notch technique for ultra-wideband antenna" *IET Microw. Antennas Propag.*, vol. 4, Iss. 11, pp. 1886–1891, 2010.
- [97] Y.S. Li, X.D. Yang, C.Y. Liu and T. Jiang, "Compact CPW-fed ultra-wideband antenna with band-notched characteristic", *Elect.Lett.*, vol. 46, no. 23, Nov. 2010.
- [98] Akkala. Subbarao, S. Raghavan, "A Miniaturized Ultra Wideband Slot Antenna with Band Notched Characteristic", *International Journal Of Microwave And Optical Technology*, vol.6, pp. 278-283, 2011.
- [99] Mohammad Mehdi, Samadi Taheri, Hamid Reza Hassani, and Sajad Mohammad Ali Nezhad, "UWB Printed Slot Antenna with Bluetooth and Dual Notch Bands", *IEEE Antennas Wireless Propag. Lett.*, vol.10, pp. 255-258, 2011.
- [100] A. C. Shagar and R. S. D. Wahidabanu, "Design and Analysis of Slot Antenna with Band Notch Function", *International Journal of RF and Microwave Computer-Aided Engineering*, vol. 22, no. 3, pp. 402-410, May 2012.
- [101] C. A. Balanis, *Antenna Theory Analysis and Design*, John Willy & Sons, 2<sup>nd</sup> Edition, Chap. 14, 1997.
- [102] R. Garg, P. Bhartia, I. Bahl and A. Ittipiboon, "Microstrip Antenna Design Handbook", Artech House, Boston, London, 2001.
- [103] J. R. James, P. S. Hall and C. Wood, "Microstrip Antenna: Theory and Design," *IEE Electromagnetic Waves*, Series 12, Peter Peregrinus, London, 1986.
- [104] A.K. Arya, M.V. Kartikeyan and A. Patnaik, "On the size reduction of Microstrip antenna with DGS", *International Conf., Infrared Millimeter and Terahertz Waves*, pp. 1-3, 2010.
- [105] M. K. Mohamed Amin, M. T. Ali, S. Saripuden, A.A Ab Aziz, "Design of Dual Rectangular Ring Antenna with DGS Technique for Wireless Application", *IEEE Symp. on Wireless Technol. and Applications (ISWTA)*, , Bandung, Indonesia, pp. 248- 253, September 23-26, 2012
- [106] Ka Hing Chiang and Kam Weng Tam, "Microstrip Monopole Antenna With Enhanced Bandwidth Using Defected Ground Structure", *IEEE Antennas Wireless Propag. Lett.*, vol. 7, pp. 532-535, 2008.
- [107] Zhong-Wu Yu, Guang-Ming Wang, and Ke Lu, "Wide Band Harmonic Suppression Based on Koch-Shaped Defected Ground Structure for a Microstrip Patch Antenna", *International Conf., Infrared Millimeter and Terahertz Waves Tech*, pp. 303-306, 2010.
- [108] M. Esa, U. Jamaluddin and M. S. Awang, "Antenna with DGS for Improved Performance", *Proceedings of 2010 IEEE- Asia-Pacific Conference on Applied Electromagnetics (APACE 2010)*, pp. 1-4, 9-11 Nov. 2010.



- [109] Yuan Dan Dong, Wei Hong, Zhen Qi Kuai, and Ji Xin Chen, "Analysis of Planar Ultrawideband Antennas With On-Ground Slot Band-Notched Structures", *IEEE Trans. Antennas Propag.*, vol. 57, no. 7, pp. 1886-1893, July 2009.
- [110] M. Ojaroudi, G. Ghanbari, N. Ojaroudi, and C. Ghobadi, "Small Square Monopole Antenna for UWB Applications with Variable Frequency Band-Notch Function", *IEEE Antennas Wireless Propag. Lett.*, vol. 8, pp. 1061-1064, 2009.
- [111] Li-Xian Li, Shun-Shi Zhong, and Min-Hua Chen, "Compact Band-Notched Ultra-Wideband Antenna Using Defected Ground Structure", *Microw. Opt. Technol. Lett.*, vol. 52, no. 2, pp. 286-289, Feb. 2010.
- [112] "CST- Microwave Studio, User's Manual,"2010
- [113] Ansoft HFSS 11.0 User Manual, San Jose, CA
- [114] Tamasi Moyra, Kumar Parui, Santanu Das, "Application of a Defected Ground Structure and Alternative Transmission Line for Designing a Quasi-Elliptic Lowpass Filter and Reduction of Insertion Loss", *International Journal of RF and Microwave Computer-Aided Engineering*, vol. 20, no. 6, pp. 682-688, Nov. 2010.
- [115] Jae-Kwan Lee and Young-Sik Kim, "Ultra-Wideband Bandpass Filter with Improved Upper Stopband Performance Using Defected Ground Structure", *IEEE Microwave and Wireless Components Letters*, vol. 20, no. 6, pp. 316-318, June 2010.
- [116] C Bo-ran Guan, Zhong-hai Zhang, "An ultra broadband antenna (UWB) loaded with defected ground structure (DGS)", *ICECC*, pp.1872-1874, 2011.
- [117] Jangyeol Kim, Nam Kim, and Seungwoo Lee, "A Broadband Antenna Using the Modified Ground Plane with a Complementary Split Ring Resonator for 5-GHz WLAN Band-Notched Performance", *Microw. Opt. Technol. Lett.*, vol. 54, no. 1, pp. 1-3, Jan. 2012.
- [118] M. Abdollahvand, G. R. Dadashzadeh, H. Ebrahimian, and M. Ojaroudi, "Compact Ultra-Wideband Printed Monopole Antenna Having Frequency Band-Notch Characteristic Using Defected Ground Structure", *Microw. Opt. Technol. Lett.* vol. 53, no. 10, pp. 2363-2368, Oct. 2011.
- [119] Jae-Kwan Lee and Young-Sik Kim, "A Multiband-Rejected UWB Monopole Antenna Using Interdigital Defected Ground Structure," *Microw. Opt. Technol. Lett.*, vol. 53, no. 2, pp. 312-314, Feb. 2011.
- [120] Chen Wang, Ze-Hong Yan, Ping Xu, and Bo Li, "A Triple Band-Notched UWB Printed Antenna with Various Slots", *Microw. Opt. Technol. Lett.* vol. 54, no. 9, pp. 2088-2091, Sep. 2012.
- [121] A.Elboushi, O.M. Ahmed, and A.R. Sebak, "Study of Ellptical Slot UWB Antennas with a 5.0-6.0 GHz Band-Notch Capacity," *Progress in Electromagnetic Research C*, vol. 16, pp. 207-222, 2010.

- [122] Nouri and G. R. Dadashzadeh, "A Compact UWB band-notched printed monopole antenna with defected ground structure," *IEEE Antennas Wireless Propag. Lett.*, vol. 10, pp. 1178-1181, 2011.
- [123] B. B. Mandelbrot, "The Fractal Geometry of Nature", New York, W. H. Freeman, 1983.
- [124] D. H. Werner, et al, "An Overview of Fractal Antenna Engineering Research," *IEEE Antennas and Propag. Magazine*, vol. 45, Issue 1, pp. 38-57, 2003.
- [125] John P. Gianvittorio and Yahya Rahmat-Samii, "Fractal Antennas: A novel Antenna Miniaturization Technique, and Applications," *IEEE Antennas and Propag. Magazine*, vol. 44, Issue 1, pp. 20-36, 2002.
- [126] S. R. Best, "On The Significance Of Self-Similar Fractal Geometry in Determining the Multiband Behavior of the Sierpinski Gasket Antenna," *IEEE Antennas and Propag. Lett.*, vol.1, pp. 22-25, 2002.
- [127] S. R. Best, "A comparison of the resonant properties of small space-filling fractal antennas," *IEEE Antennas and Propag. Lett.*, vol.2, pp. 197-200, 2003.
- [128] Philip W. Tang, "Fractal Multiband Antennas based on Polygons", *IEEE Antennas Propag., Society Int. Symp.*, vol.4, pp. 230-233, 2003
- [129] Kuem C. Hwang, "A Modified Sierpinski Fractal Antenna for Multiband Application", *IEEE Antennas Wireless Propag. Lett.*, vol. 6, pp. 357-360, 2007.
- [130] Carles Puente Baliarda, Carmen Borja Borau, Mònica Navarro Rodero, and Jordi Romeu Robert, "An Iterative Model for Fractal Antennas: Application to the Sierpinski Gasket Antenna", *IEEE Trans. Antennas Propag.*, vol. 48, no. 5, pp.713-719, May 2000.
- [131] Nima Bayatmaku, Parisa Lotfi, Mohammadnaghi Azarmanesh, and Saber Soltani, "Design of Simple Multiband Patch Antenna for Mobile Communication Applications Using New E-Shape Fractal", *IEEE Antennas Wireless Propag. Lett.*, vol. 10, pp. 873-875, 2011.
- [132] J. Pourahmadazar, C. Ghobadi, J. Nourinia and H. Shirzad, "Multiband ring fractal monopole antenna for mobile devices," *IEEE Antennas and Propag. Lett.*, vol.9, pp. 863-866, 2010.
- [133] Yi-Chieh Lee, Jwo-Shiun Sun, and Syuan-Ci Lin, "Wideband Fractal Printed Monopole Antennas", *Microw. Opt. Technol. Lett.*, vol. 49, Issue 6, pp. 1267-1272, June 2007.
- [134] Mahdi Naghshvarian-Jahromi, "Novel Wideband Planar Fractal Monopole Antenna", *IEEE Trans. Antennas Propag.*, vol. 56, no. 12, pp. 3844-3849, Dec. 2008.
- [135] A. Azari, "Ultra Wideband Fractal Microstrip Antenna Design", *Progress In Electromagnetics Research C*, vol. 2, pp. 7-12, 2008.
- [136] Abolfazi Azari, "A New Super Wideband Fractal Microstrip Antenna", *IEEE Trans. Antennas Propag.*, vol. 59, no. 5, pp.1724-1727, May 2011.

- 
- [137] Raj Kumar and K. K. Sawant, "Design Of CPW-Feed Inscribed Square Circular Fractal Antenna for UWB Applications', *Microw. Opt. Technol. Lett.*, vol . 53, Issue 5, pp. 1079-1083, May 2011.
- [138] Raj Kumar, P. Malathi, and K. Sawant, "On the Design of Wheel-Shaped Fractal Antenna", *Microw. Opt. Technol. Lett.*, vol . 53, Issue 1, pp.155-158, Jan., 2011.
- [139] Raj Kumar and P. N. Chaubey, "Design of Coplanar Waveguide-Feed Pentagonal-Cut Ultra-Wide Bandwidth Fractal Antenna and its Backscattering', *IET Microw. Antennas Propag.*, vol. 6, Iss. 13, pp. 1407–1414, 2012.
- [140] Yingsong Li, Xiaodong Yang, Chengyuan Liu, and Tao Jiang, "Miniaturization Cantor Set Fractal Ultrawideband Antenna with a Notch Band Characteristic", *Microw. Opt. Technol. Lett.*, vol. 54, no. 5, pp.1227-1230, May 2012.
- [141] Fan Yang, Xue-Xia Zhang, X. Ye and Y Rahmat-Samii, "Wide- Band E-Shaped Patch Antennas for Wireless Communcations", *IEEE Trans. Antennas Propag.*, vol. 49, no. 7, pp.1094-1100, July 2001.