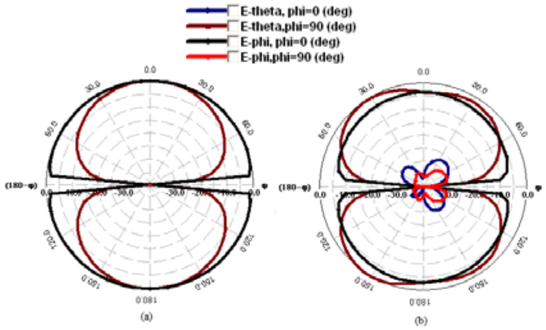

Figure 18: Simulated Radiation pattern of the side notches moved downward fractal antenna at **(a)** 900MHz **(b)** 2.1 GHz

In this sub-section, the two side notches are shifted downward by 5mm along the length of the rectangular patch with respect to its original position. Rectangular patch with notch shifted in downward direction is shown in Fig.19 (a) and its simulated S_{11} is shown in Fig.17 (b). Simulated bandwidth for S_{11} <-10dB is from (0.80-0.96) GHz and (1.74-2.92) GHz. Simulated radiation patterns at 900MHz and 2.1 GHz are shown in Fig.18 (a) and (b) respectively. At 900 MHz, the pattern is similar to the previous cases and there is minor change in the pattern at 2.1 GHz.

3. Conclusion

In this paper, a dual band planar monopole rectangular antenna with fractal stub is designed and fabricated. Parametric studies have been carried out to study the effect of various parameters on the bandwidth and radiation patterns at the two bands. The final antenna has bandwidth from (0.80-0.96) and (1.74-2.92) GHz. This dual band antenna covers the application areas of CDMA, GSM900, GSM1800, 3G, 4G and Wi-Fi bands with acceptable radiation pattern. Further improvement can be done in the radiation pattern at higher band.

References

[1] Ghatak, R.; Mishra, R.K.; Poddar, D.R., "Perturbed Sierpinski Carpet Antenna With CPW Feed for IEEE 802.11 a/b WLAN Application," IEEE Antennas and Wireless Propagation Letters,vol.7, pp.742-744, 2008
[2] Choukiker, Y.K.; Behera, S.K., "CPW-Fed compact multiband Sierpinski triangle antenna," Annual IEEE INDICON, 2010 , pp.1-3, 17-19 Dec., 2010
[3] Dau-Chyrh C.;et.al, "CPW-Fed Circular Fractal Slot Antenna Design for Dual-Band Applications," IEEE Transactions on Antennas and Propagation, vol.56, no.12, pp.3630-3636, Dec. 2008
[4] Jeemon, B.K.; Shambavi, K.; Alex, Z.C., "A multi-fractal antenna for WLAN and WiMAX application," IEEE Conference on Information & Communication Technologies (ICT), 2013, pp.953-956, 11-12 April 2013
[5] Min D.,; et.al, "Design of a CPW-fed Ultra Wideband Crown Circular Fractal Antenna," IEEE Antennas and Propagation Society International Symposium 2006, pp.2049-2052, 9-14 July 2006
[6] Kumar G and Ray K. P., Broadband Microstrip Antenna, Artech House, USA 2003.
[7] H.Tanan, C. Mahatthanajatuphae, A. Prayoot , "Study of CPW-Fed Slot Antennas with Fractal Stubs," The 8th Electrical Engineering/ Electronics, Computer, Telecommunications and Information Technology (ECTI)Association of Thailand - Conference 2011
[8] K. Raj, M. P, S.K, "On The Design Of Wheel-Shaped Fractal Antenna," Microwave And Optical Technology Letters / Vol. 53, No. 1 January 2011
[9] A. Kaka, M. Toycan, V. Bashiry, H. Ademgil and S. D. Walker, "A Fractal Geometry, Multi-band, Miniaturized Monopole Antenna Design for UWB Wireless Applications," 978-1-4577-0048-4/11/$26.00 ©2011 IEEE
[10] C.Yogesh, B.S.K, "Microstrip Line-Fed Modified Sierpinki Fractal Monopole Antenna for Dual-Wideband Applications," 978-1-4244-7770-8/10/$26.00 © 2010 IEEE
[11] W. Norakamon, S. Thanakarn, "A Multiband Fractal Ring Antenna Fed by Capacitive Coupling," The 8th Electrical Engineeringl Electronics, Computer,Telecommunications and Information Technology (ECTI) Association of Thailand - Conference 2011
[12] IE3D Software from Mentor Graphics