A Design of Dual Band MNG Antenna for Wi-Fi Applications

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Antennas which consist of metamaterial-based transmission line (MTM-based TL) such as composite right/left handed (CRLH), epsilon-negative (ENG), and mu-negative (MNG) TL have been widely studied to overcome limitations of conventional antennas. The basic principle of the MTM-based TL is to adjust the phase velocity to resonate at the desired frequency. Various types of MNG antennas have been proposed (For example, K. Wei Z. Zhang Z. Feng M. F. Iskander, "A MNG-TL loop antenna array with horizontally polarized omnidirectional patterns," *IEEE Trans. Antennas Propag.*, vol. 60, no. 6, pp. 2702–2010, Jun. 2012). Most of the MNG antennas focused only on zeroth order resonance (ZOR).

In this paper, we propose the dual band MNG antenna which covers Wi-Fi bands. The proposed antenna consists of different sized two MNG TLs as shown in Fig. 1. The outer MNG TL's ZOR frequency is near 2.4GHz. When the inner MNG TL is added, the outer MNG TL resonates near 5.5 GHz, because of the coupling between inner and outer MNG TL. As a results, the bandwidth of the antenna is shown in Fig. 2, and it includes the Wi-Fi lower (2.4 ~ 2.4835GHz) and upper (5.15 ~ 5.825GHz) bands. The electrical size of the antenna is 1/4.5 λ x 1/4.5 λ x 1/98.4 λ (27.6 mm x 27.6 mm x 1.27 mm). The radiation efficiency of the antenna is over 85 % and 97 %, respectively. The details of the design procedure and measured results will be presented at the site.

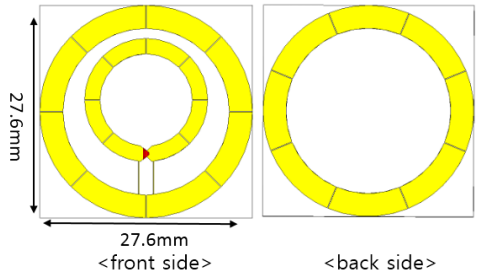

Figure 1. Simulated dual band antenna model

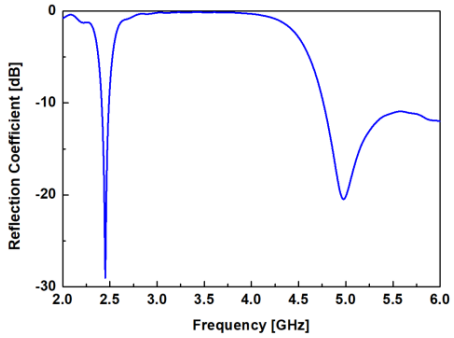

Figure 2. Simulated S-parameter of proposed dual band antenna

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