

A Wideband Dual Frequency Printed Dipole Antenna Using a Parasitic Element

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In this paper, a wideband dual frequency printed dipole antenna using a parasitic element is proposed. This antenna is designed and fabricated at the adjacent dual frequency bands (PCS: 1750~1870 MHz and IMT-2000: 1920-2170 MHz).

While the parasitic element of the reported dipole antenna is used for director [1], that of the proposed dipole antenna is for the dual-frequency operation. The parasitic element is very close to the driving dipole antenna. The proposed design is shown in Fig. 1. Feeding line and the dipole antenna lie on the top of the dielectric, and ground plane is located on the bottom of the dielectric. The electric field of the driving dipole antenna is coupled to the parasitic element, which operates as another radiator. The dipole antenna and the parasitic element are designed to have the resonant length of the different operating frequencies, and the parasitic element is designed to resonate at the lower frequency. This antenna is fed by the broadband radial stub balun with a transition which converts microstrip line into CPS (Co-Planar Stripline) [2]. This antenna is fabricated on the dielectric substrate with a relative dielectric constant of 7.8 and thickness of 2 mm. The size of the radiator is 46 mm $\times$ 6.1 mm.

The simulated and measured return losses of the proposed antenna are shown in Fig. 2. This antenna has dual-resonance at 1.8 GHz and 2.1 GHz and operating bandwidth of 860 MHz for VSWR 2:1. Fig. 3 shows the input impedance of the proposed antenna. The radiation patterns and the gains of this antenna are nearly same as the conventional dipole antennas.

From above results, the proposed antenna element has the specifications enough to use at the bands of PCS and IMT-2000. Therefore, this may be used as an antenna at the base station of PCS and IMT-2000 services.

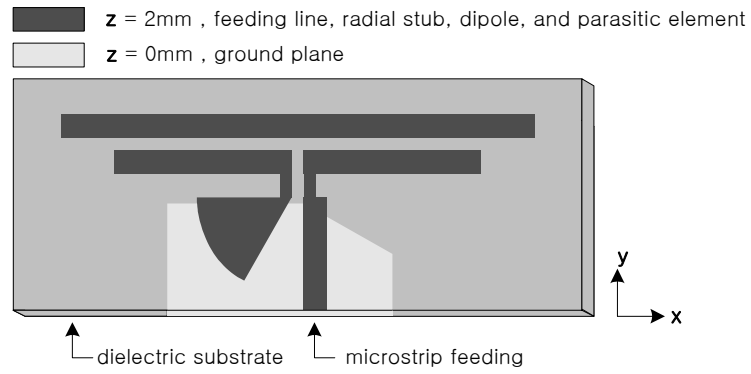


Fig. 1. Basic geometry of the dual frequency printed dipole antenna using a parasitic element

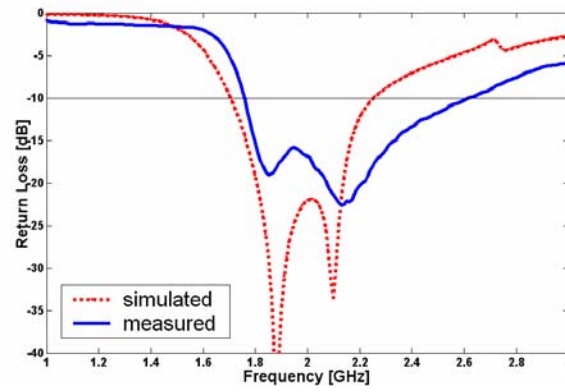


Fig. 2. Return loss of the proposed antenna

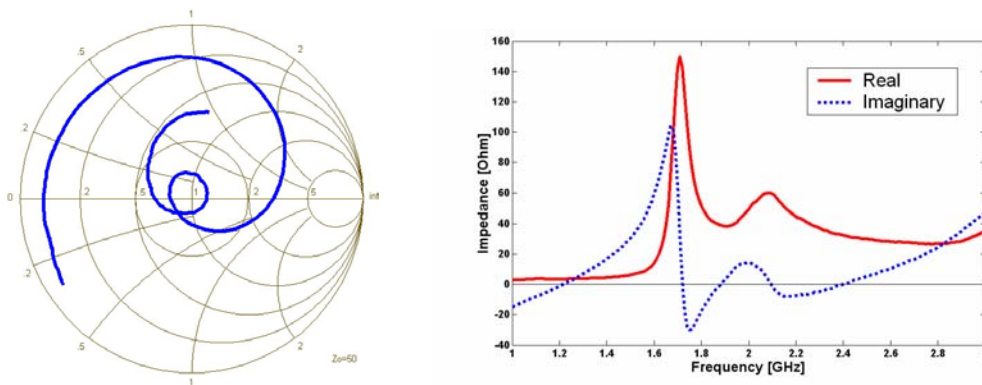


Fig. 3. Measured input impedance of the proposed antenna

References

- [1] Y. Qian, W. R. Deal, N. Kaneda, T. Itoh, "Microstrip-fed quasi-Yagi antenna with broadband characteristics," *Electronics Letters*, Vol.34, Issue.23, pp 2194 -2196, 1998
- [2] R. N. Simons, N. I. Dib and L. P. B. Katehi, "Coplanar stripline to microstrip transition," *Electronics Letters*, Vol.31, Issue.20, pp 1725-1726, 1995

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