

## A STUDY ON UWB DIPOLE ANTENNA WITH BAND CUT-OFF CHARACTERISTICS USING MULTI-RESONANCE METHOD

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### ABSTRACT

In this paper, the UWB dipole antenna with the band cutoff characteristics using the multi-resonance method is studied and proposed. The proposed antenna is designed to have the operating bandwidth of the UWB communication released by FCC, and to have the band cut-off characteristics with the sharp cutoff response at the WLAN band. To obtain the wideband operation of the antenna, the proposed antenna has two broadband dipole resonators. To get the band cut-off characteristics, two narrowband dipole resonators are added. The bandwidth of each dipole resonator is designed according to the relationship between the bandwidth and the arm width of dipole. The fabricated antenna has the operating bandwidth of 2.7 GHz to 11.0 GHz for VSWR < 2. The band cut-off frequency range is measured as 5.10 GHz ~ 5.75 GHz for -3 dB return loss. The radiated power at this band is measured as 15 dB less than the power at the operating frequency band. The proposed antenna is expected to be utilized in the UWB system without the additional circuit for the suppression of the WLAN band.

### I. INTRODUCTION

UWB (Ultra Wide Band) system is allocated to utilize the spectrum of 3.1 GHz to 10.6 GHz, that is, 7500 MHz of available spectrum for unlicensed use according to the regulations released by FCC. However, the electromagnetic interference can be happened at the HIPERLAN/2 bands (5.15 ~ 5.35 GHz, 5.470 ~ 5.725 GHz) and the IEEE 802.11a bands (5.15 ~ 5.35 GHz, 5.725 ~ 5.825 GHz) which are used for the WLAN (Wireless Local Area Network) services in Europe and USA, respectively. Therefore, practically, the UWB system can emerge to use the spectrum of 3.1 ~ 5.15 GHz and 5.825 ~

10.6 GHz, which is the spectrum of the UWB regulation except the WLAN service bands [1].

Due to this restriction at the WLAN band, the UWB RF system contains the additional circuit such as the notch filter to suppress the operation at this band. However, with the UWB antenna which has the band cut-off characteristics at the WLAN band, the UWB RF circuit can be designed concisely. Since both the ultrawide bandwidth and the band cut-off characteristics can be obtained by the multi-resonance method. Therefore, in this paper, the UWB dipole antenna with the band cut-off characteristics using the multi-resonance method is proposed.