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## A Slot Resonators Based Quintuple Band-Notched Y-Shaped Planar Monopole Ultra-Wideband Antenna

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Abstract—A Y-shaped ultra-wideband (UWB) monopole antenna containing modified ground plane with five stop bands is presented. An inverted U-shaped slot and a C-shaped slot are placed on Y-shaped radiating patch to achieve two notched bands while three pairs of C-shaped slots are placed at different positions on modified ground plane to achieve three more notched bands. The proposed antenna is designed, fabricated and experimentally tested. The designed Y-shaped antenna has overall dimensions of  $36 \times 38 \times 1.6 \text{ mm}^3$  ( $0.34\lambda_l \times 0.36 \lambda_l \times 0.016 \lambda_l$ ) and has impedance bandwidth 2.86-13.3 GHz at  $|S_{11}| < -10 \text{ dB}$  level. Measured band notches are achieved at 3.75/5.43/7.87/8.62/9.87 GHz centre notched frequencies to eliminate worldwide interoperability for microwave access (WiMAX) band (3.45-4.0 GHz), wireless local area network (WLAN) band (5.15-5.90 GHz), X-band for satellite communication (6.77-8.00 GHz), ITU-8 band (8.3-9.1 GHz), and radio navigation (RN) band (9.3-10.6 GHz), respectively. Variation of slot parameter on individual band notch is also investigated. Omnidirectional radiation pattern for XZ-plane and dipole-like radiation pattern for YZ-plane are observed. Stable gain, variation of phase response in linear fashion and group delay  $< 1.3 \text{ ns}$  for whole ultra-wideband except at band notches is achieved.

Keywords: UWB antenna, notched band, wireless communication frequencies.

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