

Multiband printed monopole antennas loaded with OCSRRs for PANs and WLANs

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Abstract-

Multiband printed monopole antennas loaded with open complementary split-ring resonators (OCSRRs) are presented. The OCSRRs, modeled as parallel LC resonant tanks, act as high-impedance elements at their resonance frequencies, and different effective $\lambda/4$ sections can be achieved in the monopole by placing them at proper locations. Thus, the first working frequency is related to the length of the monopole, while the additional bands are controlled by the resonance frequencies of the OCSRRs. Moreover, the proposed antennas present monopolar radiation characteristics at all the operation bands. Two prototypes are designed, manufactured and measured: 1) a single-loaded OCSRR dual-band printed monopole antenna covering the Bluetooth and IEEE 802.11a/b/g/n bands (2.40-2.48 and 5.15-5.80 GHz, respectively); and 2) a triband prototype based on the same design, but with an additional OCSRR designed to also cover the IEEE 802.11y frequency band (3.65-3.70 GHz). Both antennas are printed on a single-layer of a low-cost substrate, resulting in very compact designs.

Index Terms- Metamaterials, monopole antenna, multifrequency antennas, printed antennas.

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