

# Extension of Circular-Strip Loaded Cross- Dipole Frequency Selective Surface to VHF– UHF for Wideband EMI Shielding

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**Abstract:** *A compact, conformal, and wideband frequency selective surface (FSS) for electromagnetic interference (EMI) shielding in the VHF and UHF bands is presented. This paper presents the extension of a previously reported circular-strip loaded crossed-dipole frequency selective surface (FSS) topology to the VHF– UHF frequency range for wideband electromagnetic interference (EMI) shielding. Building upon the geometry reported in prior work, the unit-cell structure is adapted for VHF–UHF operation using a high-permittivity substrate and dual-layer complementary implementation. The unit cell measures only  $10\text{ mm} \times 10\text{ mm}$  ( $\approx 0.0167\lambda$  at 500 MHz) with a thickness of 25 mil. Full-wave simulations and experimental validation using a finite  $20 \times 20$  element array demonstrate shielding effectiveness exceeding 20 dB over a wide frequency range with stable performance for both polarizations and for incidence angles up to  $60^\circ$ . The results experimentally validate the feasibility of extending GHz-band miniaturized FSS concepts to the VHF–UHF regime for conformal EMI shielding applications in spacecraft and other compact RF platforms.*

**Keywords:** Frequency selective surface, EMI shielding, VHF, UHF, miniaturization, conformal structures

