New Multi-Frequency Miniaturized-Element Frequency Selective Surface Design

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ABSTRACT

This thesis propose a new multi-frequency miniaturized-element frequency selective surface (FSS) design. This miniaturized periodic element, creating a multi-band FSS, has closely spaced bands of operation. The mechanism is showed about these element resonances and the new way to make these resonances closer. The bandstop and bandpass FSSs can be simultaneouely created by using this element and its complementary structure without extra effort. In addition, it can use the multi-frequency miniaturized-element for further application, proposing a new reconfigurable miniaturized periodic element for creating a switchable multi-band FSS. By reconfiguring the FSS elements based on an alignment, it can generate more FSS operation bands. These FSS ’s created demonstrate excellent resonance stability by using the element with respect to different polarization and incidence angles. Consequently, these miniaturized-element FSS ’s are useful for only limited space, requiring a large number of operation bands and closely spaced bands of operation. Finally, we design a high delectric-constant antenna, put it in a bandpass shielding enclosure (BPSE), and find the internal antenna's optimal relative position in the BPSE.

Keywords : frequency selective surface (FSS)、miniaturized periodic element、spatial filter、electromagnetic architecture

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