Frequency Shiftable Liquid Crystal Antennae with Different Feeding Techniques

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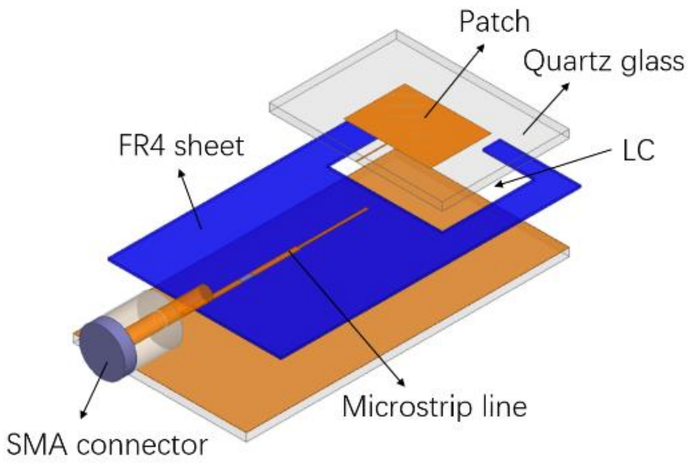
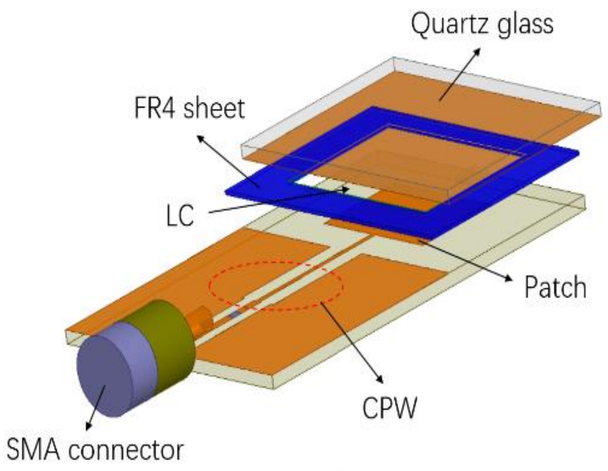
1. Device architectures



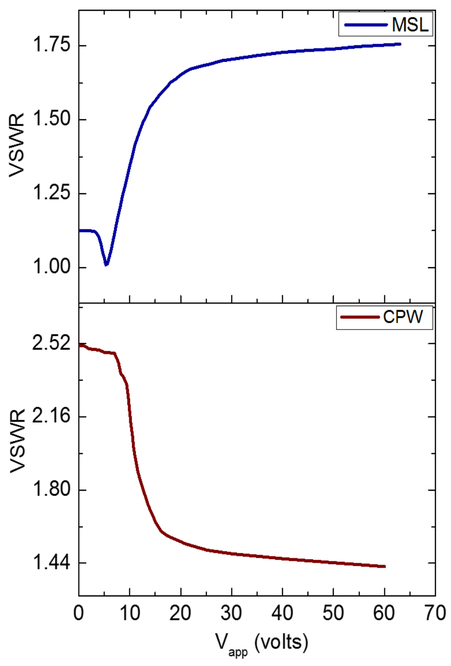
(a)



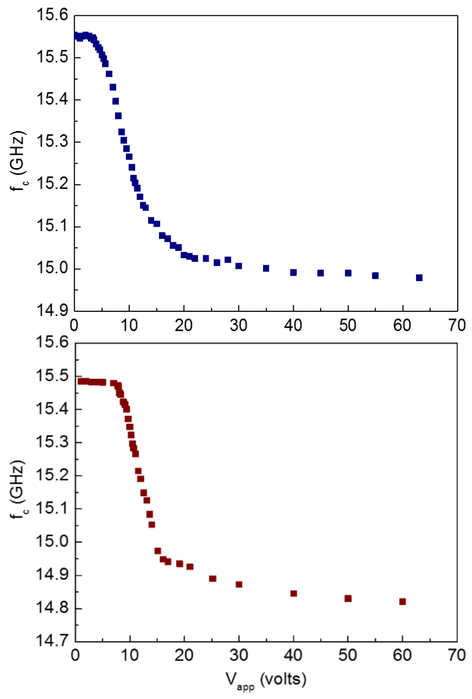
(b)

LC patch antennae with two different feedings: (a) microstrip line feeding; (b) coplanar waveguide feeding.

2. Voltage-dependent electrical property

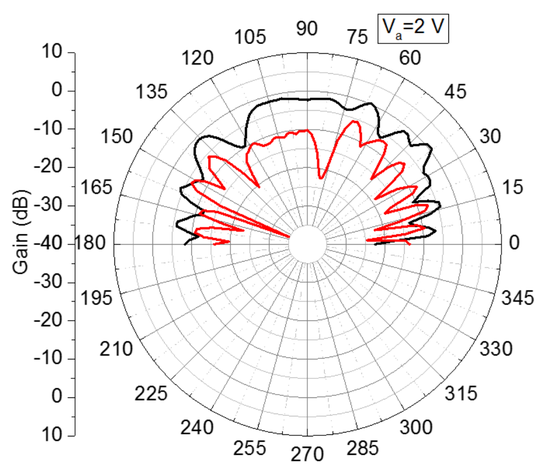


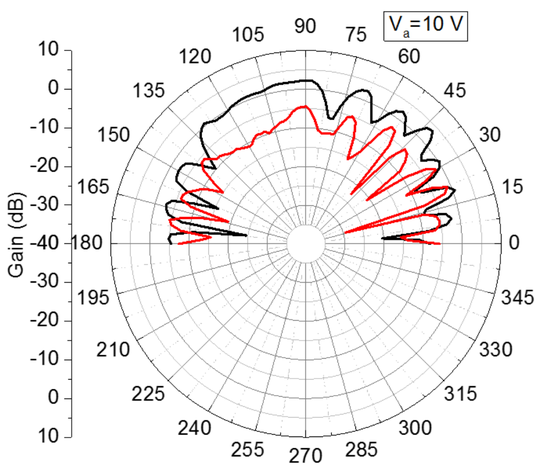
Measured VSWR versus applied voltage

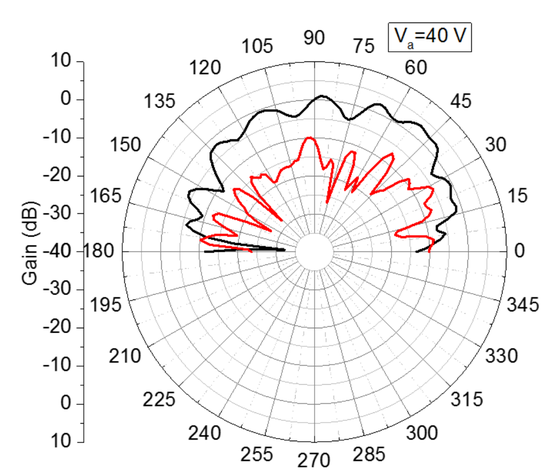


Measured resonant frequency versus applied voltage

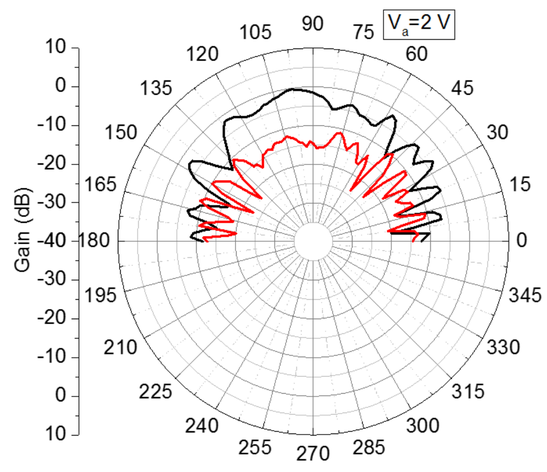
3. Voltage-dependent radiation patterns

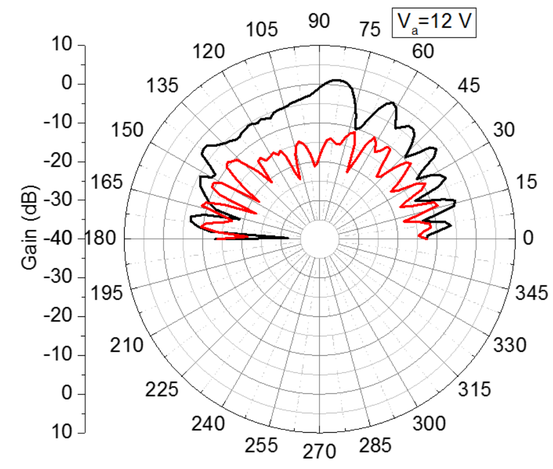


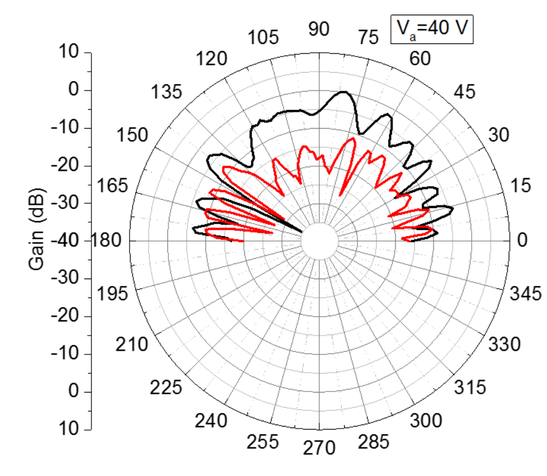




LC patch antenna with MSL feeding







LC patch antenna with CPW feeding

Note: the black curve represents the co-polarization state; the red one represents the cross-polarization state.

4. Conclusion

LC antennae with the MSL feeding and the CPW feeding are both realized in this work. Although there are differences in some aspects due to the fabrication deviation, their general microwave properties are similar to each other. Both of the two LC antennae show continuous frequency tunability, while their radiation property keeps almost unchanged for all the states. The frequency tunable LC antenna has promising potential for applications, such as low cost and low profile antenna systems with both the transmitting and receiving functionalities.