Reconfigurable scan-beam single-arm spiral antenna integrated with RF MEMS switches

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Abstract

- The system is based on a single arm spiral antenna.
- The length of the spiral is varied with the help of MEMS switches.
- Thus we are able to arrive at spiral antennas of different lengths and hence with different return loss characteristics.
- The operating frequencies is from 3GHz to 10 GHz.

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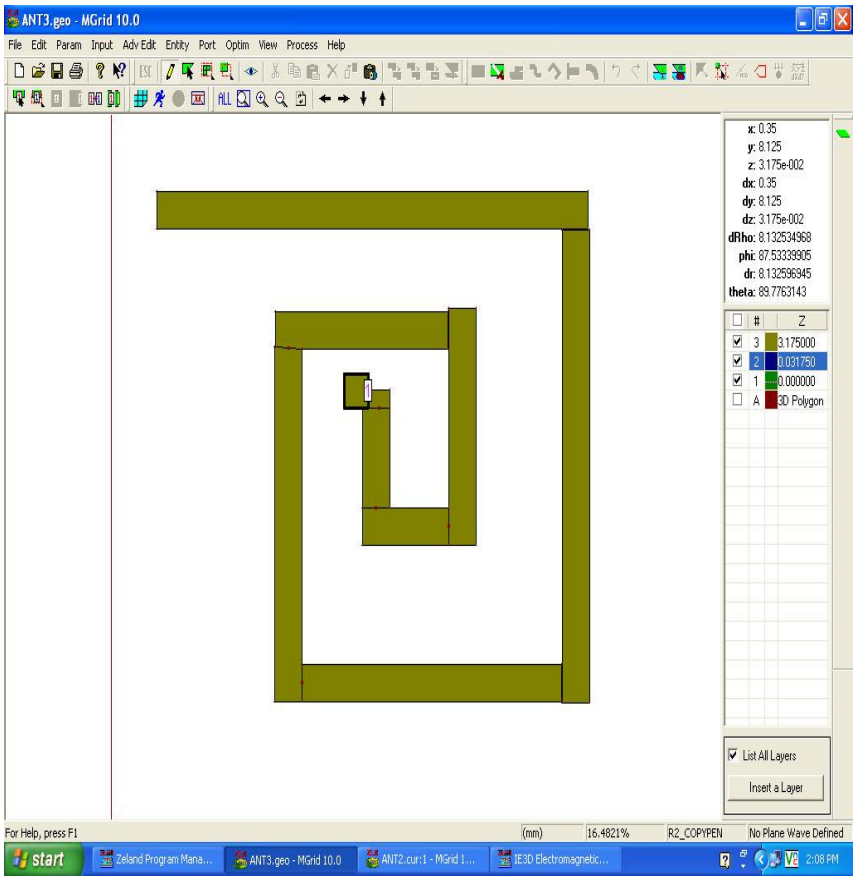
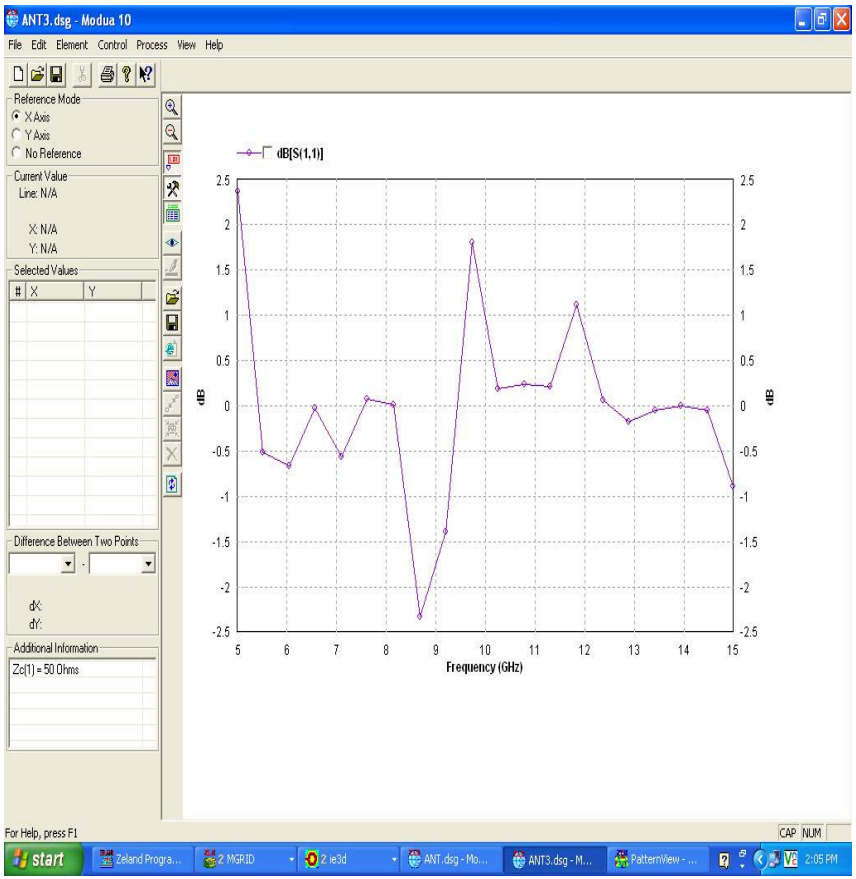
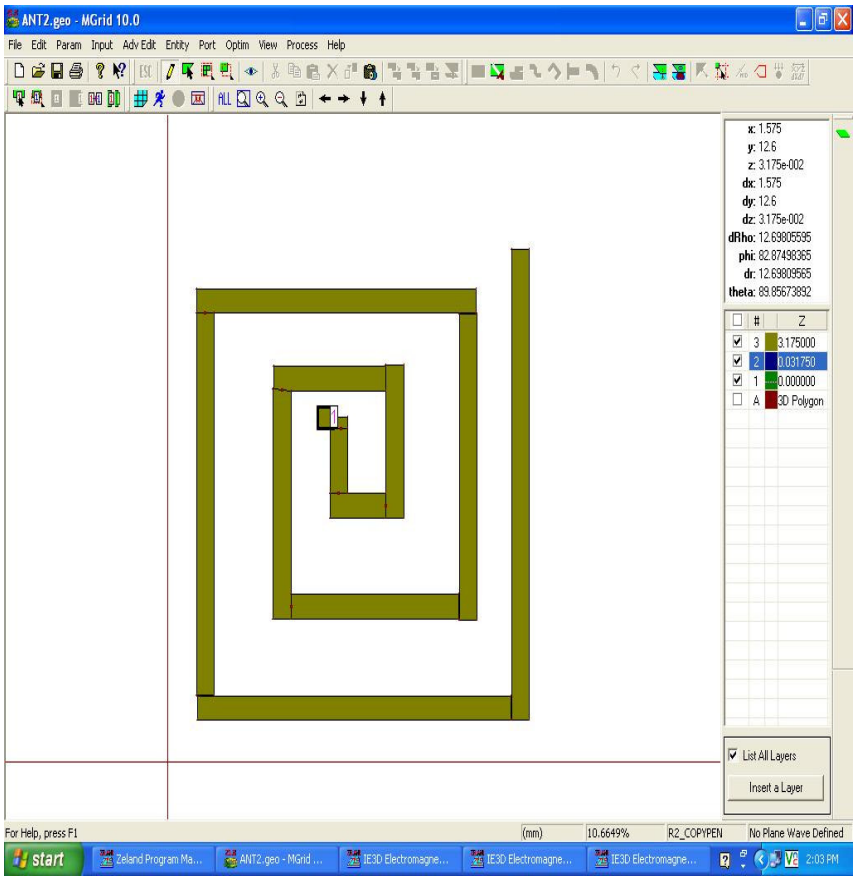
- The substrate chosen was a standard microwave PCB with ε_r=3.27 and loss tangent of 0.004.
- The structure is simulated in IE3D simulator with switches in ON and OFF conditions separately and return loss obtained.

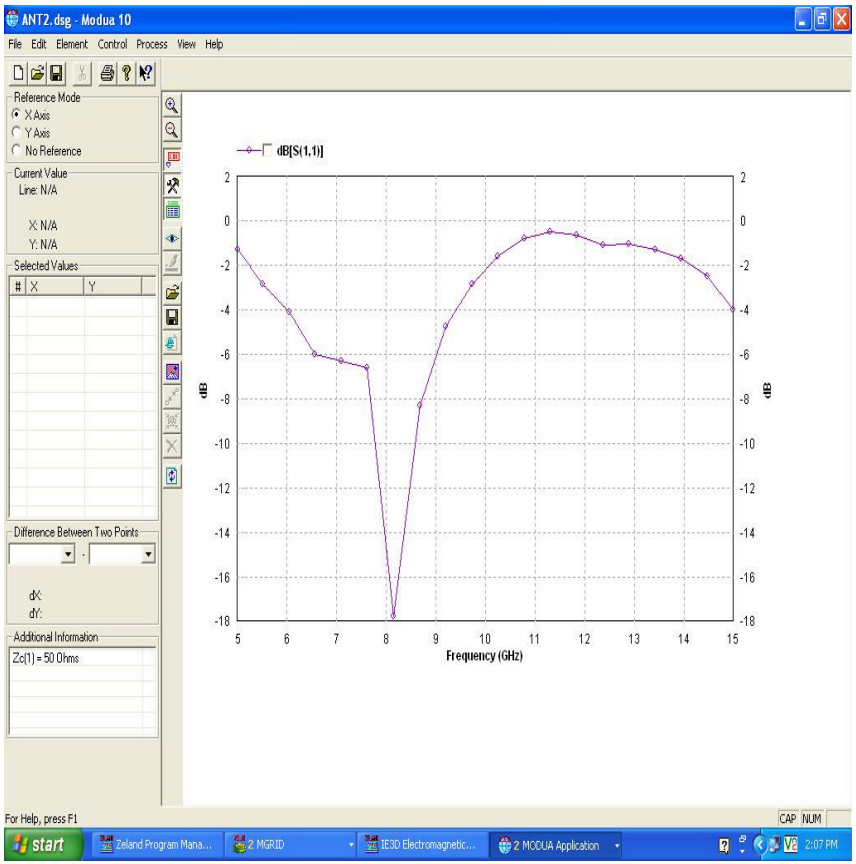
Structure1 and result



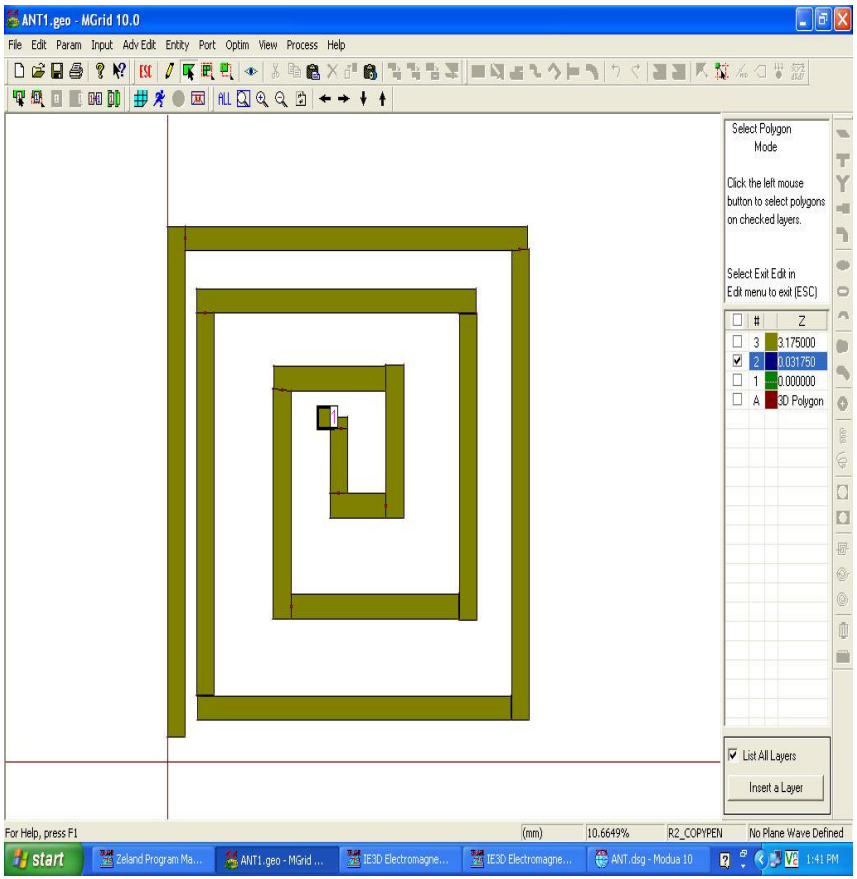


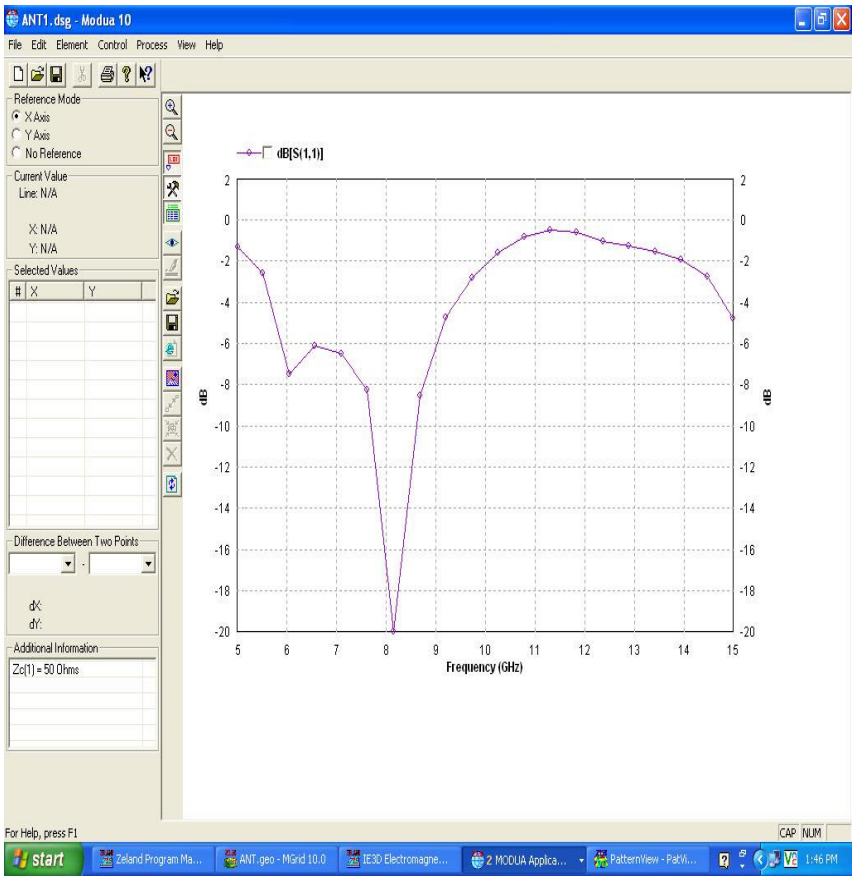
Structure2 and result



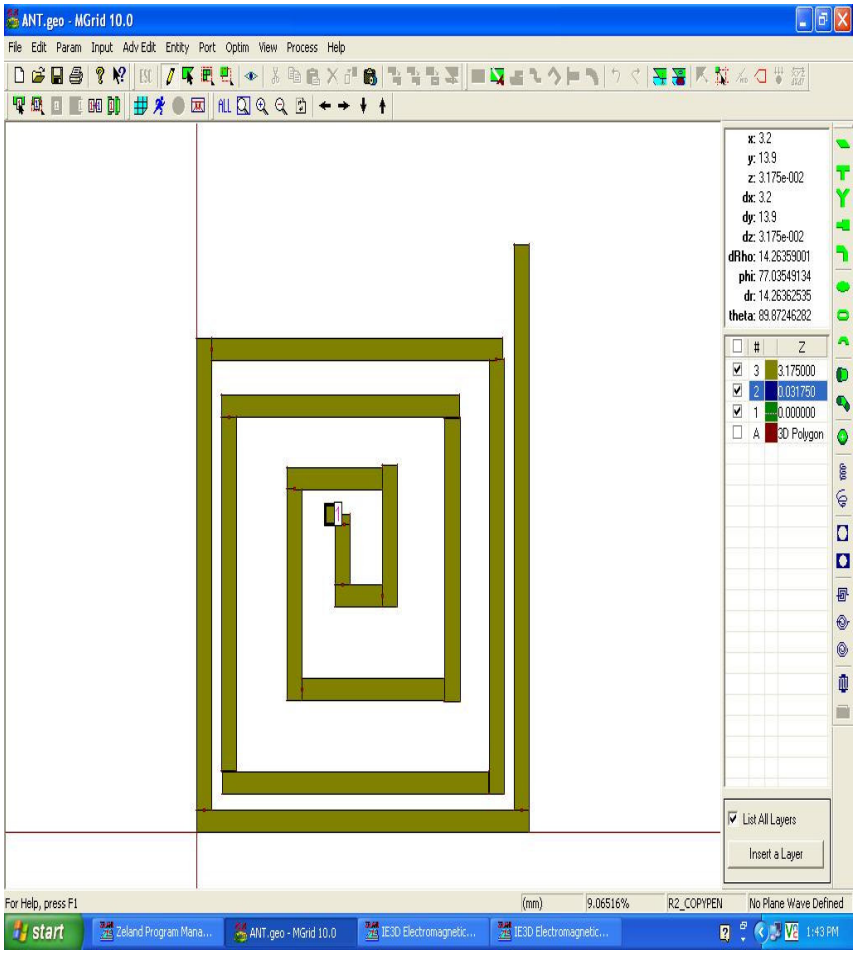


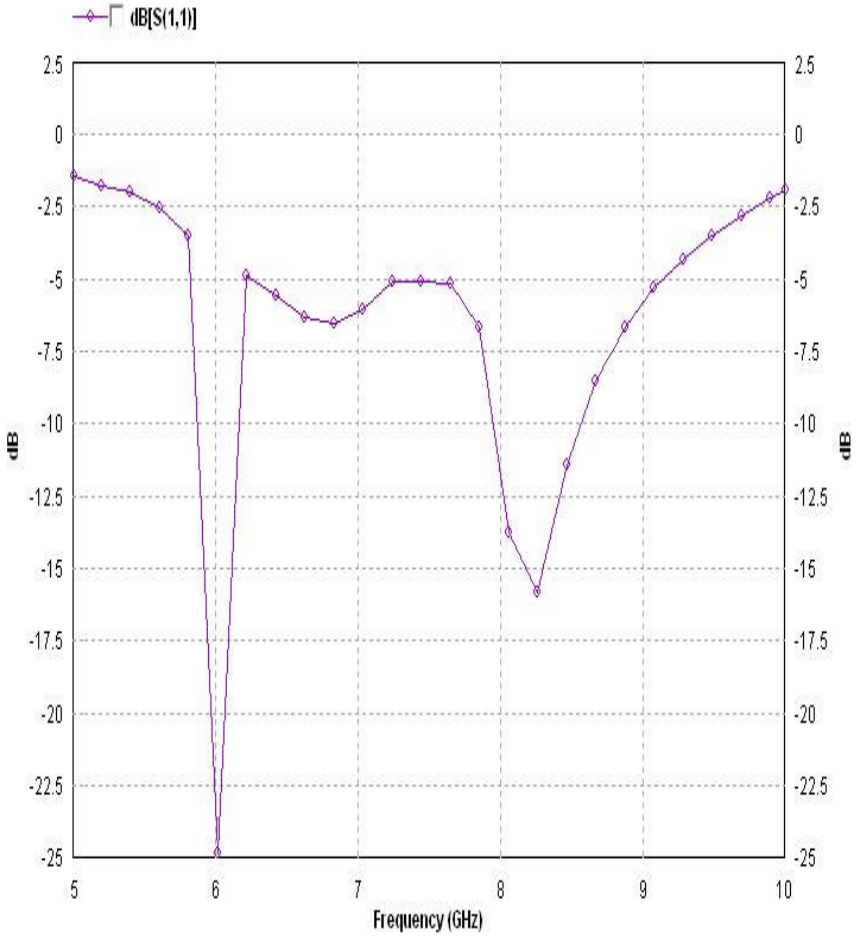
Structure3 and result





Structure4 and result





Conclusion

- The different structures were simulated as shown above.
- Four switches were used connecting the arms of the spiral and only when the switch is ON, the length gets altered.

THANK YOU