A RADIATION AND FREQUENCY RECONFIGURABLE CPW-FED DUAL SLOT ANTENNA FOR CPW RF MEMS

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The demand for highly functional and multi-purpose devices will likely increase as a result of improved CPW-based circuit topologies and more reliable RF MEMS switches. In turn, this will open the doors for many new possibilities of component integration, and improve the ability of a single system to operate in a multitude of communication scenarios. An important example of this involves the integration of RF MEMS switching technologies and antenna designs intosingle elements and arrays. While the majority of RF MEMS are currently developed in a CPW topology, this is not the case for most antennas. Therefore,the creative use of antenna designs in the same CPW based environments should also be considered for hosting these emerging technologies. In doing so, allowing the radiating element to take full advantage of switching technologies whose primary current uses are limited to switching circuit elements such as delay lines and I/O devices.

As an example of an antenna utilizing these new technologies, this work develops a pattern and frequency reconfigurable co-planar waveguide fed dual slot antenna. Specifically, this antenna has the ability to switch the main beam direction in the longitudinal plane of the slot while maintaining a 2:1 VWSR impedance bandwidth. In addition to this, the antenna can also reconfigure its frequency while maintaining its radiation characteristics. To provide the added functionality and improve the applicability of this antenna, the CPW based design has been modified for integration and fabrication with CPW-based RF MEMS and other CPW based components. To demonstrate the pattern and frequency characteristics of this type of geometry, a 5.8 GHz version of this antenna has been designed. Measured and simulated performance of this design will be provided during the presentation. In addition, several other modifications to the overall antenna design will be examined, such as finite (small) CPW grounds, addition of a lower ground plane, switch biasing, and methods of excitation for the slot geometry.

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5. Reconfigurable/Highly-Integrated Modules for RF and Wireless Applications