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A compact, low-loss, tunable phase shifter on defect mitigated dielectrics up to 40 GHz NATHAN ORLOFF, CHRISTIAN LONG, XIFENG LU, NIST, HARI NAIR, NATALIE DAWLEY, DARRELL SCHLOM, Cornell University, JAMES BOOTH, NIST — With the emergence of the internet-of-things and increased connectivity of modern commerce, consumers have driven demand for wireless spectrum beyond current capacity and infrastructure capabilities. One way the telecommunications industry is addressing this problem is by pushing front-end electronics to higher frequencies, introducing carrier aggregation schemes, and developing spectrum-sharing techniques. Some of these solutions require frequency agile components that are vastly different from what is in today's marketplace. Perhaps the most basic and ubiquitous component in front-end electronics is the phase shifter. Phase shifters are particularly important for compact beam-forming antennas that may soon appear in commercial technology. Here, we demonstrate a compact, tunable phase shifter with very low insertion loss up to 40 GHz on a defect mitigated tunable dielectric. We demonstrate performance compared to barium-doped strontium titanate phase shifters. Such phase shifters could potentially meet the stringent size and performance characteristics demanded by telecommunications industry, readily facilitating massive multiple-input multiple-output antennas in the next-generation of mobile handsets.

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