

**A STUDY OF MULTILAYER SPIRAL INDUCTOR USING  
METAMATERIAL SUBSTRATE FOR 5.8GHZ WIMAX  
APPLICATION**

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## ABSTRACT

New discovery material which contradicted in physic law known as metamaterial has been designed. It is the combination of the normal material (GaAs) with the unique structure. Computer Simulation Technology (CST) software has been used to design and simulate three-dimensinal structure. The results was then exported to Microsoft excel and Matlab to extract the dielectric value. Negative permittivity of material with split ring structure embedded in it has been used as a substrate for an inductor design. In a typical amplifier MMIC, up to 80% of chip area is occupied by inductors. Eagerness and inspired toward miniaturization, compact spiral inductors has been developed. These miniaturized inductors are constructed using a combination of three metal and three polyimide layers on a metamaterial substrate alternately. The area of multilayer inductor is almost four times smaller than planar design while maintaining same performance. The increasing number of layer, the performance of the inductor also improved. High performance of quality factor is the paramount desired with the consideration of losses.

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