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RF noise suppression on the transmission line using Fe-Si-Al/Ni-Zn magnetic composited films

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The radio-frequency (RF) noise suppressor prepared by magnetic composited films onto the microstrip lines (MSL) and coplanar transmission lines (CTL) was studied in the frequency range from 50 MHz to 13.5 GHz. The MSL was composed of Cu transmission line/dielectric materials/Cu substrate. The width and thickness of signal line on the MSL was 2000 µm and 35 µm, respectively. The epoxy ($\varepsilon_r = 4.5$) or teflon ($\varepsilon_r = 2.5$) was used for dielectric layer. The thickness of dielectric layer was 800 µm and 1500 µm. The characteristic impedance of the MSL was 50 Ω. The Fe-Si-Al/Ni-Zn magnetic composited films were put onto the MSL or CTL, and the transmission characteristics were measured. We observed that RF noise suppression by magnetic composited films varied with the film size and the composition ratio of sendust and ferrite. The frequency dependence of the power loss on the transmission line was measured for various sizes of magnetic composited films. The peak of the power loss was shifted to higher frequency with decreasing the width and thickness of the magnetic composited films. We discuss the RF noise suppression by the Fe-Si-Al/Ni-Zn composites in the near field region.