# Losses in the PEMC Boundary

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PEMC (Perfect Electromagnetic Conductor) was recently introduced as an ideal boundary material [1]. It is characterized by one real parameter, the PEMC admittance $M$, whose special values $M = 0$ and $1/M = 0$ correspond to the respective PMC and PEC cases. Realization of a PEMC boundary in terms of a lossless gyrotropic slab has also been recently suggested [2]. For real $M$, PEMC boundary is lossless while the realization would always have some loss.

In the present study extension of ideal PEMC boundary to one with small losses is given. It is shown that it is not enough to give the admittance parameter $M$ a complex value $M_r + jM_i$ but an additional conductance parameter $G$ must be introduced as well so that a lossy version of PEMC must involve three real parameters satisfying the inequality $G > |M_i|$.

As a simple example, reflection of a linearly polarized plane wave from a slightly lossy PEMC surface is studied showing how the pure polarization rotation caused by the ideal PEMC is added by a (small) decrease of the amplitude and a (small) change to elliptic polarization. Also, an analysis of a Fabry-Perot type of resonator made of two PEMC planes with losses is described.

## REFERENCES

1. Lindell, I. V. and A. H. Sihvola, "Perfect electromagnetic conductor," *J. Electromag. Waves Appl.*, Vol. 19, No. 7, 861–869, 2005.
2. Lindell, I. V. and A. H. Sihvola, "Realization of the PEMC boundary," *IEEE Trans. Antennas Propag.*, Vol. 53, No. 9, 3012–3018, 2005.