

Electromagnetic Transmission Through Apertures in a Cavity in a Thick Conductor

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Abstract—The problem of electromagnetic coupling from one region to another through an aperture-to-cavity-to-aperture system is specialized to the case of electrically small circular apertures on the axis of a cylindrical cavity of circular cross section for the transverse electromagnetic (TEM) and transverse electric (TE) cases. A simple equivalent circuit for the coupling system is developed. It is found that for certain cavity depths an exceptionally large amount of electromagnetic energy can be transmitted, and that for identical apertures the transmission cross section of the system is independent of the common radius of the apertures as well as the radius of the cavity.

