Comparison of Shielding Effectiveness of High Q Canonical Cavities with Thin Slots in a Mode-Stirred and Anechoic Chamber

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The differences between the magnitude of the power density and fields in a mode-stirred chamber and an anechoic chamber have been explored by various authors. The relationship usually includes a gain term for the object under test. The question becomes, "what happens to the gain of slot apertures in various configurations," such as when the slots are overmodded and when there is an array of apertures. Another question is "how does the Q of the cavity affect the coupling of the slot apertures".

An effort was begun to characterize the relationship between EMR coupling through single and multiple slots in a plane wave environment versus a reverberant environment over a wide band of frequencies. Two sets of canonical test objects were constructed for this investigation.

In the first case, the slot apertures were limited to a planer structure backed with a rectangular cavity. The rectangular cavity was made of half inch thick welded aluminum with a front and back lid. The front lid had 1, 2, or 4 thin slots with slot dimension of 2 inch length by 20 mil height. The back aluminum lid was replaced with an iron lid for a set of experiments which quantified the coupling dependence on the Q of the cavity by introducing losses.

The second case consisted of a set of cylindrical aluminum cavities with 1, 2, and 8 thin slots arranged around the midpoint of the objects.

The shielding effectiveness of each test object was measured in a mode-stirred chamber and measured on bore-sight in an anechoic chamber.

The results from both the cylindrical and rectangular test objects in the anechoic and mode-stirred environments will be presented.