Abstracts

Global electromagnetic analysis to help the conception of an active module

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In this article, we propose a global electromagnetic (EM) approach to help the design of an amplifier module. The device is composed of a succession of 4 cavities which are separated by dielectric inserts. Because of these last factors, no parasitic interaction can be generated between the different enclosures. So, we can separately study each one by an adequate simulation and cascade the 4 responses to obtain the global behavior of the module. At the cavity level, the EM calculation gives the passive area characterization. MMICs are considered as lumped elements, their electrical responses are connected to the localized accesses inserted in the meshing of the distributed structure. Consequently the effect of active MMICs on parasitic phenomena is taken into account. Then, we show that the resonance of the TE/sub 1, 1, 0/ mode appears in each enclosure and damages the device performances. An equivalent circuit model which represents these resonance effects has been optimized to demonstrate the importance of active circuits responses in the apparition of parasitic modes. In fact, we show that the more the amplification of MMICs is consequent, the more the resonance phenomena become significant. Finally, to reject the disruptive peaks of the frequency bandwidth, we propose to add metallic blocks in each cavity. The number, the size and the location of these have been optimized and good results have been obtained.

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