Abstracts

Intermodulation Analysis of FET Resistive Mixers Using Volterra Series

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We have implemented the Volterra-series method to analyze intermodulation (IM) distortion in FET resistive mixers. The nonlinearities of the channel conductance of a NE71000 MESFET and a NE32400 HFET were first characterized using a low-frequency harmonic power measurement. The data was then used in a simulation program and results for two-tone IM distortion in X-band were compared with the measured data for both MESFET and HFET resistive mixer circuits. Very good agreement was achieved in each case. We have also shown by simulation that the two separate contributions to the third-order IM distortion from the mixing between the input signals themselves and the mixing between the input signals and the second-order mixing products have a very strong cancellation, which results in the low IM distortion in the FET resistive mixers observed in measurements.

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