

Predicting and Correcting for Antenna Imperfections in Reverberation Chamber Measurements

John M Ladbury, Jason B Coder
National Institute of Standards and Technology

We have previously published a simple model for antennas in a reverberation chamber. Using this model, we evaluate the effect of antenna imperfections on a typical reverberation-chamber measurement. We also show how to correct measured data to remove these effects. Fortunately, many of the effects and corrections are consistent with some of the “hand wavy” approaches that we have used for several years. However, for special cases where antennas are poorly matched and the losses in the chamber are relatively low, there can be significant differences. Properly accounting for the imperfections should significantly improve the accuracy and reliability of reverberation-chamber measurements.

We present a much more rigorous method of dealing with the imperfections and predicting how they influence all of the parameters that could be measured with a Vector Network Analyzer. We show that corrections are relatively intuitive if the chamber is lossy, and the transmission and reflection equations can be greatly simplified. If the losses are lower, the corrections can become significantly more complicated.