A COMPARISON OF BROADBAND REALIZED GAIN MEASUREMENTS BETWEEN A NEAR-FIELD RANGE AND A NEWLY RENOVATED SHORT TAPERED CHAMBER

Theodore K. Anthony
US Army Research Laboratory
Adelphi, Maryland 20783, USA
theodore.k.anthony.civ@mail.mil

A comparison of gain, pattern, and polarization measurements from our near-field range and from our newly renovated short tapered chamber has been undertaken at the Army Research Lab (ARL). The near-field range at ARL can also perform far-field pattern measurements in the frequency range of 1.2 – 50 GHz, with the Near-field range having dimensions 25' x 16' x 10'. In addition to its planer scanner, the near field range is equipped with a turntable allowing spherical scans. The short tapered chamber operational frequency range is 200 MHz – 20 GHz, with AUTs centered 10' from each side except the taper with a 45' distance between antennas.

For chamber comparative purposes, the antenna(s) used were the Schwarzbeck BBHA-9120-D (www.schwarzbeck.com) - operational from 1 - 18 GHz, and a Satimo SH400 (www.satimo.com) – operational from 0.4 - 6 GHz. Typically, these broadband antennas are used by us for gain by comparison calculations. Accordingly, gain, pattern, and polarization measurements were performed in the Near-Field range to see how much they differ from similar measurements taken in the short tapered anechoic chamber.

This study was primarily motivated by the fact that the short tapered chamber has been newly renovated with absorber material and ARL would like to validate performance with the previous configuration - which had a slightly different absorber layout. The chamber interior renovation consisted of all the old absorber being replaced with new absorber as laid out and designed by the contractor. Post renovation measurements in the tapered chamber led to a reconfiguration of the absorber near the apex. This post renovation reconfiguration resulted in a slight performance improvement over the post renovation, but not as broadband as the pre-renovation data. The realized gain measured in the short tapered chamber is compared with HFSS simulations and Near-Field Chamber data.