

AbstractID: 5044 Title: Image Quality Testing Using an Oil-filled ACR MRI Phantom at 3 T

**Purpose:** Image uniformity testing at high field clinical MRI scanners is challenging using a phantom filled with aqueous solution due to the dielectric resonance effect. This study aimed to investigate the feasibility of using silicone oil-filled ACR MRI phantom for quality control testing at 3 T.

**Method and Materials:** Experiments were conducted on a 3.0 T GE Signa HD MRI scanner using the standard quadrature head coil. Two ACR MRI phantoms, one filled with standard aqueous materials and the other with silicone oil were used for image quality testing following the ACR guidance. Five series of images were acquired, including a sagittal image and four series of axial images, i.e. ACR T1, ACR T2, site T1 (SE, TR/TE=500 ms/ Min Full), and site T2 (FSE, TR/TE=4000/102 ms, ETL=17). Finally, the images were analyzed according to the ACR MRI Quality Control Manual (2001) and the results obtained from the two phantoms were compared.

**Results:** The percent intensity uniformity (PIU) obtained from the oil phantom was at least 6% higher than that from the original phantom (88% vs. 82% for ACR T1 and 94% vs. 81% for ACR T2). No significant differences were found in all other measures as obtained from the two phantoms.

**Conclusion:** Image inhomogeneity in high field MRI is directly affected by both the coil configuration and the electric properties of the object. Our results indicate that silicone oil is more suitable for use in the routine quality assurance test at high field by minimize the effect from the phantom materials. Filling the ACR MRI phantom with silicone oil permits the same testing procedures without compromising the action criteria for the image uniformity.