

AbstractID: 6684 Title: Comparison of Artifact Size Caused by Metallic Tissue Marking Clips at 1.5T and 3T Breast MRI: A Phantom Study

**Purpose:** To compare the signal void artifact size caused by metallic tissue marking clips at 1.5T and 3T and to test the impact of different readout bandwidth and TE on the artifact size.

**Methods and Materials:** The signal void size of three commercially available metallic tissue marking clips were assessed at both 1.5T and 3T scanners. The clips studied were immersed in a gel phantom with enough distance (>25mm) to avoid field interference between them. An RF-spoiled T1-weighted gradient echo (SPGR) sequence commonly used in DCE breast imaging was used on both scanners with TR/TE/FA=32/4.6/25°, FOV=160mm, spatial resolution of  $1 \times 1 \times 4 \text{mm}^3$ , and water fat shift of 1.534 pixels (i.e., readout bandwidth = 22.6 kHz for 1.5T, and 45.3 kHz for 3T). Same sequence was repeated with higher readout bandwidth of 139 kHz (1.5T) and 198 kHz (3T). In addition, TE=1.16ms was also tested with partial Fourier readout and high readout bandwidth to study change of TE on the effect of signal void artifact size on both scanners.

**Results:** At TE=4.6ms, both scanners showed signal void artifacts 2~8 times larger than the clips themselves. Importantly, the signal void size was 15%~30% larger at 3T compared to that of 1.5T. Increasing readout bandwidth had little impact on signal void artifact size on both scanners. However, decreasing TE from 4.6 ms to 1.16 ms reduced the average artifact size at both 1.5T (27%) and 3T (31%).

**Conclusion:** Signal void artifact size is larger at 3T for all three metallic tissue marking clips studied at the current experimental settings. This could be a disadvantage of 3T scanners when used to detect and follow-up breast cancer adjacent to metallic tissue marking clips after biopsy. Short TE can be used to effectively reduce signal void artifacts at both 1.5T and 3T.