Purpose:
The detection of ultrasound artifacts due to transducer failure is important for maintaining image quality. The aim of this study is to evaluate 3 methods for detecting ultrasound artifacts, involving direct evaluation of dynamic B-mode clips and 2 types of single frame statistical images.

Methods:
A range of artifacts of varying severity were artificially created for 28 transducers of varying models. The appearance of these artifacts was substantially similar to actual artifacts detected during ultrasound scanner acceptance testing and routine quality assurance. A second set of 28 matching transducers contained no artifacts. A 10 second clip was recorded of a dynamic speckle pattern from a custom liquid phantom ("dynamic clip"). A single-frame image was obtained by computing the median values at each pixel location over all frames of the clip ("median image"). This single frame median image was then subtracted from a baseline median image previously obtained with no induced artifact ("subtracted median"). All images were evaluated by 6 observers and the mean sensitivity and specificity for the three artifact detection methods estimated.

Results:
In all cases the dynamic clip had the lowest sensitivity (61%) of the three detection methods. The subtracted median images had the highest sensitivity of 97% and while maintaining a high specificity of 92%.

Conclusions:
For routine quality control, the use of subtracted median images allows detection of artifacts with very good sensitivity and specificity. For acceptance testing, where there are no previous baseline images available for subtraction, the use of median images is useful, although comparison with median images from different transducers of the same model and/or multiple observers should be made to decrease the incidence of false-positive findings. If statistical images are not available, direct inspection of the dynamic B-mode clips is useful for acceptance testing and quality control, but with lower sensitivity.