

AutoQA Plus MR ACR



Application Features

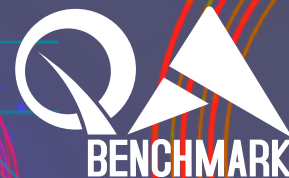
- Instant trend analysis using our 'Trend Report Links'
- Designed for simple and intuitive navigation
- Pass/Fail performance evaluation
- Reports available in HTML and PDF formats
- Regional date and number format supported
- Multiple language support
- Export Database in Excel format

Image Quality Parameters Evaluated

- High contrast spatial resolution
- Slice thickness accuracy
- Slice position accuracy
- Geometric distortion
- Image intensity uniformity
- Ghosting
- Signal-to-noise ratio (SNR)
- Low contrast resolution
- Geometric distortion – Localizer



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Step	Details	Results	Pass/Fail
High Contrast Spatial Resolution		Expected ≤ 1.0mm Upper Left 1.0 Lower Right 1.0	✓
Slice Thickness Accuracy	Top Ramp Bottom Ramp 51.8 51.8 51.8 51.8 4.0mm 4.0mm 1.05 1.05	Slice Thickness Expected 5 ± 0.7mm Measured 5.0 ± 0.7	✓
Slice Position Accuracy	Threshold 725	Bar Length Difference Expected 5.0mm to 9.0mm Measured 8.5 ± 0.7	✓
Geometric Accuracy	Horizontal Vertical Threshold 295.7mm 195.7mm 705	Diameter Expected 295 ± 2mm Measured 295.7 ± 0.7	✓

Image Processing

- High Contrast Spatial Resolution requires user input. 'High Contrast Spatial Resolution' screen displays slice 1 with window/center (w/c) and magnification controls to support proper viewing for resolution determination. User needs to assess the upper left (UL) and lower right (LR) resolution for the 1.1 mm, 1.0 mm, 0.9 mm sections, and identify the minimum hole size in a row (UL) or column (LR) distinguishable from adjacent holes.
- Slice Thickness Accuracy - Horizontal count density profiles are sampled and integrated for the top ramp (TR) and bottom ramp (BR). The integrated profile is first processed with a 5-point smoothing filter then baseline corrected. The peak pixel value is determined for the TR and BR profiles and the FWHM is calculated by linear interpolation. Slice Thickness Accuracy is the average of the TR and BR FWHM measurements divided by 10. Slice Offset is the difference between the TR and BR ramp centers multiplied by the ramp angle magnification factor.
- Slice Position Accuracy is the difference between the endpoints of left and right wedge profiles and reported according to the instructions provided in the ACR Large Phantom Guidance documentation.
- Geometric Accuracy is the distance measurements from single pixel profile samples.
- Image Intensity Uniformity is calculated according to the instructions provided in the ACR Large Phantom Guidance documentation.
- Ghosting is calculated according to the instructions provided in the ACR Large Phantom Guidance documentation
- Signal-to-Noise (SNR) is calculated using the large ROI mean from the Image Intensity Uniformity measurement and two background noise (SD) measurements from the ghosting calculation.
- Low Contrast Resolution - Automated low contrast target detection is based on maximizing the target mean using ROI diameters approximately equal to the target diameters. Optimization methods adjust in centering and rotation angles of expected target locations. Target visualization threshold is > 1 SD of the target contrast. The mean and standard deviation for background ROI's were averaged for each target; ROI's tangential to target for outer two rings and radial to the target for the inner ring. Contrast to noise ratio (CNR) is calculated for the 7 mm targets (spoke 1) in slices 8- 11. Manual Low Contrast – User can override automatic low contrast detection and manually input the number of spokes detected. Application 'Settings' default to manual selection which turns on 'Low Contrast Spatial Resolution' screen for user input with controls like those available for the High Contrast Spatial Resolution screen.

