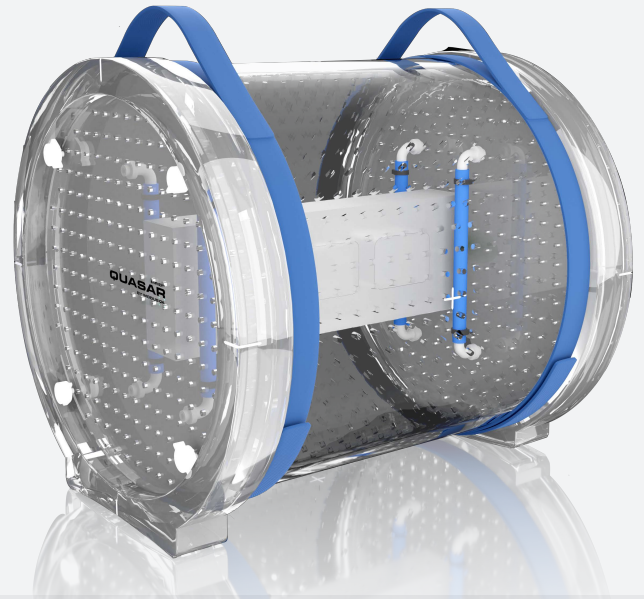


MRID^{3D} QUASAR BY MODUS QA



The **Best Way** to **QUANTIFY**
MRI GEOMETRIC
DISTORTION IN 3D!



WORKFLOW EFFICIENCY

Quickly setup, scan and quantify geometric distortion measurements in as little as 10 minutes with a lighter, larger and faster analysis system.



GEOMETRIC ACCURACY

Large FOV phantom design follows recommendations from NEMA/ MITA MS-12 and IEC 62464-1 for highest accuracy even when distortion is high and vendor correction is off.



DIMENSIONAL STABILITY

Integrated expansion tubes (patent pending) compensate for changes in liquid volume, caused by changes in temperature and pressure, ensuring the phantom is dimensionally stable.



HARMONIC ANALYSIS

Adapts analytical techniques that are routinely used in MRI B0 shimming and gradient coil design.

QUASAR™ MRID^{3D} is a lighter, larger and more efficient measurement technique that leverages harmonic analysis to quantify MRI geometric distortion in 3D.

Harmonic analysis is a well-established mathematical tool used to solve electromagnetism problems with well-defined boundary conditions including MRI gradient coil design and B0 shimming. The QUASAR MRID^{3D} Geometric Distortion Analysis System extends this approach by measuring distortions on the closed surface of a boundary phantom and then uses harmonic analysis to calculate the distortions inside. This permits the use of a lighter, larger, hollow boundary phantom.

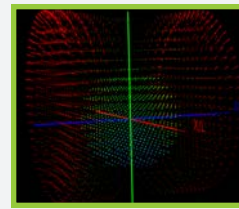
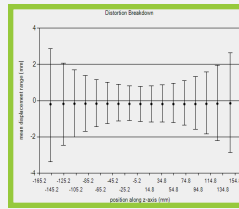
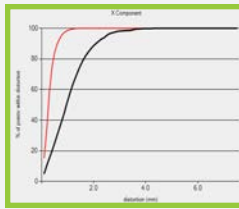
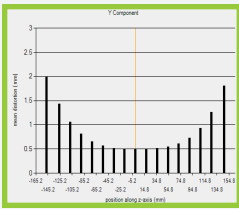
At 21 kg, the 39.4 cm diameter by 39.1 cm long phantom is half the weight of a water-filled grid phantom of the same volume. It includes recessed handles for safe carrying plus integrated 3 point contact feet and engraved landmarks for convenient OSHA compliant (under 50 lbs.) one person set-up. Fiducials in the acrylic phantom contain susceptibility matched mineral oil for fast high contrast 3D T1W scanning. Mineral oil is non-reactive and allows plastics to remain dimensionally stable over time unlike water which causes plastics to swell. The maintenance free phantom never has to be drained or refilled. The low dielectric constant mineral oil permits dielectric-resonance-free use at high field strengths.

The system includes robust, mature, client-based image analysis software. The built-in DICOM receiver ensures efficient file transfer. There is no waiting for files to upload to the cloud thus avoiding associated IT issues. Control point detection and harmonic analysis are fully automated; from phantom setup to results in as little as 10 minutes. Software features include the

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MODUS QA
TRUSTED ACCURACY

ability to separate distortions caused by main magnetic field inhomogeneities from those caused by gradient non-linearities. A region of interest selector allows users to focus their analysis on targeted regions for more demanding applications such as SRS. A rich set of data presentation tools allows trending and comparison amongst a diverse selection of phantom scans. Users can export customizable automated reports including full DVf spreadsheets.



The modern approach of QUASAR MRID^{3D} is a better, faster and lighter alternative for routine distortion assessment. GRID phantoms are either too small or too heavy. A properly designed distortion analysis system quantifies machine

induced distortions. GRID phantoms do not accurately simulate patient susceptibility distortion. The QUASAR MRID^{3D} phantom is carefully designed to minimize perturbations to the magnetic fields you are trying to measure, thus ensuring that the phantom does not bias the measurement.

ADDITIONAL NEW QA CAPABILITIES

- ▶ Rapid Ferrous Content Detection QA Procedure
- ▶ Submillimeter Laser Landmark Alignment Check
- ▶ Characterization of Z Gradient Non-linearity
- ▶ Phantom Position and Twist Verification

MRI DATA ACQUISITION RECOMMENDATIONS

- ▶ 3D T1 weighted fast gradient echo sequence with 1 signal average, minimum TE and TR, small flip angle ~10 minute acquisition time @ 1.5T, ~5 minute acquisition time @ 3T
- ▶ 410 mm field of view (FOV) in-plane with 385 mm FOV in-slice thickness direction
- ▶ 1 mm³ to 1.5 mm³ Isotropic (cubic) voxels
- ▶ Bandwidth Range: 100 Hz / Pixel to 1,000 Hz / Pixel (25 KHz to 250 KHz)

RECOMMENDED SYSTEM REQUIREMENTS

- ▶ **Operating System:** Windows 7 SP1 or higher
- ▶ **Processor:** Intel Core™ i7 or better
- ▶ **Hard Disk Space:** 10 GB minimum (64-bit)
- ▶ **RAM:** 8 gigabyte (GB) or more
- ▶ **Screen Resolution:** 1920 x 1080 pixels
- ▶ **Graphics Card:** Intel HD Integrated Graphics or Nvidia GeForce GTX 750 or better

PRODUCT SPECIFICATIONS

- ▶ **Phantom Material:** Acrylic
- Density:** 1.18 g/cm³
- Weight:** 21 kg
- Volume Susceptibility:** $\chi_v = -9.01 \times 10^{-6}$ @ 20°C
- ▶ **Contrast Media:** 5 liters of high T1 contrast Paraffinic Mineral Oil
- Volume Susceptibility:** $\chi_v = -9.24 \times 10^{-6}$ @ 20°C
- Density:** 0.83 g/cm³, T1= ~300ms @1.5T, Dielectric Constant $\epsilon_r < 3$

PRODUCT DIMENSIONS

- ▶ **Physical:** 39.4 cm diameter x 39.4 cm long
- ▶ **Imaging:** 36.8 cm diameter x 32.1 cm long
- ▶ **Internal Hollow Volume:** 25 liters = 25 kg weight reduction compared to conventional grid phantoms

ORDERING INFORMATION

100-1018	QUASAR™ MRID ^{3D} Geometric Distortion Analysis System Includes:
	▶ 1-Software License
	▶ 1-Phantom
	▶ User's Guide
500-5040	Additional Software License
500-5042	Annual Maintenance Contract with Extended Hardware Warranty
500-5043	Unlimited Software License

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Modus QA

1570 North Routledge Park,
London, Ontario Canada N6H 5L6

Toll Free: +1 (866) 862-9682 (North America)

Phone: +1 (519) 438-2409

Fax: +1 (519) 643-0127

[e] info@modusQA.com

[w] www.modusQA.com

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