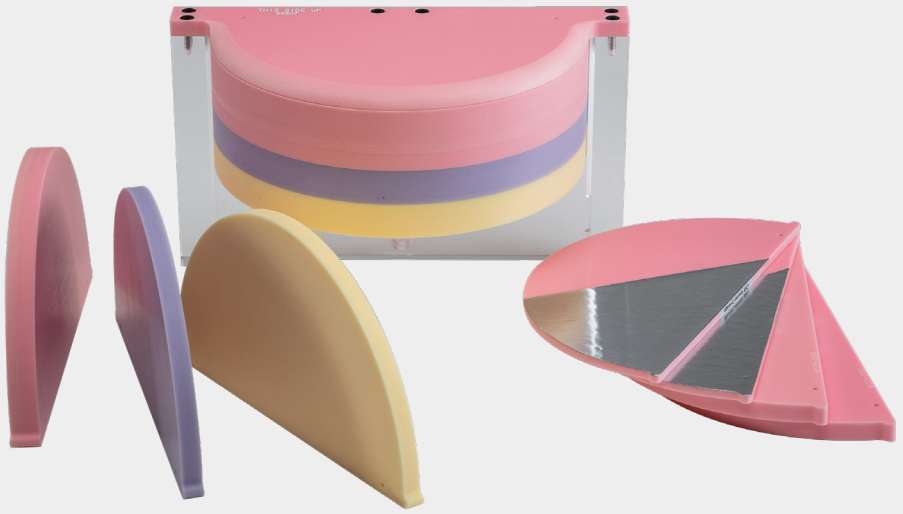
SUN NUCLEAR corporation

Modular DBT™ Phantom

Quality Control for Digital Breast Tomosynthesis Systems



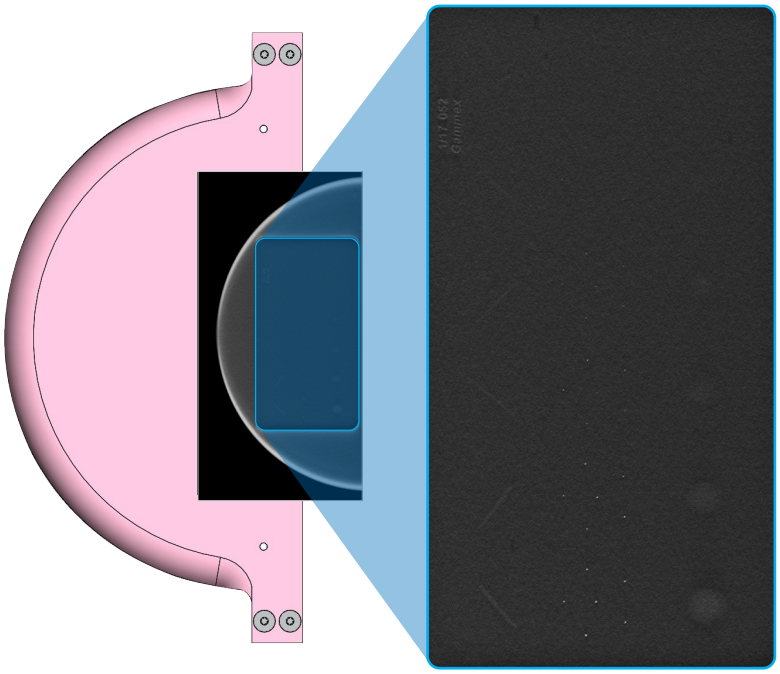
- Evaluate image quality and quantify targets in reconstructed images
- Thoroughly test Tomosynthesis system performance
- Comply with protocols and standards, including IEC 61223-3-6 and developing AAPM Task Group 245 requirements

The Modular DBT™ Phantom leverages proven Gammex® technologies for Tomosynthesis and Digital Mammography systems. A range of simple to complex targets are precisely placed within tissue-equivalent breast material that is 50% breast-glandular and 50% breast-adipose.[1] This uniquely flexible phantom design includes modules that assess Image Quality and a wide range of performance metrics, including Modulation Transfer Function (MTF).

Save time and simplify Tomosynthesis QC

The phantom is designed for acceptance testing, routine QC and research.

- Automatically align to the chest wall for reproducible tests
- Assess image quality and artifact detection using the DBT Phantom configuration for Image Quality
- Move test objects closer to or further from the detector without tools



The Image Quality Module includes specks, masses and fibers embedded on the central plane.

[1] Hammerstein R., Miller D., White D., et al; Absorbed Dose in Mammography; RADIOLOGY;130:485-491.

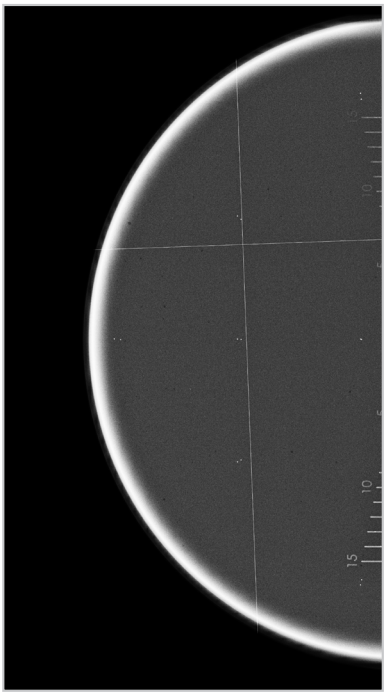
sunnuclear.com
7600 Discovery Drive, Middleton, WI 53562 USA

Adaptable for Image Quality tests

- Image Quality (detectability)
- Missing Tissue Detection
- 2D and 3D Accuracy
- Line Spread Function (LSF)
- Artifact Detection
- Contrast-to-Noise Ratio (CNR)
- Signal-to-Noise Ratio (SNR)
- Compression
- Modulation Transfer Function (MTF)

Evaluate the entire imaging chain

- High-attenuating objects to test projection images
- Low contrast objects and simulated breast tissue for reconstructed images



Tomosynthesis reconstructed image shows bead, wire and ramp test objects.

Modules are clearly marked and visible during testing for easy identification and placement.

The numbered contrast scale measures missing tissue detection.

Breast-glandular and breast-adipose homogeneous modules support testing with various levels of glandularity and thickness.

SUN NUCLEAR corporation

sunnuclear.com
7600 Discovery Drive, Middleton, WI 53562 USA

Specifications

The Modular DBT Phantom is backed by a 5-year warranty. Included are several target modules and blanks, the back plate assembly, a user guide and a custom hard-sided waterproof case. The phantom holder can total up to 10 cm thickness using included modules.

Module Name	Target Characteristics	Quantity & Thickness
Image Quality	Specks, masses, fibers. See specifications below.	1 - 15 mm
Missing Tissue Detection	Barium-filled grooves, 1 mm x 0.5 mm, sized from 0 mm to 15 mm	1 - 10 mm
MTF, LSF	2 tungsten wires, 25 micron DIA	1 - 10 mm
CNR	1100 aluminum alloy sheet, 0.1 mm thick, 45° angle	2 - 5 mm
2D and 3D Accuracy	14 tungsten BBs, 0.279 mm DIA, aligned in X, Y and Z-axis	1 - 15 mm
Breast Blank	No targets	1 - 5 mm; 2 - 10 mm
Breast-Glandular Blank	No targets	1 - 10 mm; 1 - 20 mm
Breast-Adipose Blank	No targets	1 - 10 mm; 1 - 20 mm

All modules are epoxy resin-based Hammerstein composition with dimensions of 210 mm wide with a radius of 105 mm.

Image Quality Module Test Object Specifications

Fiber Diameter (mm)	Speck Diameter, Glass Sphere (mm)	Mass Thickness (mm)
0.89 ± 0.05	0.33 ± 0.0100	1.00 ± 0.05
0.75 ± 0.03	0.28 ± 0.0083	0.75 ± 0.05
0.61 ± 0.03	0.23 ± 0.0069	0.50 ± 0.05
0.54 ± 0.03	0.20 ± 0.0059	0.38 ± 0.04
0.40 ± 0.03	0.17 ± 0.0084	0.25 ± 0.03
0.30 ± 0.03	0.14 ± 0.0070	0.20 ± 0.02