

The evaluation of T-E phantom and Quality assurance of ultrasound

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INTRODUCTION

Quality assurance tissue-mimicking phantoms are used to evaluate the accuracy and performance of ultrasound imaging system. The phantoms mimic the acoustic properties of human tissue and provide test structures within the simulated environment. They are essential to detect the performance changes that occur through normal aging and deterioration of system components. Routine equipment performance monitoring can reduce the number of repeat examinations, the duration of examination and maintenance time.

METHOD

The Model #539 Multipurpose Phantom is contained in a protective housing to provide strength and permanence. Built-in scanning wells are provided to permit the use of water or a low viscosity gel as acoustic coupling agents.

The Multipurpose phantom is designed to provide the user with a comprehensive means of evaluating the performance of sector, linear array, phased array and annular array diagnostic imaging system.

TEST PERFORMED

- * Dead Zone or Transducer Ring-Down
- * Vertical Measurement Calibration
- * Horizontal Measurement Calibration
- * Focal Zone
- * Sensitivity
- * Axial & Lateral Resolution
- * Functional Resolution, Definition and Fill-In
- * Gray Scale & Displayed Dynamic Range

RESULTS

Instrument setting

Power : 0 dB

Dynamic range : 54 dB

	Pre 1 /Persis 4 /post 2
	Gain : 13dB
	Image magnification : 16 cm
Test performed	Product specifications
Dead zone	< 10mm
Vertical measurement	2cm center to center 0.2mm
Horizontal measurement	spacing 3cm 1.5mm
Sensitivity	< 7.5mm
Axial resolution spacing	2.0, 1.0, 0.5, 0.25mm
Lateral resolution spacing	1mm
Number of cystic targets	9
Size of cystic targets	2, 4, 6mm
Size of gray scale	10mm

DISCUSSION

In diagnostic ultrasound, equipment quality assurance(QA) involves steps taken periodically to ensure that ultrasound instruments are operating consistently at their expected level of performance. During routine scanning every sonographer is vigilant for equipment changes that could lead to suboptimal imaging and might require service. Thus in some ways, equipment quality assurance is carried out every day, even when not identified as a process in itself.

CONCLUSION

Quality assurance testing also provides confidence that image data, such as distance measurements and area estimations, are accurate and that image quality is the best possible from the imaging instrument.