

ACR Accreditation Update : USnd



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ACR Accreditation as of March 2018

MODALITY	ACCREDITED FACILITIES
Mammography	8414
MR	7323
CT	7209
ULTRASOUND	8312
Nuclear Medicine	3983
Breast Ultrasound	2324
PET	1999
Interventional Breast Imaging	1543
Breast MRI	1796
Radiation Oncology	887
Total	39,883

ACR Ultrasound Accreditation Program Requirements



- Includes sections on
 - Acceptance testing
 - Annual survey
 - Quality control testing (routine)
 - Preventive maintenance
- Physicist involvement in the program is strongly recommended, but not required

Acceptance testing

- This is designated as an **optional** component of the program, although the value of acceptance testing is recognized in the document
- Testing should include all tests to be performed in subsequent annual surveys, but may be more comprehensive

Annual survey

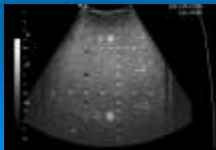
ACR Test	Minimum Testing Frequency (Minimum Frequency of Testing)
1. Acceptance testing (optional)	Acceptance testing is optional and is not required for accreditation. It is recommended that acceptance testing be performed at least annually.
2. Image quality and safety	Image quality and safety testing is required for accreditation. It is recommended that image quality and safety testing be performed at least annually.
3. Equipment (hardware and software)	Equipment testing is required for accreditation. It is recommended that equipment testing be performed at least annually.
4. Operator (physician and sonographer)	Operator testing is required for accreditation. It is recommended that operator testing be performed at least annually.
5. Patient (patient safety and comfort)	Patient testing is required for accreditation. It is recommended that patient testing be performed at least annually.
6. System (system performance and safety)	System testing is required for accreditation. It is recommended that system testing be performed at least annually.
7. Education (education and training)	Education testing is required for accreditation. It is recommended that education testing be performed at least annually.
8. Compliance (compliance with regulations)	Compliance testing is required for accreditation. It is recommended that compliance testing be performed at least annually.
9. Documentation (documentation of testing)	Documentation testing is required for accreditation. It is recommended that documentation testing be performed at least annually.
10. Accreditation (accreditation status)	Accreditation testing is required for accreditation. It is recommended that accreditation testing be performed at least annually.

- A.S. is a **required** component of the program
- Specific tests are designated, some required and some **optional**

- All scanners and probes in routine clinical use must be tested
- A signed report describing results must be provided to the practice
- Phantoms must be used for uniformity, sensitivity, and geometric accuracy tests
 - No specific phantoms are described
 - Commercial and custom phantoms are acceptable
- No specific test methods are required
- Subjective & objective methods are acceptable
 - *No specific performance benchmarks or pass-fail criteria are provided*

Routine QC Program

- Typically performed by:
 - Equipment service engineer
 - Appropriately trained sonographer
 - Biomed



Physical and mechanical inspection

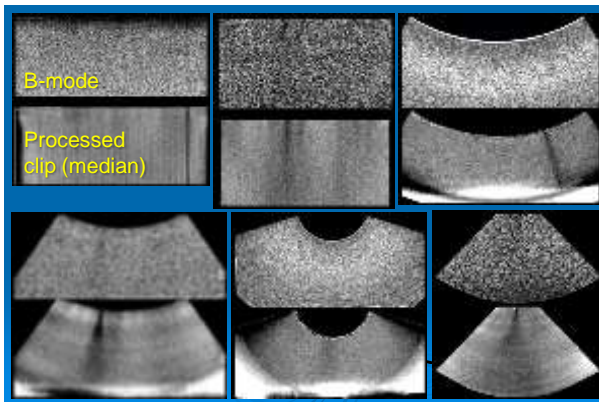
- | | |
|--|---|
| <ul style="list-style-type: none"> ➤ Scanner <ul style="list-style-type: none"> • Wheel locks • Monitor bezel • Keyboard • Power cable • Probe ports • Ancillary equipment | <ul style="list-style-type: none"> ➤ Probes <ul style="list-style-type: none"> • Face • Handle / housing • Cable connection to handle, strain relief • Cable • Connector |
|--|---|



Image uniformity & artifact survey

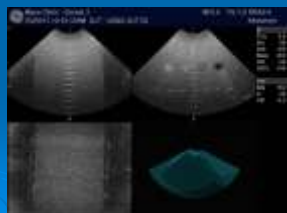
- Most effective test for identifying problems
- Scan a uniform test object/phantom showing moving speckle
 - Inspect image while scanning
 - Process a clip to produce a median or mean image (AAPM)
- Assess artifact severity and needed action (clinical images)





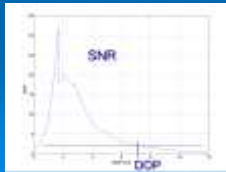
Geometric accuracy:

- Measure known axial, lateral, and (reconstructed) elevational distances with scanner calipers or an automated program



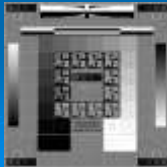
System sensitivity

- Common approaches
 - Visual DOP estimation
 - Calculation of DOP from SNR vs depth curve
 - IEC 61391-2



Ultrasound scanner electronic image display performance

- Critical component of performance assessment:
Ultrasound scanner monitor is effectively a primary diagnostic display device
- No requirements of specific tests



Primary interpretation display performance

- This most likely means PACS workstations
- Testing only required for diagnostic workstations used for US exam primary interpretation, *and located at same facility as the US scanner*
- No requirements of specific tests
- *Inclusion of display testing results obtained by PACS team or biomed service group would be acceptable*

- Routine QC is an **optional** (but recommended) component of the program
- Likely performed by a sonographer or service engineer

[illegible]


- A subset of 5 of the annual tests are designated for routine QC
 - Geometric accuracy is only needed for 3D or 4D probes, and is only checked in the elevational direction
 - Test methods may be different than for annual survey, especially if a sonographer is performing them

GC Test	
1.	Physical and Mechanical Inspection
2.	Image Uniformity and Artifact Survey
3.	Geometric Accuracy (mechanically scanned transducers only)
4.	Ultrasonic Scanner Electronic Image Display Performance
b.	Primary Interpretation Display Performance*

- This is a **required** component of the program
- Must be performed by a qualified service engineer
- PMs must be documented
 - Corrective action addressing issues found during annual surveys must also be documented, and included with applications for ACR (re)accreditation

<u>QCTest</u>	<u>ACR</u>	<u>MUSC</u>	<u>Performed by</u>
1. Mech. & Elec.	6 mo.	3 mo.	Tech
2. Uniformity	6 mo.	3 mo.	Tech
3. Depth of Penet.	6 mo.	3 mo.	Tech
4. Anechoic Void	NA	3 mo.	Tech
5. Grey Scale Target	NA	3 mo.	Tech
6. Distance Accuracy	NA	12 mo.	Physicist
7. Axial Resolution	NA	12 mo.	Physicist
8. Monitor Testing	NA	12 mo.	Physicist

Common Pitfalls in Ultrasound Accreditation



- Failure to review required attributes/testing instructions
- Technical imaging errors
- Submitting cine loops in place of required static images
- Incomplete Annual Survey report
- Lack of credentialed personnel
- Failure to send complete set of clinical images
- Submitting tech worksheets in place of physician reports
- Failure to submit diagnostic criteria for vascular exams
- Failure to perform annual QC

Acknowledgements

- Nick Hangiandreau, PhD
- Sameer Tipnis, PhD

The End

According to the new ACR ultrasound QC requirements, which of the following tests is not required during the annual survey?

- 20% 1. Sensitivity
- 20% 2. Geometric accuracy
- 20% 3. Spatial resolution
- 20% 4. Physical and mechanical integrity
- 20% 5. Image uniformity and artifact survey

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- 1. Sensitivity
- 2. Geometric accuracy
- 3. Spatial resolution
- 4. Physical and mechanical integrity
- 5. Image uniformity and artifact survey

Reference: ACR ultrasound and breast ultrasound accreditation program requirements:
<http://www.acr.org/~media/ACR/Documents/Accreditation/US/Requirements.pdf>
<http://www.acr.org/~media/ACR/Documents/Accreditation/BreastUS/Requirements.pdf>

The new ACR ultrasound QC requirements specify pass/fail criteria for which of the following evaluations?

- 20% 1. Sensitivity
- 20% 2. Geometric accuracy
- 20% 3. Image uniformity and artifact survey
- 20% 4. All of these
- 20% 5. None of these

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- 1. Sensitivity
- 2. Geometric accuracy
- 3. Image uniformity and artifact survey
- 4. All of these
- 5. None of these

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What is the minimum number of annual routine ultrasound QC testing sessions?

- 20% 1. 4
- 20% 2. 3
- 20% 3. 2
- 20% 4. 1, plus the annual survey
- 20% 5. Routine QC is recommend but is not absolutely required

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2. 3
3. 2
4. 1, plus the annual survey
5. Routine QC is recommend but is not absolutely required

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