WRIGHT STATE UNIVERSITY

12 November 2022

Wright State University

3640 Colonel Glenn Hwy

Dayton, OH 45435

RE: Evaluation of MRI System – Philips Ingenia Cx 3.0T

Wright State University:

On 12 November 2022, a physics evaluation of the MRI equipment in the Center of Neuroimaging and Neuro-Evaluation of Cognitive Technologies (CoNNECT) was performed in accordance with the American College of Radiology guidance from the ACR MRI Quality Control Manual (2015). This evaluation also included a review of the weekly quality control program and weekly quality control tests. Weekly quality control tests were compared with those acquired during this physics evaluation. This evaluation meets the requirements of the ACR MRI Quality Control Manual (2015).

The scientist noted that a continuous, Zone IV illuminated sign is not currently present. One has been purchased and is awaiting installation from facilities. The scientist also did not perform a soft copy evaluation of the MRI scan console display at this time.

Questions regarding this evaluation can be sent via the e-mail address below.

Regards,

Matthew S. Sherwood
MRI Director/MRI Scientist
Wright State University Center of Neuroimaging and Neuro-Evaluation of Cognitive Technologies
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Table of Contents

1. MRI Equipment and Facility Specifications

1.1. MRI Equipment Specifications

Manufacturer	Philips	Magnetic Field (Tesla)	3.00
Model	Ingenia Cx	Software Package	R5.7.1.3
Type	Closed Bore	ACR MRAP Number	n/a
Configuration	Fixed	ACR BMRAP Number	n/a
Location	NEC 137BA	OMPC Serial Number	n/a

1.2. Facility Accreditation(s)

☐ The Joint Commission (TJC)
☐ Det Norske Veritas (DNV)
☐ Healthcare Facilities Accreditation Program (HFAP)
☐ Accreditation Commission for Health Care (ACHC)
☐ National Committee for Quality Assurance (NCQA)

1.3. Program Accreditation(s)

☐ American College of Radiology (ACR)
☐ Intersocietal Accreditation Commission (IAC)
☒ No ACR or IAC Program Accreditation at this time

1.4. MRI Physicist/Scientist Personnel Present

☒ Matthew Sherwood, PhD

1.5. ACR Accreditation Modules

☐ Head
☐ Spine
☐ Body
☐ Musculoskeletal (MSK)
☐ Cardiac
☐ Breast
☐ Magnetic Resonance Angiography (MRA)

1.6. Technical References

a. American College of Radiology (ACR) MRI Quality Control Manual (2015)
b. Large and Medium Phantom Test Guidance for the ACR MRI Accreditation Program (2021).
c. AAPM Report 100 Acceptance Testing and Quality Control Procedures for MRI Facilities.
d. ACR Manual on MR Safety (2020).

2. Assessment Summary

This summary is based on tests, visual assessments, and reviews of weekly quality control tests completed by the MRI scientist/physicist.

2.1. Equipment Performance Evaluation

Magnetic Field Homogeneity
☒PASS ☐FAIL

Center Frequency
☒PASS ☐FAIL

Table Position Accuracy
☐PASS ☒FAIL

Transmit Gain
☒PASS ☐FAIL

Center Frequency
☒PASS ☐FAIL

Radiofrequency Coil Tests
☒PASS ☐FAIL

Displays: Soft Copy
☐PASS ☐FAIL

Console Check
☒PASS ☐FAIL

Displays: Hard Copy (printers)
☐PASS ☐FAIL ☒N/A

2.2. ACR MRI Phantom Evaluation

Low Contrast Object Detectability
☒PASS ☐FAIL

Geometric Accuracy
☒PASS ☐FAIL

Slice Thickness Accuracy
☒PASS ☐FAIL

Percent Signal Ghosting
☒PASS ☐FAIL

Image Intensity Uniformity
☒PASS ☐FAIL

Artifact Analysis
☒PASS ☐FAIL

Slice Position Accuracy
☒PASS ☐FAIL

2.3. MR Safety: Physical Measures

Zone I and Zone II Placards
☒PASS ☐FAIL

Zone III Placard & Security Device
☒PASS ☐FAIL

Zone IV Placard & Security Device
☒PASS ☐FAIL

Zone IV Lighted Sign
☐PASS ☒FAIL

Zone IV Continuous Red Light
☐PASS ☒FAIL

Zone IV Ferrous Object Labels
☒PASS ☐FAIL

Ferromagnetic Detection Device
☒PASS ☐FAIL

Quench Button Accessible & Secure
☒PASS ☐FAIL

5-Gauss Line Markings as Required
☒PASS ☐FAIL

Line of Sight: Console – Zone IV
☒PASS ☐FAIL

2.4. Description of Security Devices for Zones III and IV

III	IV	
☐	☒	Lock and Key
☒	☐	Badge/Keycard
☐	☐	Keypad/Code
☐	☐	Other
☐	☐	None

3. Safety Risk Management

3.1. MRI Environment

The site manages safety risks in the MRI environment with the following:

☒ Claustrophobia, anxiety or emotional distress
☒ Urgent or emergent medical care
☒ Medical implants, devices or embedded foreign objects (such as shrapnel)
☒ Ferromagnetic objects entering the MRI environment
☒ Acoustic noise

3.2. Safety Risks

☒ Restricting access of everyone not trained in MRI safety or screened by MRI-trained staff from Zones III and IV
☒ Ensuring restricted areas are controlled by and under the direct supervision of MRI-trained staff

☒ Signage posted at the entrance to Zone IV conveying potentially dangerous magnetic fields are present, magnet is always on except in rare cases.

3.3. Annual Training on Safe MRI Practices

The site verified and documents that technologists/MR operators who perform MRI examinations participate in ongoing education that includes annual training on safe MRI practices in the MRI environment, including the following:

☒ Patient screening criteria addresses ferromagnetic items, medical implants and devices, and risk for nephrogenic systemic fibrosis (NSF)
☒ Proper patient positioning activities to avoid thermal injuries
☒ Equipment and supplies that have been determined to be acceptable for use in the MRI environment (MRI safe or MR Conditional)
☒ MRI safety response procedures for patients who require urgent or emergent medical care
☒ MRI equipment emergency shutdown procedures, such as MRI system quench and cryogen safety procedures
☒ Patient hearing protection
☒ Management of patients with claustrophobia, anxiety, or emotional distress
☒ Terminology for defining the safety of items in the magnetic resonance environment is provided in ASTM F2503 Standard Practice for Marking Medical Devices and Other Items for Safety in the Magnetic Resonance Environment (http://www.astm.org)

3.4. Incident Reporting

The site collects data on:

☒ Incidents where ferromagnetic items unintentionally entered the MRI scanner room
☒ Injuries resulting from the presence of ferromagnetic items in the MRI scanner room
☒ Patient thermal injuries that occur during MRI exams

3.5. MRI Safety Program

The site has the following policy and training measures:

☒ Written policies are present and readily available to facility staff
☒ Written policies are reviewed and updated on a regular

3.6. MRI Safety Program Assessment

The site's MRI safety policy has the following measures:

☒ Designated MR Medical Director
☒ Site access restrictions (MR Zones)
☒ Documented MRI safety education/training for all personnel

☒ Policy and procedure for screening of patients and non-MR personnel
☒ Policy for pediatric patients
☒ Policy for magnet quench
☒ Policy for cryogen safety
☒ Policy for acoustic noise
☒ Policy for pregnant patients and staff
☒ Policy for the safe use of contrast agents
☒ Policy for patient sedation
☒ Policy for prevention of patient thermal burns
☒ Emergency code procedures
☒ Policy for screening of devices and objects that may enter the MR scan room
☒ Policy for the designation of "MR Safe" and "MR Conditional" status of objects
☒ Policy for the reporting of MR safety incidents or adverse incidents
☒ Policy for communication between staff and MR patients
☒ Policy for the handling of medical waste and the control of infection

4. Description of ACR MRI Phantom Acquisition Protocols

4.1. Specification of Test

	Coil A	Coil B
Coil Description	dsHead 3.0T	dsHead 32CH
Top S/N	6005	185
Bottom S/N	5772	185
Coil Condition	OK	OK
Phantom Type | Size	ACR | Large	ACR | Large
Phantom ID	J14773	J14773
Phantom Condition	OK	OK
Scan Room Lights	On	On

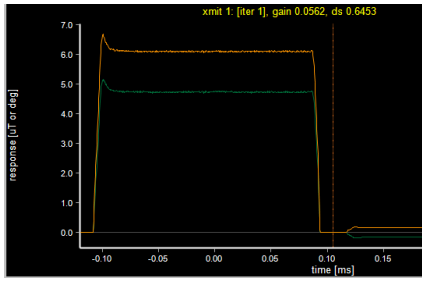
4.2. Coil and Phantom Arrangement

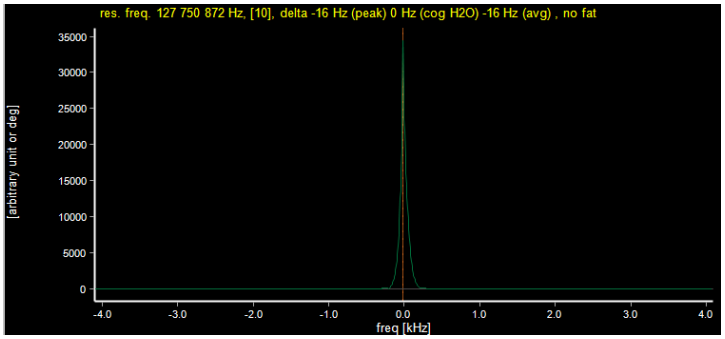
A

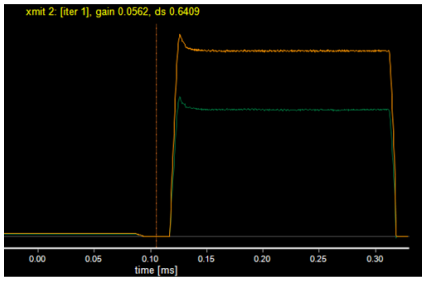
B

4.3. ACR Phantom Prescan

Coil Description	dsHead 3.0T	dsHead 32CH
Transmitter #1 Gain	0.5629	0.6453
Transmitter #2 Gain	0.5925	0.6409
Center Frequency (Hz)	127750857	127750872







4.4. ACR Phantom MRI Acquisition Protocols

	ACR & Site		
Scan Series	Sagittal Loc	ACR T1 Axial	ACR T2 Axial
Pulse Sequences	Spin Echo	Spin Echo	Spin Echo
Slice Orientation	Sagittal	Axial	Axial
Rep. Time (TR): ms	200	500	2000
Echo Time (TE): ms	20	20	20
Echo Time (TE) 2: ms	n/a	n/a	80
Echo Train Length: ms	n/a	n/a	n/a
Acquisition Matrix (Freq. x. Phase)	256x256	256x256	256x256
Field of View: mm (Freq. x Phase)	250x250	250x250	250x250
Slice Thickness: mm	5	5	5
Slice Gap: mm	1	1	1
Averages (NSA/NEX)	1	1	1
Bandwidth 1: kHz	0.218	0.218	0.218
Bandwidth 2: kHz	n/a	n/a	0.218
Intensity Correction	1|2	1|2	1|2
Intensity Filter	*none*	*none*	*none*
Flip Angle: degrees	90	90	90
Scan Time (min:sec)	0:53	2:10	8:32
Imaging Options	*none*	*none*	*none*

Intensity Correction Description

1	CLEAR
2	Uniformity Correction

5. Evaluation of ACR MRI Phantom Acquisition Images

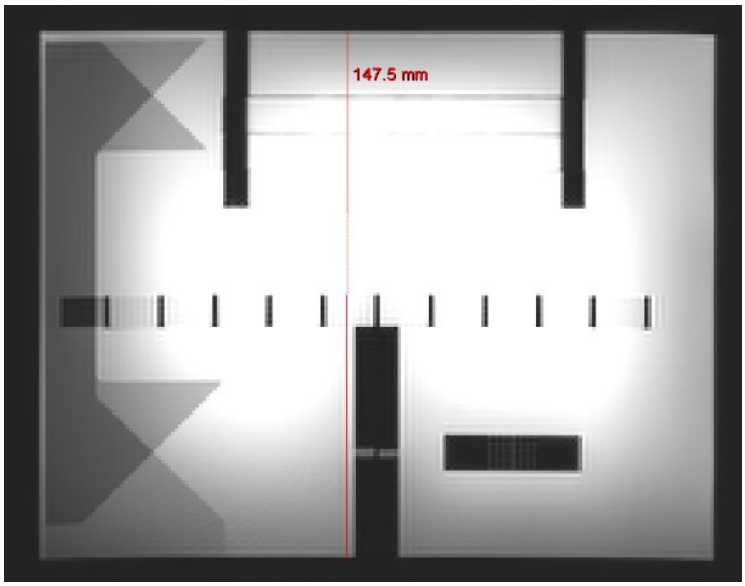
5.1. Geometric Accuracy (z)

The following, in accordance with ACR procedures, defines the process followed to determine the geometric accuracy (z) from the acquired sagittal locator image:

i. Navigate to slice 1 of the image.
ii. Outline the phantom in the image with a rectangle.
iii. The window is set to 1 and the level is adjusted until half the phantom is black. This level is recorded.
iv. The window/level is reset and the level is adjusted to half the recorded value in the previous step.
v. The interpolate option is enabled to create better contrasting edges.
vi. The phantom is measured from top to bottom (z) near the center and results are recorded in mm.

Results

Coil Description	dsHead 3.0T	dsHead 32CH
Series	Sagittal Locator	Sagittal Locator
Slice	1	1
Display Window | Level	1860 | 600	1860 | 675
Length (z) (mm)	147.7	147.5
Error (mm)	0.3	0.5
Test Results	**PASS**	**PASS**



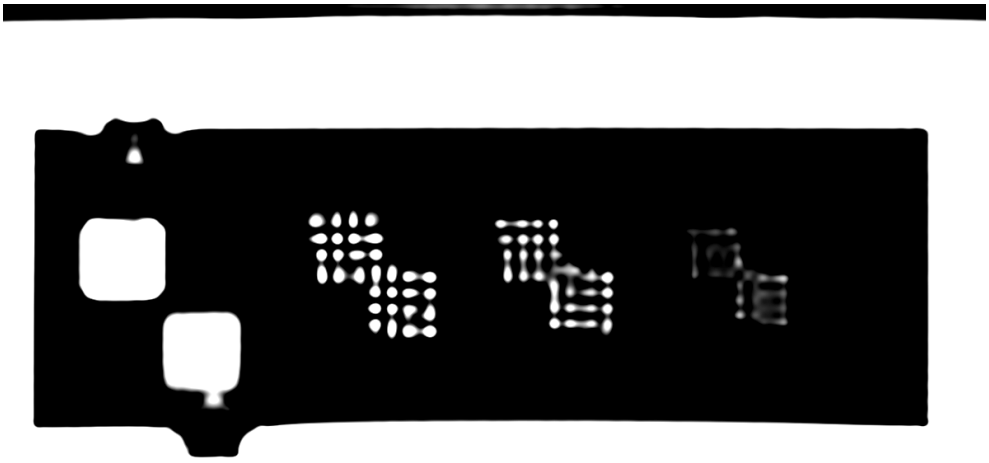
5.2. High Contrast Spatial Resolution

The following, in accordance with ACR procedures, defines the process followed to determine the high contrast spatial resolution from the acquired Axial T1 and Axial T2 images:

i. Navigate to slice 1 of the image.
ii. Adjust window and level as necessary to resolve 4 signals left to right in the upper left block of the array and 4 signals top to bottom in lower right array.

Results

Coil Description	dsHead 3.0T		dsHead 32CH	
Series and Slice Number	Ax T1	Ax T2 TE 80	Ax T1: 1	Ax T2 TE 80
Slice	1	1	1	1
Display Window | Level	844 | 635	379 | 300	133 | 350	500 |355
Array 1.1mm Resolvable	YES	YES	YES	YES
Array 1.0mm Resolvable	YES	YES	YES	YES
Array 0.9mm Resolvable	YES	YES	YES	NO
Test Results	**PASS**	**PASS**	**PASS**	**PASS**



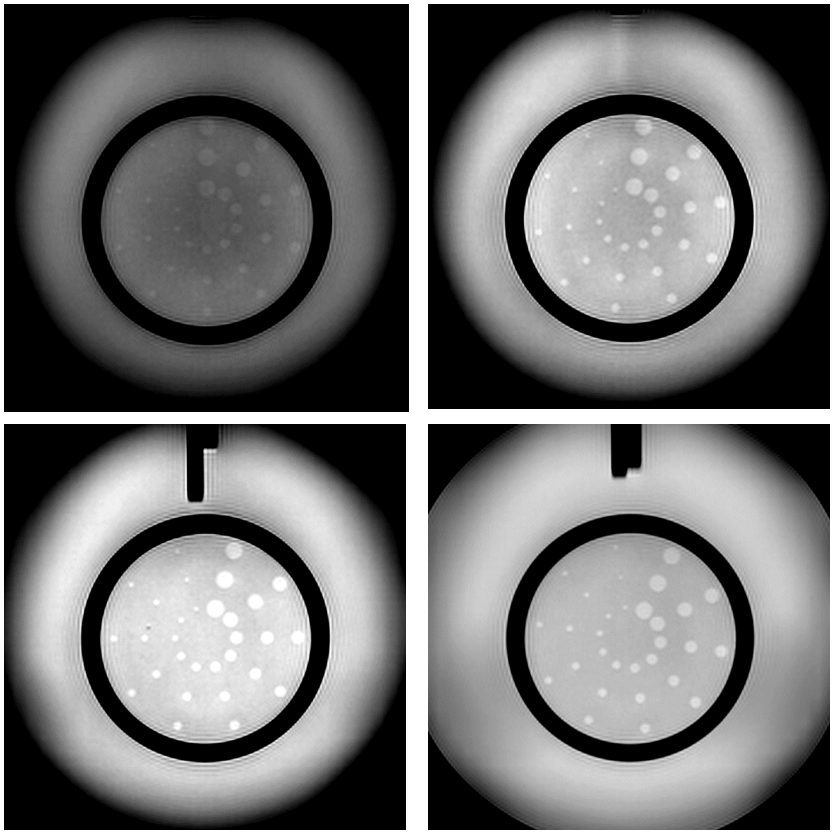
5.3. Low Contrast Object Detectability

The following, in accordance with ACR procedures, defines the process followed to determine the low contrast object detectability from the acquired Axial T1 and Axial T2 images:

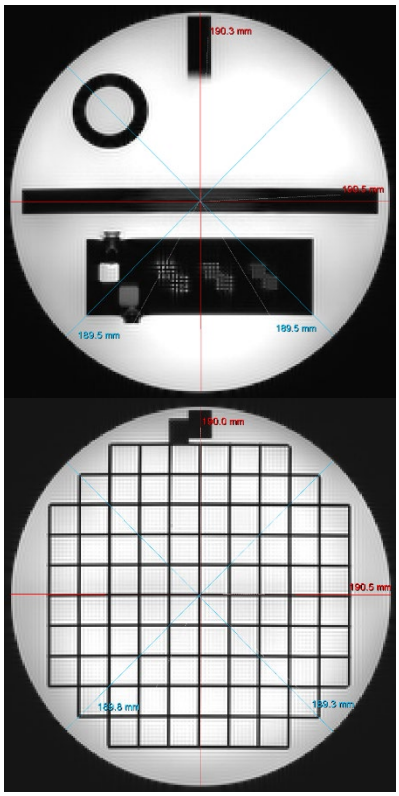
i. Navigate to slice 8 of the image.
ii. Window and level as necessary to visual radial holes ("spokes").
iii. Repeat for slices 9 through 11.
iv. Sum the spokes measured for all 4 slices.

Results

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Display Window | Level	738 | 1729	815 | 1032	553 | 2008	762 | 1274
Slice 8 Spokes	10	9	10	10
Slice 9 Spokes	10	10	10	10
Slice 10 Spokes	10	10	10	10
Slice 11 Spokes	10	10	10	10
Total Resolvable Spokes	40	39	40	40
Test Results	**PASS**	**PASS**	**PASS**	**PASS**



5.4. Geometric Accuracy (x/y)



The following, in accordance with ACR procedures, defines the process followed to determine the geometric accuracy (x/y) from the acquired Axial T1 and Axial T2 images:

i. Navigate to slice 1 of the image.
ii. Outline the phantom image with an ellipse.
iii. The window is set to 1 and the level is adjusted until half the phantom is black. This level is recorded.
iv. The window/level is reset and the level is adjusted to half the recorded value in the previous step.
v. The interpolate option is enabled to create better contrasting edges.
vi. The phantom is measured from top to bottom (y) near the center and results are recorded in mm.
vii. The phantom is measured from left to right (x) new the center and results are recorded in mm.
viii. The phantom is measured diagonally upper left to lower right and upper right to lower left near the center and results are recorded in mm.
ix. The previous steps are repeated for slice 5.

Results

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Slice	1	1	1	1
Display Window | Level	1802 | 825	946 | 410	1766 | 825	889 | 390
Length (L/R) (mm)	190.5	190.3	190.3	190.1
Length (A/P) (mm)	190.3	190.0	190.5	190.5
Length (UL to LR) (mm)	189.0	189.3	189.5	189.9
Length (UR to LL) (mm)	189.9	189.9	189.5	189.9
Test Results	**PASS**	**PASS**	**PASS**	**PASS**

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Slice	5	5	5	5
Display Window | Level	2147 | 900	1133 | 475	2161 | 900	1141 |511
Length (L/R) (mm)	190.3	190.3	190.0	190.3
Length (A/P) (mm)	190.0	190.5	190.5	189.9
Length (UL to LR) (mm)	189.3	189.5	189.3	188.9
Length (UR to LL) (mm)	189.9	190.5	189.8	190.0
Test Results	**PASS**	**PASS**	**PASS**	**PASS**

5.5. Slice Thickness Accuracy

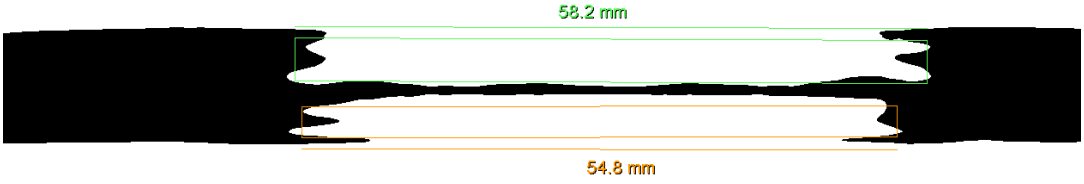
The following, in accordance with ACR procedures, defines the process followed to determine the slice thickness accuracy from the acquired Axial T1 and Axial T2 images:

i. Navigate to slice 1 of the image.
ii. Adjust the window and level as necessary to reveal the slice thickness insert.
iii. Place rectangular ROIs on the ramps of the slice thickness insert.
iv. Set the window to 1 and the level to ½ of the average signal of the two ROIs.
v. Measure and record the horizontal length of the upper and lower ramp in mm.
vi. Slice thickness accuracy is calculated per the ACR method:

$$0.2 \times \frac{top \times bottom}{top + bottom}$$

Results

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Slice	1	1	1	1
Mean Value Upper ROI	298	156	274	138
Mean Value Lower ROI	271	148	278	128
Display Window | Level	1 | 142	1 | 76	1 | 138	1 | 67
Upper Ramp Length (mm)	50.5	48.7	58.2	54.8
Lower Ramp Length (mm)	60.6	57.8	54.8	53.9
Calculated Slice Thickness (mm)	5.509	5.286	5.645	5.435
Error (mm)	0.509	0.286	0.645	0.435
Test Results	**PASS**	**PASS**	**PASS**	**PASS**



5.6. Slice Position Accuracy

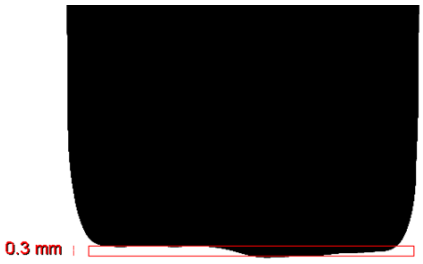
The following, in accordance with ACR procedures, defines the process followed to determine the slice position accuracy from the acquired Axial T1 and Axial T2 images:

i. Navigate to slice 1 of the image.
ii. Place a rectangular ROI in the water portion of the phantom (approximately 400mm^2).
iii. Set the window to 1 and the level to ½ of the measured water signal from the ROI.
iv. Measure and record the vertical difference between the lengths of the two slice position inserts.
v. Repeat for slice 11.

Results

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Slice	1	1	1	1
Display Window | Level	1 | 907	1 | 445	1 | 917	1 | 431
Length Difference	0.3	0.3	0.3	0.2
Actual Displacement	0.15	0.15	0.15	0.10
Test Results	**PASS**	**PASS**	**PASS**	**PASS**

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Slice	11	11	11	11
Display Window | Level	1 | 800	1 | 403	1 | 948	1 | 467
Length Difference	-4.00	-4.00	-3.60	-3.70
Actual Displacement	2.00	2.00	1.80	1.85
Test Results	**PASS**	**PASS**	**PASS**	**PASS**



5.7. Image Intensity Uniformity

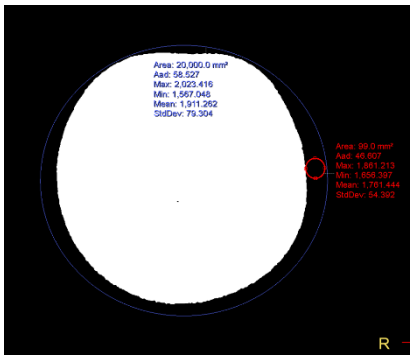
The following, in accordance with ACR procedures, defines the process followed to determine the image intensity uniformity from the acquired Axial T1 and Axial T2 images:

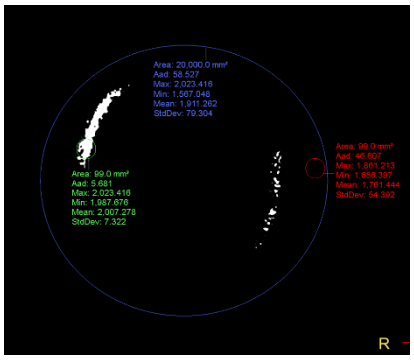
i. Navigate to slice 7 of the image.
ii. Place a large circular ROI in the water portion of the phantom (approximately 20,000mm^2).
iii. Set the window and level to 1.
iv. Slowly raise the level until a small area of dark pixels develops inside the large ROI.
v. Draw a small ROI (approximately 100mm^2) over the area of dark pixels.
vi. Measure and record the mean signal value as the maximum intensity value.
vii. Continue to raise the level until a small area of light pixels remains in the large ROI.
viii. Draw a small ROI (approximately 100mm^2) over the area of light pixels.
ix. Measure and record the mean signal value as the maximum intensity value.
x. Calculate image intensity uniformity per the ACR method:

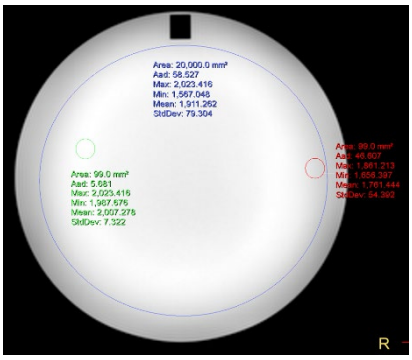
$$100 \times \left[1 - \frac{maximum\ intensity\ value - minimum\ intensity\ value}{maximum\ intensity\ value + minimum\ intensity\ value}\right]$$

Results

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Slice	7	7	7	7
Area of Small ROI (mm^2)	101	101	99	101
Area of Large ROI (mm^2)	20, 000	20,000	20,000	20,000
Max Intensity Value	1,984.463	1,056.108	2,007.278	1,053.366
Min Intensity Value	1,630.347	833.37	1,761.444	861.825
Percent Image Uniformity	90.204	88.212	93.477	89.999
Test Results	**PASS**	**PASS**	**PASS**	**PASS**







5.8. Percent Signal Ghosting

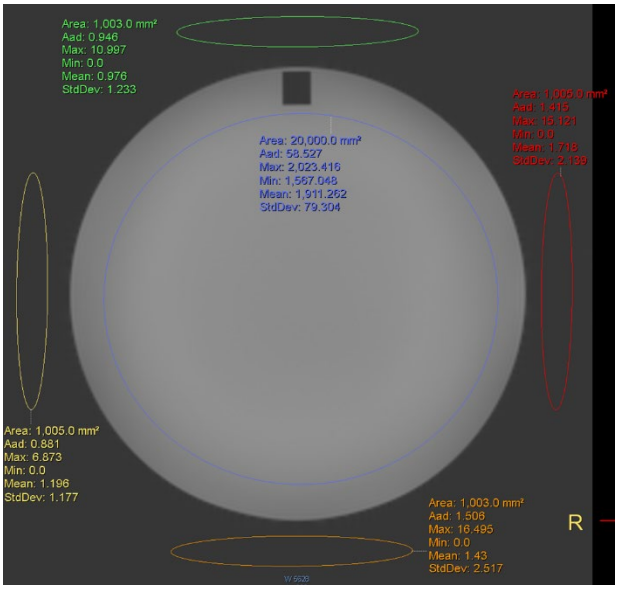
The following, in accordance with ACR procedures, defines the process followed to determine the percent signal ghosting from the acquired Axial T1 and Axial T2 images:

i. Navigate to slice 7 of the phantom.
ii. Place a large circular ROI in the water portion of the phantom (approximately 20,000mm^2).
iii. Place smaller, elliptical ROIs in the air on the top/bottom and left/right of the phantom (approximately 1,000mm^2).
iv. Measure and record the mean signal values for all 5 ROIs.
v. Calculate percent signal ghosting per the ACR method:

$$100 \times \left| \frac{(top + bottom) - (left + right)}{2 \times large\ ROI} \right|$$

Results

Coil Description	dsHead 3.0T		dsHead 32CH	
Series	Ax T1	Ax T2 TE 80	Ax T1	Ax T2 TE 80
Slice	7	7	7	7
Large ROI Mean Value	1,860.61	969.236	1,911.262	987.431
Top ROI Mean Value	0.676	0.434	0.976	0.259
Bottom ROI Mean Value	1.287	0.064	1.430	0.56
Left ROI Mean Value	2.016	1.406	1.196	0.669
Right ROI Mean Value	2.25	1.188	1.718	1.733
Signal Percent Ghosting (%)	0.062	0.108	0.013	0.080
Test Results	**PASS**	**PASS**	**PASS**	**PASS**



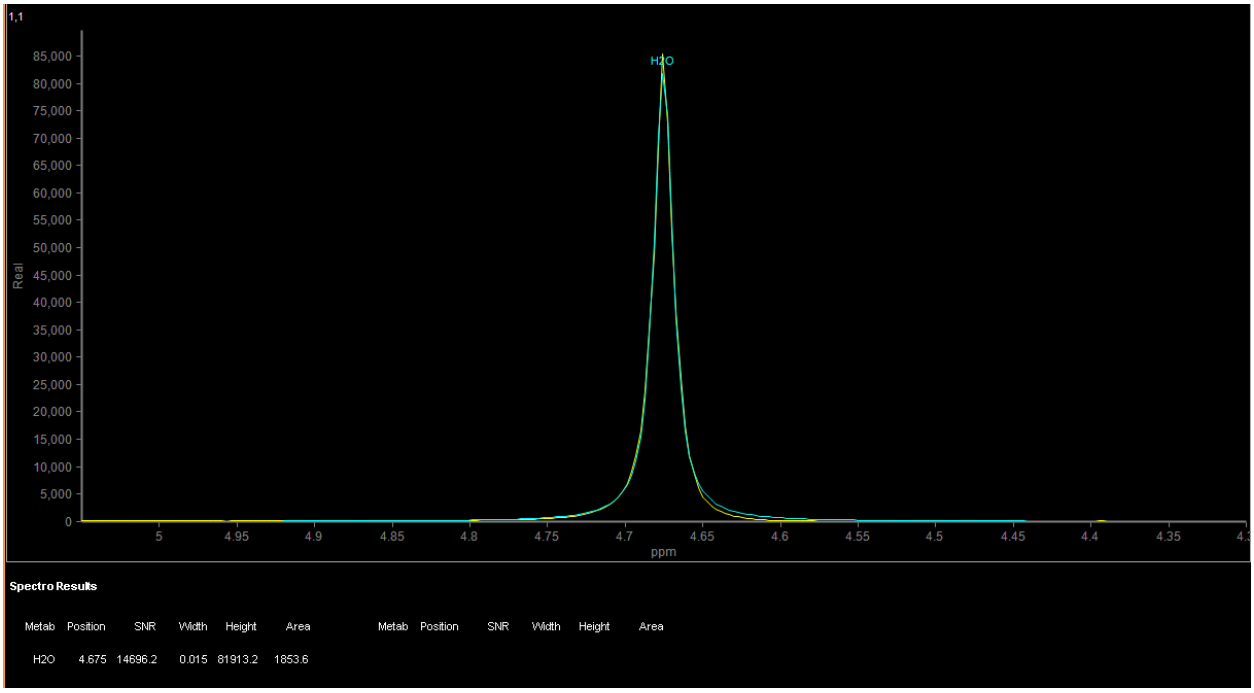
6. Evaluation of Magnetic Field Homogeneity

Phantom Description and Position

Coil Description	dsHead 32CH
Top S/N	185
Bottom S/N	185
Coil Condition	OK
Phantom Type	Spectro Sphere A
Phantom Diameter (mm)	100
Phantom Condition	OK
Scan Room Lights	On

Measurement and Results

Isometric voxel size (mm)	50
Measured FWHM (ppm)	0.015
Estimated FWHM (Hz)	1.92
Test Results	**PASS**



7. RF Coil Evaluations

7.1. dsHead 3.0T

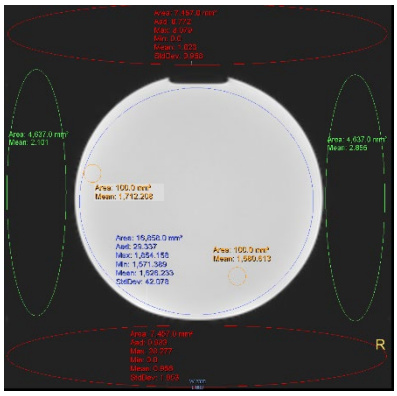
SN	5772 | 6005
REF	4598-000-97974 | 4598-000-97984
Coil Condition	OK
Phantom	Bottle: Large
Phantom Condition	OK

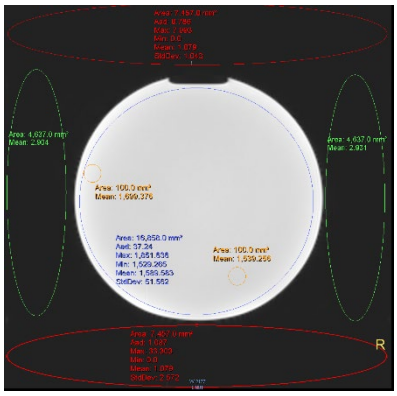
Acquisition Parameters

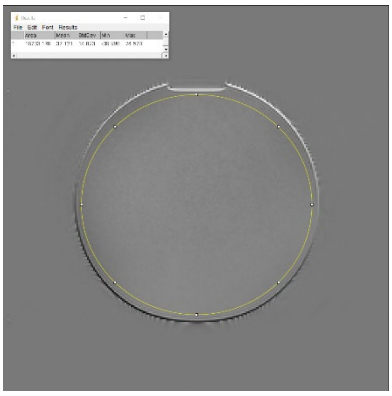
Sequence	TR (ms)	TE (ms)	Flip	Plane	FOV (mm)	Matrix	BW (kHz)	NSA	Thickness	Gap
SE	300	20	90	Ax	300x300	256x256	0.218	1	5	-

Measurements

Mean	Max	Min	Ghosting	Noise	Air Noise SD	NEMA Noise SD
1,626.233	1,712.208	1,580.613	2.4780	0.9895	1.5382	14.823







Results

Mean SNR - NEMA	155.154
Min. SNR - NEMA	100
Mean SNR - Air	1057.247
Min. SNR - Air	300
Test Results	**PASS**
Percent Image Uniformity	96.004%
Min. Expected PIU	75%
Test Results	**PASS**
Percent Signal Ghosting	0.092%
Max Expected Ghosting	3%
Test Results	**PASS**
Artifacts Noted	*none*

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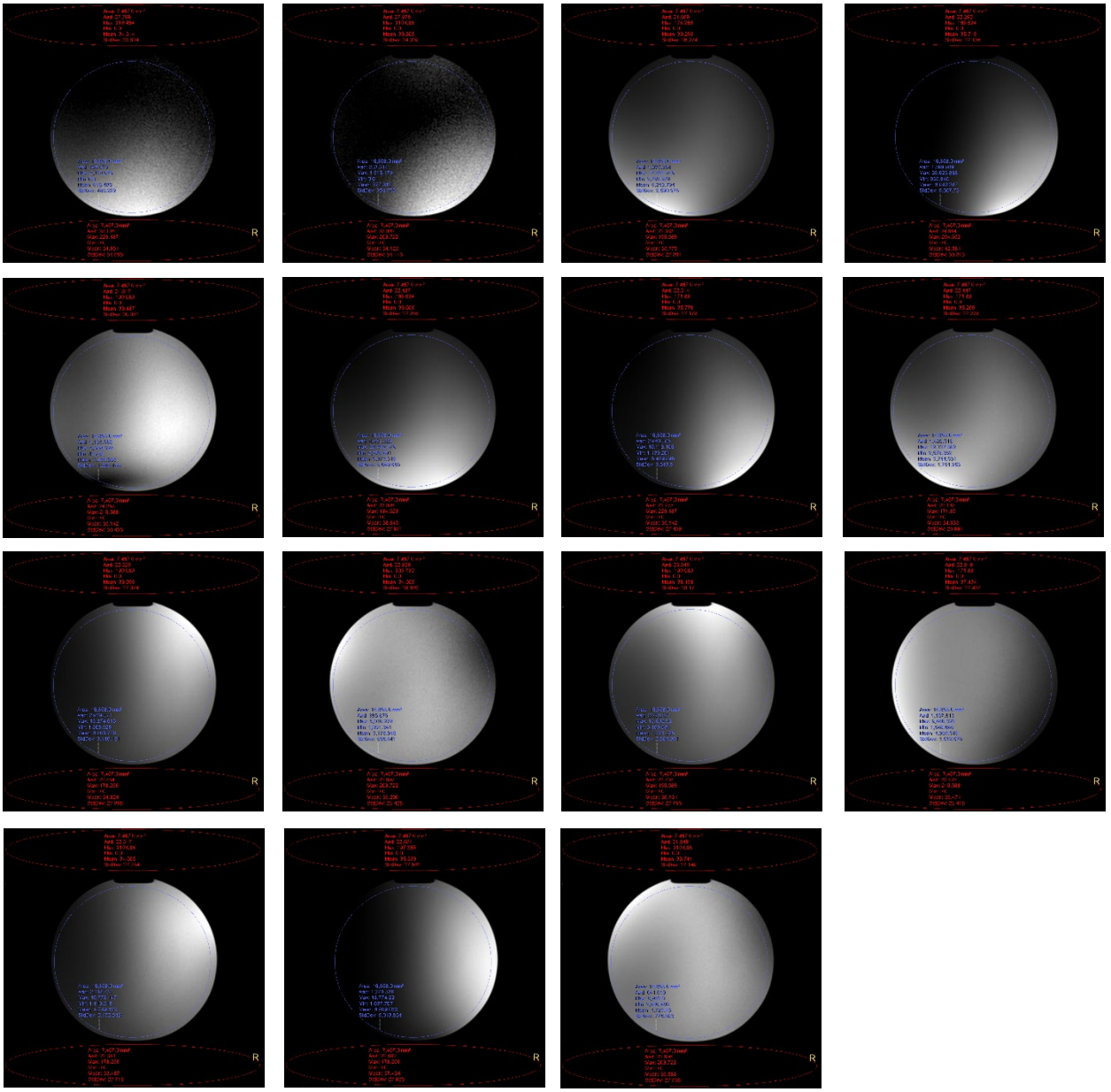
CoNNECT

Manufacturer: Philips
Model: Ingenia Cx

Channel	Mean	Noise SD	Noise Type	Mean SNR
1	618.486	34.197	Air	18.086
2	377.012	34.093	Air	11.058
3	6242.794	32.264	Air	193.492
4	6942.387	28.768	Air	241.32
5	3446.588	30.244	Air	113.959
6	9973.319	27.585	Air	361.549
7	5429.945	27.309	Air	198.835
8	5744.631	27.136	Air	211.695

Channel	Mean	Noise SD	Noise Type	Mean SNR
9	6508.778	27.221	Air	239.105
10	3178.948	28.546	Air	111.363
11	7731.235	27.964	Air	276.473
12	4905.616	28.179	Air	174.091
13	4749.133	27.751	Air	171.134
14	6509.033	27.744	Air	234.61
15	4725.45	27.344	Air	172.814



7.2. dsHeadNeck 3.0T

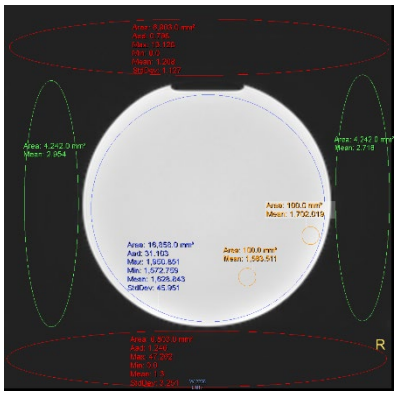
SN	5772 | 001174
REF	4598-000-97974 | 4598-000-97993
Coil Condition	OK
Phantom	Bottle: Large
Phantom Condition	OK

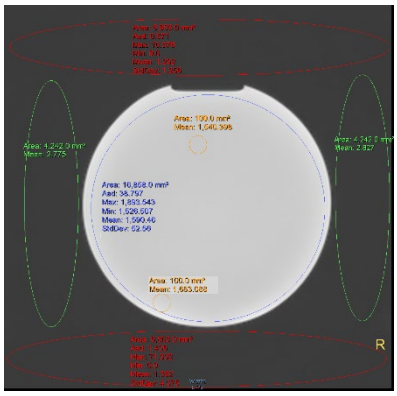
Acquisition Parameters

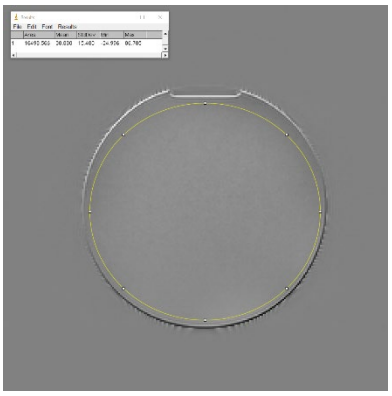
Sequence	TR (ms)	TE (ms)	Flip	Plane	FOV (mm)	Matrix	BW (kHz)	NSA	Thickness	Gap
SE	300	20	90	Ax	300x300	256x256	0.218	1	5	-

Measurements

Mean	Max	Min	Ghosting	Noise	Air Noise SD	NEMA Noise SD
1,628.843	1,702.019	1,583.511	2.8360	1.2540	2.4330	15.480







Results

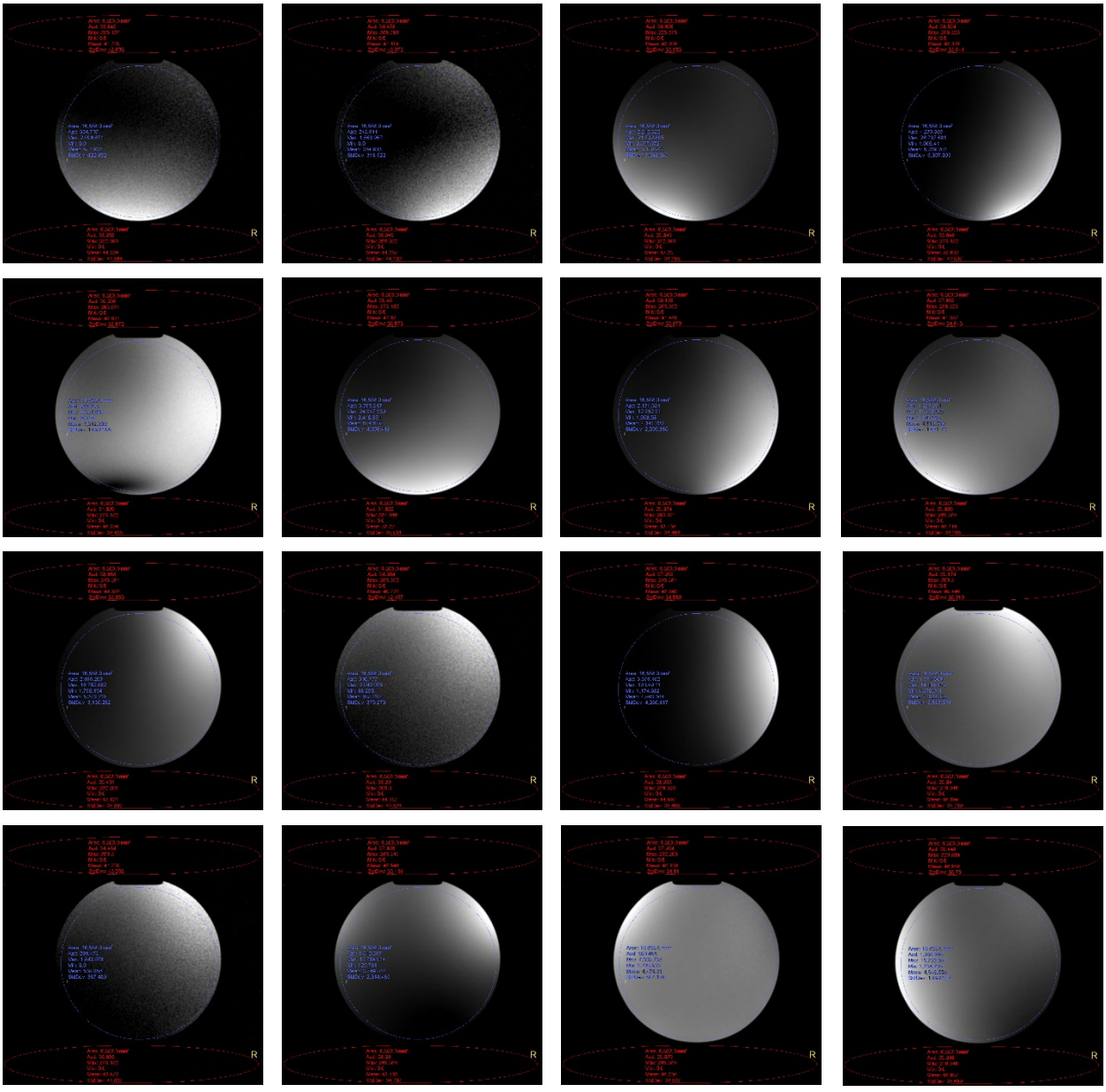
Mean SNR - NEMA	148.807
Min. SNR - NEMA	100
Mean SNR - Air	669.475
Min. SNR - Air	200
Test Results	**PASS**
Percent Image Uniformity	96.393%
Min. Expected PIU	75%
Test Results	**PASS**
Percent Signal Ghosting	0.097%
Max Expected Ghosting	3%
Test Results	**PASS**
Artifacts Noted	*none*

Wright State University
CoNNECT

Manufacturer: Philips
Model: Ingenia Cx

CH	Mean	Noise SD	Noise Type	Mean SNR
1	571.633	43.088	Air	13.267
2	364.903	43.789	Air	8.333
3	6176.914	35.908	Air	172.019
4	6239.202	38.319	Air	162.821
5	3312.399	39.206	Air	84.488
6	8606.05	37.95	Air	226.772
7	4141.233	36.075	Air	114.796
8	4818.519	35.474	Air	135.831

Channel	Mean	Noise SD	Noise Type	Mean SNR
9	5373.215	35.876	Air	149.772
10	688.282	42.999	Air	16.007
11	4943.364	35.224	Air	140.34
12	7138.654	36.015	Air	198.212
13	539.056	43.553	Air	12.377
14	2314.485	34.981	Air	66.164
15	4474.31	35.733	Air	125.216
16	4648.054	36.209	Air	128.369



7.3. dsHead 32CH

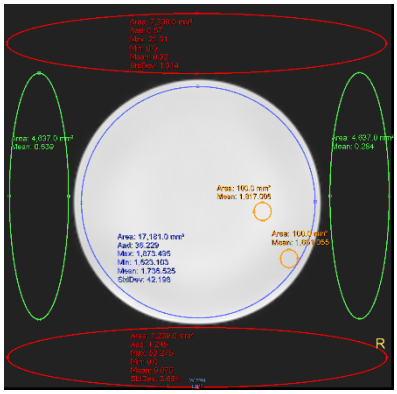
SN	185
REF	4598-012-90892
Coil Condition	OK
Phantom	Bottle: Large
Phantom Condition	OK

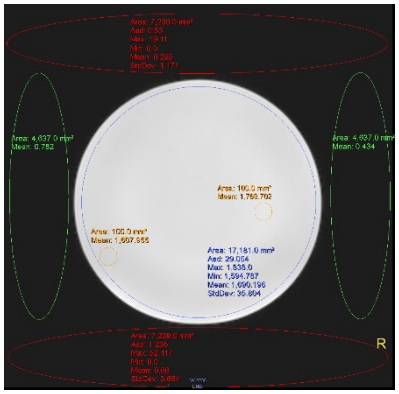
Acquisition Parameters

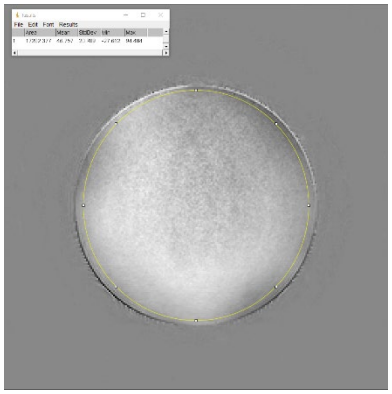
Sequence	TR (ms)	TE (ms)	Flip	Plane	FOV (mm)	Matrix	BW (kHz)	NSA	Thickness	Gap
SE	300	20	90	Ax	300x300	256x256	0.218	1	5	-

Measurements

Mean	Max	Min	Ghosting	Noise	Air Noise SD	NEMA Noise SD
1,736.525	1,814.006	1,651.055	0.4615	0.4975	2.7458	20.709







Results

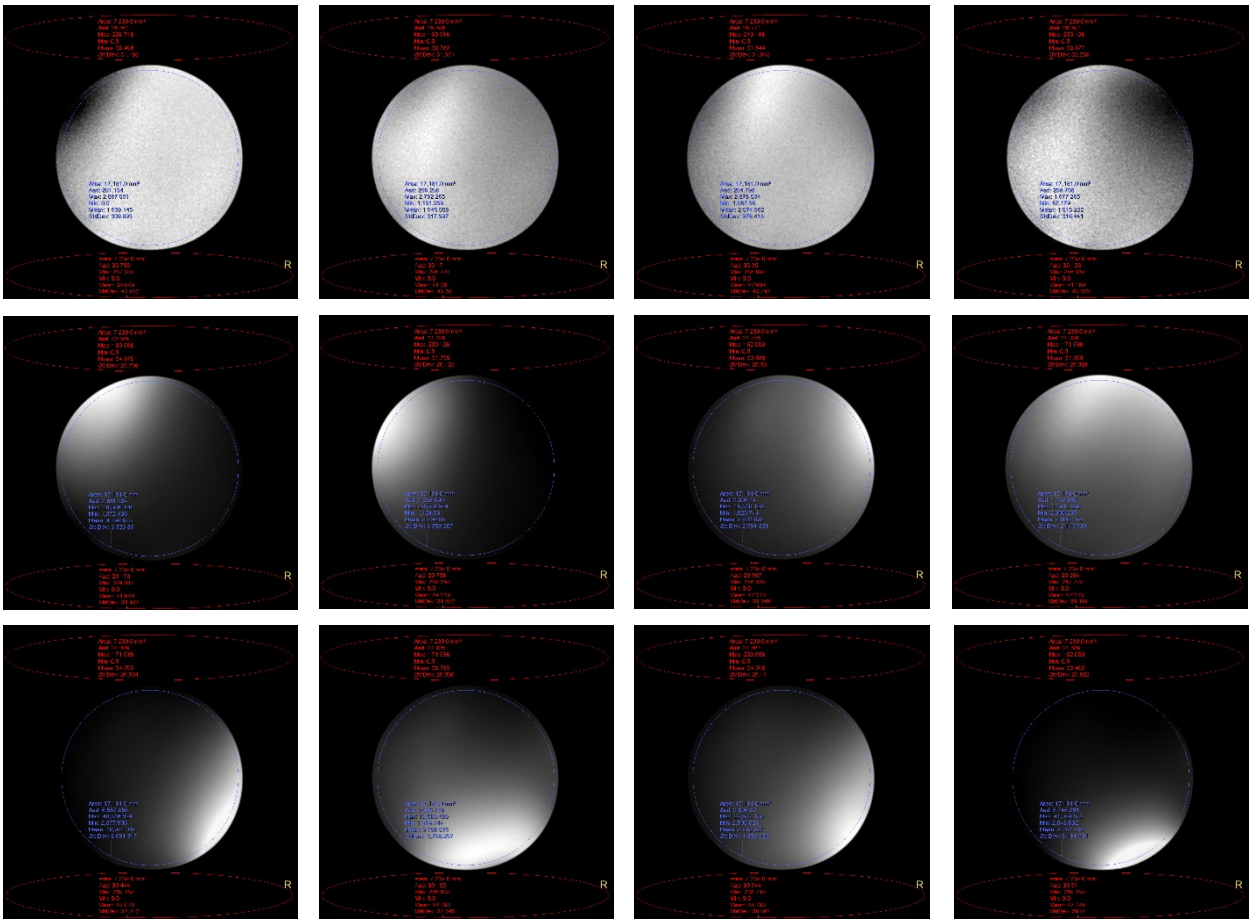
Mean SNR - NEMA	118.587
Min. SNR - NEMA	100
Mean SNR - Air	632.441
Min. SNR - Air	300
Test Results	**PASS**
Percent Image Uniformity	95.297%
Min. Expected PIU	75%
Test Results	**PASS**
Percent Signal Ghosting	0.002%
Max Expected Ghosting	3%
Test Results	**PASS**
Artifacts Noted	*none*

Wright State University
CoNNECT

Manufacturer: Philips
Model: Ingenia Cx

Channel	Mean	Noise SD	Noise Type	Mean SNR
1	1639.145	37.022	Air	44.275
2	1946.009	37.938	Air	51.295
3	2074.662	38.263	Air	54.221
4	1015.222	38.212	Air	26.568
5	4796.978	32.422	Air	147.953
6	5466.55	31.95	Air	171.095
7	5423.093	31.804	Air	170.519
8	5669.156	31.481	Air	180.083
9	10951.02	32.49	Air	337.058
10	6598.036	32.307	Air	204.229
11	8443.028	32.77	Air	257.647
12	1639.145	37.078	Air	44.208
13	8751.416	32.495	Air	269.316
14	2862.31	36.557	Air	78.297
15	1141.97	37.799	Air	30.212
16	1441.209	38.887	Air	37.062

Channel	Mean	Noise SD	Noise Type	Mean SNR
17	1394.608	38.106	Air	36.598
18	1204.391	36.743	Air	32.779
19	1990.609	38.171	Air	52.15
20	1026.848	38.029	Air	27.002
21	1939.242	44.13	Air	43.944
22	721.796	38.847	Air	18.58
23	964.046	38.079	Air	25.317
24	1051.34	38.772	Air	27.116
25	11088.72	32.256	Air	343.767
26	4944.977	33.44	Air	147.874
27	8183.242	32.106	Air	254.883
28	9025.877	38.289	Air	235.733
29	3201.289	35.916	Air	89.133
30	718.174	38.692	Air	18.561
31	8840.902	41.604	Air	212.501
32	2804.749	36.22	Air	77.437



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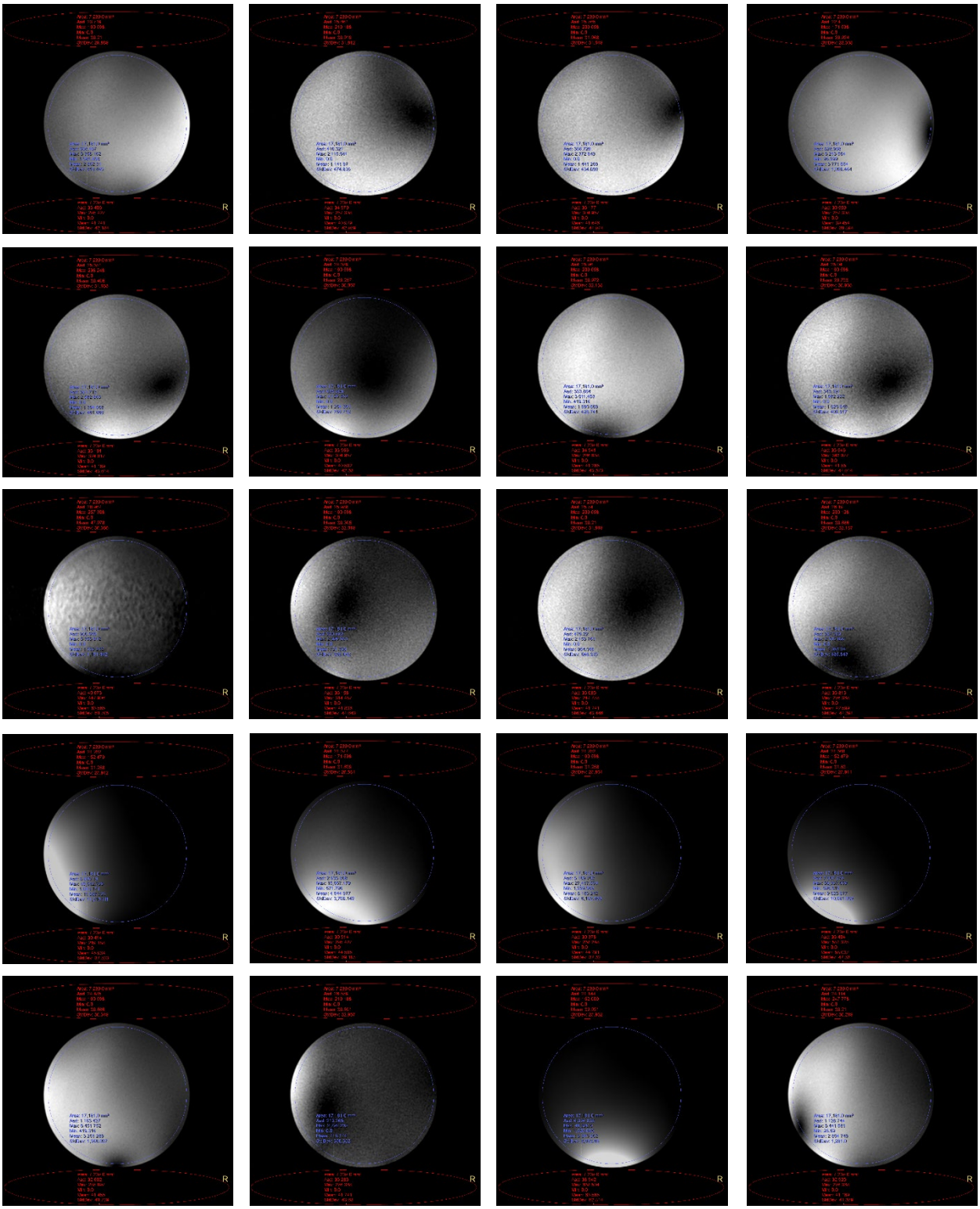
Manufacturer: Philips
Model: Ingenia Cx



7.4. dsAnterior

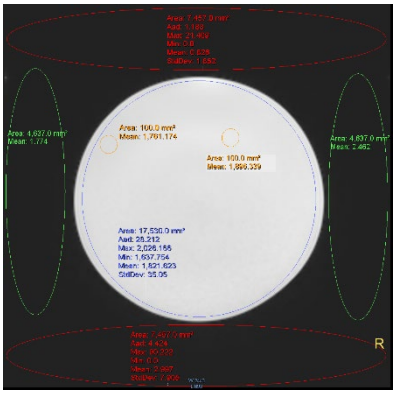
SN	005528
REF	4598-001-18407
Coil Condition	OK
Phantom	Cylinder: 5.27L
Phantom Condition	OK

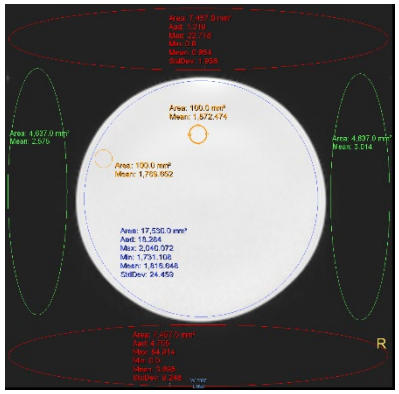
Acquisition Parameters

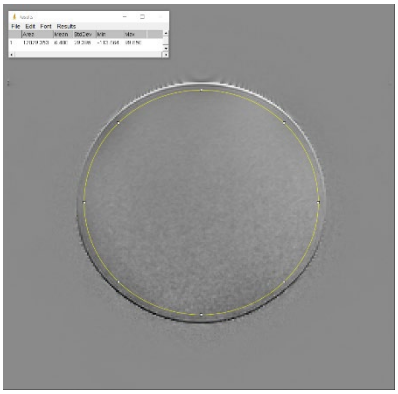
Sequence	TR (ms)	TE (ms)	Flip	Plane	FOV (mm)	Matrix	BW (kHz)	NSA	Thickness	Gap
SE	300	20	90	Ax	300x300	256x256	0.218	1	5	-

Measurements

Mean	Max	Min	Ghosting	Noise	Air Noise SD	NEMA Noise SD
1,821.623	1,896.339	1,761.174	2.1180	1.9115	5.7410	29.395







Results

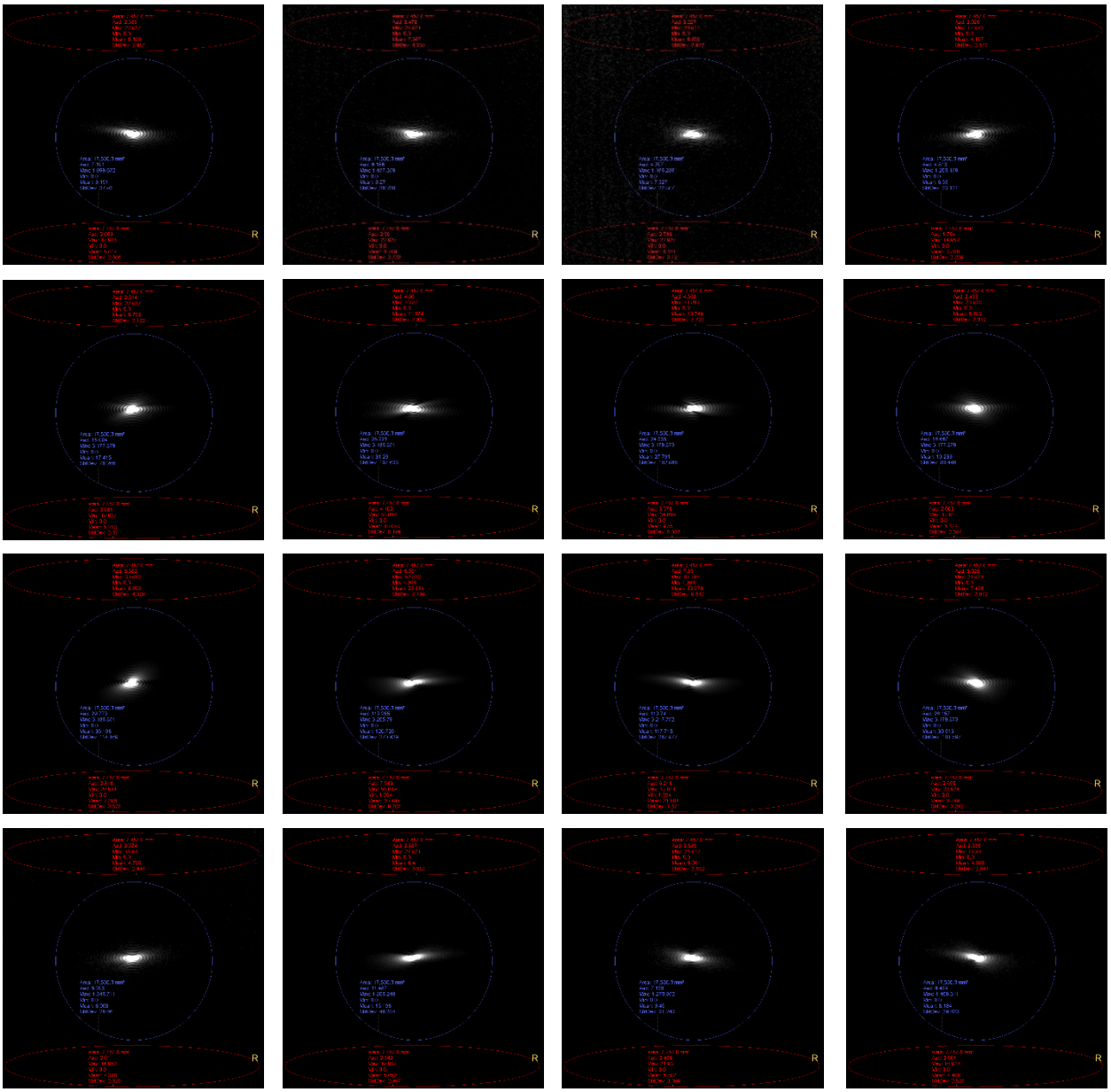
Mean SNR - NEMA	87.640
Min. SNR - NEMA	50
Mean SNR - Air	317.299
Min. SNR - Air	100
Test Results	**PASS**
Percent Image Uniformity	96.304%
Min. Expected PIU	75%
Test Results	**PASS**
Percent Signal Ghosting	0.011%
Max Expected Ghosting	3%
Test Results	**PASS**
Artifacts Noted	*none*

Wright State University
CoNNECT

Manufacturer: Philips
Model: Ingenia Cx

Channel	Mean	Noise SD	Noise Type	Mean SNR
1	9.191	2.831	Air	3.246
2	9.27	4.045	Air	2.292
3	7.327	3.707	Air	1.976
4	6.35	2.414	Air	2.631
5	17.415	2.905	Air	5.994
6	31.29	5.581	Air	5.607
7	27.791	5.39	Air	5.156
8	19.239	2.828	Air	6.802

Channel	Mean	Noise SD	Noise Type	Mean SNR
9	35.198	3.97	Air	8.866
10	120.726	9.016	Air	13.39
11	117.715	8.6	Air	13.688
12	30.513	3.555	Air	8.584
13	6.968	2.728	Air	2.555
14	13.198	3.306	Air	3.992
15	9.49	3.349	Air	2.833
16	8.184	2.714	Air	3.015



7.5. Inherent Body

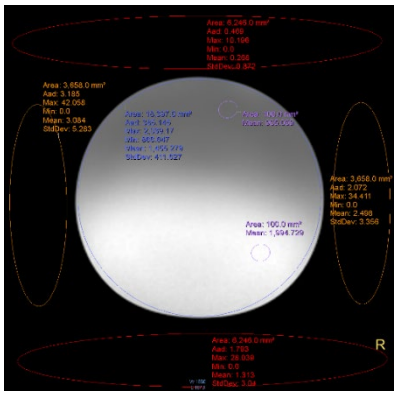
SN	n/a
REF	n/a
Coil Condition	OK
Phantom	Bottle: Large
Phantom Condition	OK

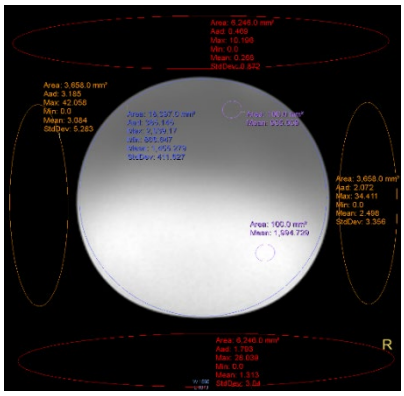
Acquisition Parameters

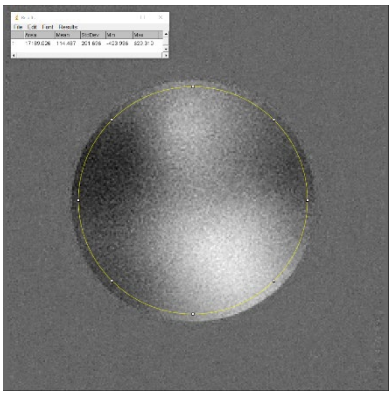
Sequence	TR (ms)	TE (ms)	Flip	Plane	FOV (mm)	Matrix	BW (kHz)	NSA	Thickness	Gap
SE	300	20	90	Ax	300x300	256x256	0.218	1	5	-

Measurements

Mean	Max	Min	Ghosting	Noise	Air Noise SD	NEMA Noise SD
1,755.071	1,949.021	1,479.906	37.8130	36.2640	16.0246	201.696







Results

Mean SNR - NEMA	12.306
Min. SNR - NEMA	10
Mean SNR - Air	109.524
Min. SNR - Air	50
Test Results	**PASS**
Percent Image Uniformity	86.319%
Min. Expected PIU	75%
Test Results	**PASS**
Percent Signal Ghosting	0.088%
Max Expected Ghosting	3%
Test Results	**PASS**
Artifacts Noted	*none*

7.6. dsFlex Medium

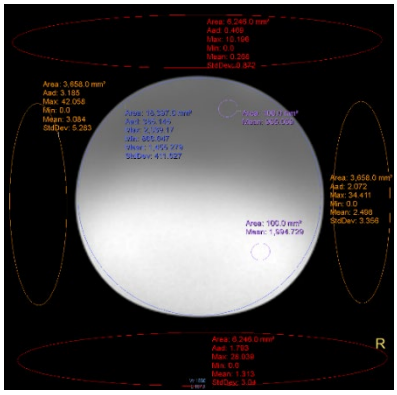
SN	157017533005 | 1605 | 1611
REF	9896-030-19018 | 4535-303-22422
Coil Condition	OK
Phantom	Bottle: Small
Phantom Condition	OK

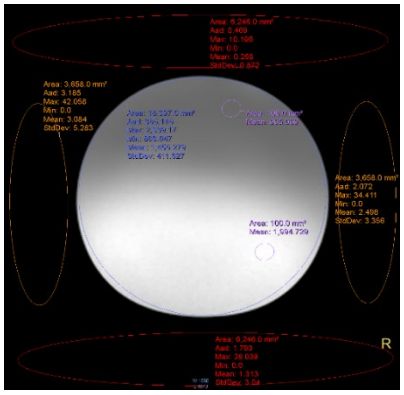
Acquisition Parameters

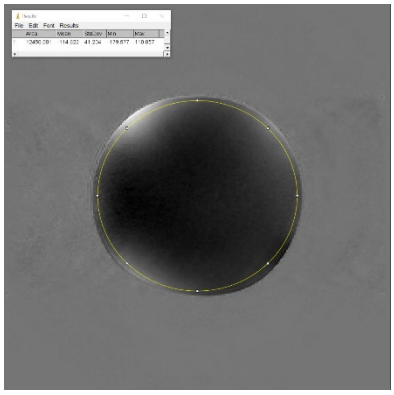
Sequence	TR (ms)	TE (ms)	Flip	Plane	FOV (mm)	Matrix	BW (kHz)	NSA	Thickness	Gap
SE	300	20	90	Ax	300x300	256x256	0.218	1	5	-

Measurements

Mean	Max	Min	Ghosting	Noise	Air Noise SD	NEMA Noise SD
1,118.351	1,363.614	1,038.722	5.2985	0.9455	1.3763	41.204







Results

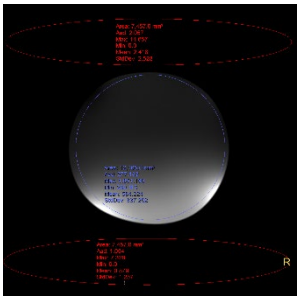
Mean SNR - NEMA	38.384
Min. SNR - NEMA	25
Mean SNR - Air	812.575
Min. SNR - Air	500
Test Results	**PASS**
Percent Image Uniformity	86.476%
Min. Expected PIU	75%
Test Results	**PASS**
Percent Signal Ghosting	0.389%
Max Expected Ghosting	3%
Test Results	**PASS**
Artifacts Noted	*none*

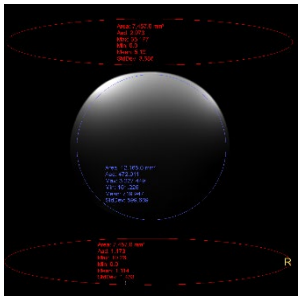
Channel	Mean	Noise SD	Noise Type	Mean SNR

Channel	Mean	Noise SD	Noise Type	Mean SNR

1	584.224	1.996	Air	292.646

2	719.947	2.796	Air	257.452





7.7. Inherent Posterior

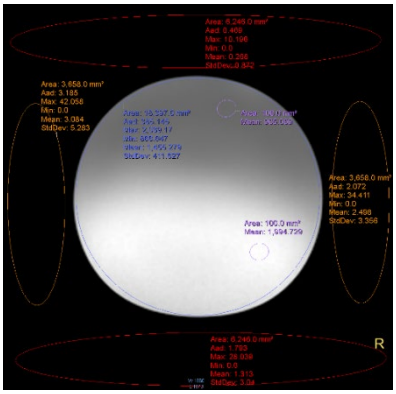
SN	n/a
REF	n/a
Coil Condition	OK
Phantom	Bottle: Large
Phantom Condition	OK

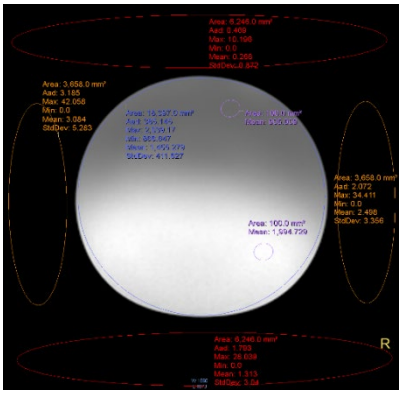
Acquisition Parameters

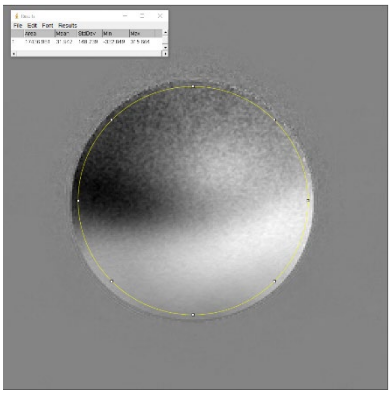
Sequence	TR (ms)	TE (ms)	Flip	Plane	FOV (mm)	Matrix	BW (kHz)	NSA	Thickness	Gap
SE	300	20	90	Ax	300x300	256x256	0.218	1	5	-

Measurements

Mean	Max	Min	Ghosting	Noise	Air Noise SD	NEMA Noise SD
1,776.361	1,977.146	1,672.91	2.9570	1.6590	4.9185	148.739







Results

Mean SNR - NEMA	16.890
Min. SNR - NEMA	10
Mean SNR - Air	361.156
Min. SNR - Air	50
Test Results	**PASS**
Percent Image Uniformity	91.665%
Min. Expected PIU	75%
Test Results	**PASS**
Percent Signal Ghosting	0.073%
Max Expected Ghosting	3%
Test Results	**PASS**
Artifacts Noted	*none*

Wright State University
CoNNECT

Manufacturer: Philips
Model: Ingenia Cx

Channel	Mean	Noise SD	Noise Type	Mean SNR
1	8.537	1.338	Air	6.38
2	6.209	1.469	Air	4.227
3	16.65	2.052	Air	8.116
4	11.945	2.099	Air	5.692
5	20.07	1.335	Air	15.039
6	58.646	2.773	Air	21.148

Channel	Mean	Noise SD	Noise Type	Mean SNR
7	74.836	3.866	Air	19.356
8	34.016	1.92	Air	17.714
9	14.746	1.857	Air	7.943
10	22.605	1.462	Air	15.467
11	21.598	2.117	Air	10.202
12	8.537	1.338	Air	6.38