**HIMSS and RSNA**

**Integrating the Healthcare Enterprise**

# IHE/MESA Image Display Tests

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# 1 Image Display Tests

## 1.1 Introduction

This document describes several tests for Image Display systems. The Display Consistency tests are defined in a separate document: *Display Consistency Test Plan for Image Displays*.

### 1.1.1 Integration Profiles and Test Procedures

This document lists a number of tests for Image Display Systems. You may not be responsible for all of these tests.

Please refer to the Connectathon web tool to list the required tests for your system. The web address of this tool depends on the year and project manager. Please contact the appropriate project manager to obtain this information.

## 1.2 Message Attributes

Image Displays may make queries using a number of attributes. The tests defined in this document will request queries by specific attributes listed in the table below. It is expected that the Image Display software will contain other attributes as well; the tests require only that some attributes are present.

The tests also allow you to perform multiple queries to cover all of the requested attributes. That is, we list a number of attributes in the table below and do not expect your system to use all of these attributes as matching keys in a single query.

**Matching Key Attributes for Image Displays**

| Attribute Name | Tag |
|---|---|
| Study Date | 0008 0020 |
| Accession Number | 0008 0050 |
| Patient Name | 0010 0010 |
| Patient ID | 0010 0020 |
| Modalities in Study | 0008 0061 |

## 1.3 Message Values

Tests described in section 2 will require specific values in the matching keys. These are defined in tables in section 2.

## 1.4 Configuration

The MESA Image Manager maintains a database of DICOM applications used for C-Move operations. Add an entry for the storage SCP(s) associated with your workstation. Edit the text file *$MESA_TARGET/db/loaddicomapp.pgsql* (Unix) or *$MESA_TARGET/db/loaddicomapp.sql* (Windows NT) Use the existing entries as a template and add entries for your workstations as appropriate. The column names found in the SQL insert statements are described in the following table.

| Column Name | Description |
|---|---|
| aet | DICOM Application Entity Title. Must be unique. |
| host | Host name (or IP address) of the application. |
| port | TCP/IP port number for receiving associations. |
| org | The organization that operates the device. Useful if multiple organizations use the Image Manager. |
| com | A comment field. |

You can test your work as follows:

```
perl load_apps.pl imgmgr
```

The file *$MESA_TARGET/runtime/imgmgr/ds_dcm.cfg* is used to configure the MESA Image Manager. The only parameter users should change is the LOG_LEVEL value. Log levels are defined in section 1.5. DICOM configuration parameters are listed in the table below.

| Application | AE Title | Port |
|---|---|---|
| MESA Image Manager | MESA_IMG_MGR | 2350 |

Read the *Runtime Notes* section of the *Installation Guide* to determine the proper settings for the MESA runtime environment.

## 1.5 Starting the MESA Servers

These instructions assume you are using a terminal emulator on Unix systems or an MS DOS command window under Windows NT. Each test uses a command line interface; there is no graphical user interface. Before you start the test procedure, you need to start the MESA Image Manager servers. Make sure the appropriate database is running (PostgreSQL, SQL Server). To start the MESA servers:

1. Enter the Image Display exam folder: *mesa_tests/rad/actors/imgdisp*
2. Execute the appropriate script to start the servers:

   `scripts/start_mesa_servers.csh` (Unix)

   `scripts\start_mesa_servers.bat` (Windows)

Log levels are set for the MESA Image Manager in the file: *$MESA_TARGET/runtime/imgmgr/ds_dcm.cfg*. Log levels are:

| | |
|---|---|
| 0 | no logging |
| 1 | errors |
| 2 | warnings |
| 3 | verbose |
| 4 | conversational (really verbose) |

When you are finished running one or more tests, you can stop the servers:

`scripts/stop_mesa_servers.csh` (Unix)

`scripts\stop_mesa_servers.bat` (Windows)

Log files are stored in *$MESA_TARGET/logs*.

## 1.6 Submission of Results

Test descriptions below inform the reader to “submit results to the Project Manager”. This is does not mean “email”. The current submission process should be documented by the Project Manager, but will not include emailing files directly to the Project Manager.

# 2 Individual Tests

## 2.1 Image Display Test 500: Display Calibration

Image Displays supporting the Consistent Presentation of Images Integration Profile must calibrate their displays in accordance with DICOM PS 3.14. Instructions for this test are included in the document: *Display Consistency Test Plan for Image Displays*. See section 2.2.

## 2.2 Image Display Test 501: Image SCU Query Keys

In this test, the Image Display is required to query the MESA Image Manager using specific matching keys. For each matching key and value in the table below, direct the Image Display to make one or more queries of the MESA Image Manager. Repeat or multiple queries are allowed. That is, you might choose to query several times with a certain matching key. We do not expect the Image Display to send individual queries with multiple matching keys (Patient Name and Patient ID), but the test software will allow that.

| Attribute Name | Tag | Matching Key Value |
|---|---|---|
| Study Date | 0008 0020 | 19950126 |
| Accession Number | 0008 0050 | 2001B20 |
| Patient Name | 0010 0010 | CRTHREE* |
| Patient ID | 0010 0020 | CR3 |
| Modalities in Study | 0008 0061 | MR |

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the data sets into the MESA Image Manager.

```
perl 50x/load_img_mgr.pl
```

4. Send at least one DICOM Study Level C-Find request (Study Root model) to the MESA Image Manager for each attribute/matching key value defined in the table above.
5. Run the evaluation script to verify that each attribute was requested in a query.

```
perl 501/eval_501.pl <AE Title of Image Display>
```

Results will be found in the file *501/grade_501.txt*. If you need to clear the existing queries to run the test again, you can restart at step 3 or run this script:

```
perl scripts/clear_img_mgr_queries.pl
```

## 2.3 Image Display Test 502: SCU Query Evaluation

This test uses the queries sent by the Image Display during Test 501 and any other queries you want to evaluate. This test examines all queries sent by the Image Display to determine if they are legal DICOM queries.

After you conclude Test 501, the MESA Image Manager will still have a record of the queries sent by your Image Display. If you want to send more queries to the Image Manager, you may do so. There are no required queries. You might want to send queries at the Series and SOP Instance level.

Evaluate the Image Display queries as follows:

```
perl 502/eval_502.pl <AE Title of Image Display>
```

Query results are stored in the file *502/grade_502.txt*.

As above, you can clear the queries stored by the MESA Image Manager as follows:

```
perl scripts/clear_img_mgr_queries.pl
```

## 2.4 Image Display Test 503: Presentation State SCU Query Keys

There are no extra requirements for Image Displays when querying for Presentation State objects. There are other optional keys that are not tested with this software.

## 2.5 Image Display Test 504: Key Image Note SCU Query Keys

***This test is not complete in IHE Y4 and is not required.***

Image Displays supporting the Key Image Note Integration Profile are required to support certain keys as matching and return keys.

## 2.6 Image Display Test 505: Patient Information Updated in Image Manager

***This test is not ready with this release of software.***

This test simulates patient updates on an Image Manager. This is an optional test as Image Displays are not required to honor patient updates (only suggested to).

You will be asked to retrieve images from the MESA Image Manager. We will then change the patient name on the Image Manager and ask you to retrieve the images a second time. Your software should update your internal system with the new patient name.

This test produces no results that can be recorded.

1. Repeat steps 1 through 4 as defined in Test 501.
2. Retrieve the study for patient XXXX.
3. Select a new name for patient XXXX. Change the name of the patient in the MESA Image Manager as follows:

```
perl 505/change_patient_name.pl <new name>
```

4. Query the MESA Image Manager and retrieve the images for the renamed patient. Your system should be updated with the proper information.

## 2.7 Image Display Test 506: Patients Merged in Image Manager

***This test is not ready with this release of software.***

This test simulates patient merges on an Image Manager. As with test 505, this is an optional test for Image Display systems.

You will be asked to retrieve images from the MESA Image Manager. We will then merge two patients on the Image Manager and ask you to retrieve the images a second time. Your software should update your internal system with the new patient name and ID.

This test produces no results that can be recorded.

1. Repeat steps 1 through 4 as defined in Test 501.
2. Retrieve the study for patient XXXX.
3.

## 2.8 Image Display Test 511: Render Key Image Note 511

In this test, Image Displays will render a Key Image Note that refers to a single image from a series.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

   ```
   perl 50x/load_img_mgr.pl
   ```

4. Load the Key Object data sets into the MESA Image Manager:

   perl 51x/load_img_mgr.pl

5. Retrieve the Key Image Note for the patient CRTHREE^PAUL with series number 511.
6. Render this Key Image Note and the one referenced image.
7. Capture the rendered output (screen dump, camera) and submit the output to the Project Manager.

## 2.9 Image Display Test 512: Render Key Image Note 512

In this test, Image Displays will render a Key Image Note that refers to two images from one series.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.

3. Load the Image data sets into the MESA Image Manager:

```
perl 50x/load_img_mgr.pl
```

4. Load the Key Object data sets into the MESA Image Manager:

```
perl 51x/load_img_mgr.pl
```

5. Retrieve the Key Image Note for the patient CTFIVE^JIM with series number 512.
6. Render this Key Image Note and the one referenced image.
7. Capture the rendered output (screen dump, camera) and submit the output to the Project Manager.

## 2.10 Image Display Test 513: Render Key Image Note 513

In this test, Image Displays will render a Key Image Note that refers to two images; each from a different series.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 50x/load_img_mgr.pl
```

4. Load the Key Object data sets into the MESA Image Manager:

```
perl 51x/load_img_mgr.pl
```

5. Retrieve the Key Image Note for the patient MRTHREE^STEVE with series number 513.
6. Render this Key Image Note and the one referenced image.
7. Capture the rendered output (screen dump, camera) and submit the output to the Project Manager.

## 2.11 Image Display Test 521: Consistent Presentation of Images

This test is for Image Displays that support the Consistent Display of Images integration profile. Instructions for this test are found in the document *Display Consistency Test Plan for Image Displays*. See all of sections 2.3 through 3.3.

# 3 Nuclear Medicine Profile Tests

## 3.1 Image Display Test 2400: NM Display Window Upper/Lower

Reference Rad TF-1: E.5.1.

Open or import the NM image in file MESA2400.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2400 <AE Title> host port
```

to push (DICOM C-Store) the image to your Image Display actor.

Image Display should have controls to display images using “Window Upper” and “Window Lower” values. Display the image using an upper value of 1280 and a lower value of 768.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.2 Image Display Test 2401: NM Display Pseudo-Color

Reference Rad TF-1: E.5.1.

Open or import the NM image in file MESA2401.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2401 <AE Title> host port
```

to push (DICOM C-Store) the image to your Image Display actor.

Image Display actors should be able to load a pseudo-color table to map intensity values. The format of the table is unspecified. The test data includes an Excel spreadsheet that maps intensity values to RGB colors. The spreadsheet is in the file `$MESA_TARGET/mesa_tests/rad/actors/imgdisp/color/2401.xls`.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.3 Image Display Test 2402: NM Image Resizing 1

Reference Rad TF-1: E.5.2.

Open or import the NM image in file MESA2402.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2402 <AE Title> host port
```

to push (DICOM C-Store) the image to your Image Display actor.

The test image is stored at 32x32 pixels. Display the image according to the Frame Zoom Guidelines in Rad TF-1: E.5.2. Use an upper value of 1280 and a lower value of 768.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.4 Image Display Test 2403: NM Image Resizing 2

Reference Rad TF-1: E.5.2.

Open or import the NM image in file MESA2403.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2403 <AE Title> host port
```

to push (DICOM C-Store) the image to your Image Display actor.

The test image is stored at 64x64 pixels. Display the image according to the Frame Zoom Guidelines in Rad TF-1: E.5.2. Use an upper value of 1280 and a lower value of 768.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.5 Image Display Test 2404: NM Image Resizing 3

Reference Rad TF-1: E.5.2.

Open or import the NM image in file MESA2404.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2404 <AE Title> host port
```

to push (DICOM C-Store) the image to your Image Display actor.

The test image is stored at 128x128 pixels. Display the image according to the Frame Zoom Guidelines in Rad TF-1: E.5.2. Use an upper value of 1280 and a lower value of 768.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.6 Image Display Test 2405: NM Image Resizing 4

Reference Rad TF-1: E.5.2.

Open or import the NM image in file MESA2405.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2405 <AE Title> host port
```

to push (DICOM C-Store) the image to your Image Display actor.

The test image is stored at 256x1024 pixels. Display the image according to the Frame Zoom Guidelines in Rad TF-1: E.5.2. Use an upper value of 1280 and a lower value of 768.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.7 Image Display Test 2406: NM Image Display Query Keys

Reference Rad TF-2: 4.14.4.1.2

In this test, Image Displays will query an Image Manager for Study and Series level information and display that for the user. In particular, the Image Display is supposed to query for and be able to display the DICOM attribute Series Description (0008, 103E). The Image Display need not query by Series Description; it only needs to use that attribute as a return key and display the data.

1. Start the MESA servers as described in section 1.5 above.
2. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

3. Query the Image Manager for all NM studies (modalities in Study = NM)
4. Select one of the studies from the returned list. Display the study information including Series Description.
5. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.8 Image Display Test 2408: NM Image Display Attributes

Reference Rad TF-2: 4.16.4.2.2.3

In test 2408, the Image Display is required to display these attributes:

```
0054 0220 View Code Sequence
0040 0555 Acquisition Context Sequence
0008 103E Series Description
```

The Image Display will retrieve a specific image from the MESA Image Manager, display the image and demonstrate the display of the attributes listed above. The Technical Framework does not specify how the values are displayed nor the actions required by the user.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2408.
5. Display the study information including the attributes listed above.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.9 Image Display Test 2410: NM Grid Display

Reference Rad TF-2: 4.16.4.2.2.3.2

In test 2410, the Image Display is required to display an image using the Grid Display.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2410.
5. Display all frames of the image using a Grid Display.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.10 Image Display Test 2411: NM Fit Display

Reference Rad TF-2: 4.16.4.2.2.3.2

In test 2411, the Image Display is required to display an image using the Fit Display.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2411.
5. Display all frames of the image using a Fit Display.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.11 Image Display Test 2412: NM Comparison Display

Reference Rad TF-2: 4.16.4.2.2.3.2

In test 2412, the Image Display is required to display an image using the Comparison Display.

1. Create/modify the SQL script to identify the Image Display under test.

2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2412.
5. The image is a DYNAMIC image with two values for Energy Window. Use Energy Window to define two framesets. Display the framesets in a Comparison Display.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.12 Image Display Test 2413: NM Wholebody Display

Reference Rad TF-2: 4.16.4.2.2.3.2

In test 2413, the Image Display is required to display an image using the Wholebody Display.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2413.
5. Display the image frames using a Wholebody Display.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.13 Image Display Test 2414: NM MPR Display

Reference Rad TF-2: 4.16.4.2.2.3.2

In test 2414, the Image Display is required to display an image using the MPR Display.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2414.
5. Display the image frames using a MPR Display.

6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.14 Image Display Test 2415: NM Image Zoom

Reference Rad TF-2: 4.16.4.2.2.3.4

In test 2415, the Image Display is required to display an image with zoom.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2415.
5. Display the image frames at 1x zoom. Repeat the display at 2x zoom. Capture both screen displays as described in step 6 below.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.15 Image Display Test 2416: NM Image Review Option

Reference Rad TF-2: 4.16.4.2.2.3.5

In test 2416, the Image Display is required to display images with the Image Review Option.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2416.
5. Display series 1 and series 2 at the same time. Series 1 is a dynamic image set; series 2 is a static image set.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.
7. Select a hot spot on the image in series 2. Display the value of a selected pixel.
8. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.16 Image Display Test 2417: NM Result Screens

Reference Rad TF-2: 4.16.4.2.2.4

In test 2416, the Image Display is required to display images with the Image Review Option.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2417.
5. Display all images (multiple series) sequentially. For each series/image, perform a screen capture as defined below.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

## 3.17 Image Display Test 2420: NM Image STATIC

Reference Rad TF-2: 4.16.4.2.2.3

Open or import the NM image in file MESA2420.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2420 <AE Title> host port
```

to push (DICOM C-Store) the image to your Image Display actor.

This image has these values

| | |
|---|---|
| Energy Window | 1 value |
| Detector # | 2 values |

A tabular representation is:

| | | |
|---|---|---|
| Frame | 1 | 2 |
| Energy Window # | 1 | 1 |
| Detector # | 1 | 2 |

This image has one value for Energy Window and two values for Detector. Select the second Detector and display the image in a Grid Display or Fit Display.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

Use IE or other browser to display the file MESA2420CINE.gif. This should display a cine view of the data listed above. Be prepared to show your display to a Project Manager at the Connectathon. You do not need to submit a screen capture of the cine movie.

## 3.18 Image Display Test 2421: NM Image WHOLEBODY

Reference Rad TF-2: 4.16.4.2.2.3

Test not defined.

## 3.19 Image Display Test 2422: NM Image DYNAMIC

Reference Rad TF-2: 4.16.4.2.2.3

DICOM P3.3 C.8.4.8

Open or import the NM image in file MESA2422.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2422 <AE Title> host port
```

This image has these values

| | |
|---|---|
| Energy Window | 1 value |
| Detector # | 2 values (1, 2) |
| Phase # | 1 values |
| Time Slice # | 6 values |

A tabular representation is:

| Frame | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Energy Window # | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Detector # | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Phase # | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Time Slice # | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |

Select the second Detector and first phase and display the frames in a Grid Display or Fit Display.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

Use IE or other browser to display the file MESA2422CINE.gif. This should display a cine view of the data listed above. Use your Image Display system to display the same cine view. Discounting display speed, the displays should be equivalent. Be prepared to show your display to a Project Manager at the Connectathon. You do not need to submit a screen capture of the cine movie.

## 3.20 Image Display Test 2423: NM Image GATED

Reference Rad TF-2: 4.16.4.2.2.3

Open or import the NM image in file MESA2423.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2423 <AE Title> host port
```

This image has these values

| | |
|---|---|
| Energy Window | 1 value |
| Detector # | 1 value |
| R-R Interval | 3 values |
| Time Slot | Multiple values |

A tabular representation is:

| Frame | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Energy Window # | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Detector # | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| R-R interval | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Time Slot # | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Select the first Detector and first R-R Interval and display the frames in a Grid Display or Fit Display. Also, select the first Detector and third R-R Interval and display the frames in a Grid Display or Fit Display.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

Use IE or other browser to display the file MESA2423RR1CINE.gif and MESA2423RR3CINE.gif. This should display a cine view of the data listed above. Use your

Image Display system to display the same cine view. Discounting display speed, the displays should be equivalent. Be prepared to show your display to a Project Manager at the Connectathon. You do not need to submit a screen capture of the cine movie.

## 3.21 Image Display Test 2424: NM Image TOMO

Reference Rad TF-2: 4.16.4.2.2.3

Open or import the NM image in file MESA2424.dcm. From the imgdisp test directory, you can use the script:

```
perl scripts/send_nm_image.pl 2424 <AE Title> host port
```

This image has these values

| | |
|---|---|
| Energy Window | 1 value |
| Detector # | 1 value |
| Rotation | 2 values |
| Angular View | 10 values |

Display the frames in a Grid Display or Fit Display.

Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

Use IE or other browser to display the file MESA2424CINE.gif. This should display a cine view of the data listed above. Use your Image Display system to display the same cine view. Discounting display speed, the displays should be equivalent. Be prepared to show your display to a Project Manager at the Connectathon. You do not need to submit a screen capture of the cine movie.

## 3.22 Image Display Test 2425: NM Image GATED TOMO

Reference Rad TF-2: 4.16.4.2.2.3

Test not defined.

## 3.23 Image Display Test 2426: NM Image RECON TOMO

Reference Rad TF-2: 4.16.4.2.2.3

Test not defined.

## 3.24 Image Display Test 2427: NM Image GATED RECON TOMO

Reference Rad TF-2: 4.16.4.2.2.3

Test not defined.

## 3.25 Image Display Test 2428: NM Image Display Multiple Framesets

Reference Rad TF-2: 4.16.4.2.2.3

In test 2428, the Image Display displays multiple framesets taken from two different series of the same study.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the Image data sets into the MESA Image Manager:

```
perl 24xx/load_img_mgr.pl
```

4. Retrieve the study with Patient ID MESA2428.
5. Display both series simultaneously.
6. Perform a screen capture and store the result in a JPEG, GIF or other format that is easily displayable using IE. Label the file with your company name and test number and submit to the Project Manager for evaluation.

# 4 Test Cases: PDI

These test cases are generally associated with the Radiology PDI profile

## 4.1 Test Case 1931: Media "Reader" Read RSNA 2004 CD

The purpose of this test is for the Display actor to open the DICOMDIR file on the RSNA 2004 CD and render the images and other composite objects on the CD.

### 4.1.1 References

RAD TF

### 4.1.2 Instructions

To run this test, follow these steps:

1. Obtain the RSNA 2004 PDI Demonstration CD. If you do not have a physical copy of the CD, download the ISO image of the CD from the MESA distribution page and create a CD from the ISO image.
2. Obtain the text file RSNA2004CD.doc from the MESA documentation page. This file will list all of the vendor studies on the RSNA CD.
3. Use your DICOM application to open the DICOMDIR file on the RSNA CD.
4. Select and display all of the studies on the CD. For those studies with multiple images, you can select a small subset of the images.
5. For each set of vendor data, modify the file RSNA2004CD.doc to indicate if you can successfully render the data. Questions are Yes/No. You can add comments at the bottom of the file.

### 4.1.3 Evaluation

1. Submit the modified text file to the Project Manager.
2. If there are problems with rendering, submit a screen capture demonstrating the problem and/or submit additional documentation in the RSNA2004CD.doc file.

## 4.2 Test Case 1932: Media "Reader" Reads Vendor CDs

The purpose of this test is for the Display actor to open the DICOMDIR file on CDs provided by vendors for the RSNA 2004 PDI demonstration and to render the composite objects on those CDs.

### 4.2.1 References

RAD TF

### 4.2.2 Instructions

To run this test, follow these steps:

1. Obtain the vendor CDs from the RSNA 2004 PDI Demonstration. If you do not have a physical copy of the CDs, download the ISO images from the MESA distribution page and create a CD from the ISO image.
2. Obtain the text file VENDOR2004CD.txt from the MESA documentation page. This file will list all of the vendor CDs.
3. Use your DICOM application to open the DICOMDIR file on each vendor CD.
4. Select and display all of the studies on the CD. For those studies with multiple images, you can select a small subset of the images.
5. For each set of vendor data, modify the file VENDOR2004CD.doc to indicate if you can successfully render the data. Questions are Yes/No. You can add comments at the bottom of the file.

### 4.2.3 Evaluation

1. Submit the modified text file to the Project Manager.
2. If there are problems with rendering, submit a screen capture demonstrating the problem and/or submit additional documentation in the VENDOR2004CD.txt file.

# 5 Evidence Document – Cardiology Options Profile Tests

## 5.1 Image Display Test 20603: ED: Describe Image Display/Report Creator Methods

Test 20603: Do not divulge any proprietary information. Create a Word document with the following naming convention: *CompanyName_Product_20603_ID_2005.doc* and send it to the appropriate Domain (cardiology, radiology, ITI) Technical Project Manager.

In 500 words or less for each, describe the following:

1. Which SOP Classes (e.g, Comprehensive, Basic Text, etc.) and which Templates (eg., Echo, Procedure Log) does your product exact evidence from?

MESA: No software required.

## 5.2 Image Display Test 20630: Evidence Display – Cath option

Test 20630 tests the display of a well known SR.

Reference Card: TF-2.

In test 20630, the Image Display displays a known SR document.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.
3. Load the SR data sets into the MESA Image Manager:

```
perl 20630/load_img_mgr.pl
```

Evaluation: No MESA test script required for evaluation. The vendor should create a word file using the document naming convention of: *CompanyName_Product_ 20630_ID_2005.doc* . Using any vendor tool cut and paste in a screen snapshot from your own product which demonstrates that the DICOM SR information was displayed.

## 5.3 Image Display Test 20631: Evidence Display – Echo option

Test 20631 tests the display of a well known SR.

Reference Card: TF-2.

In test 20631, the Image Display displays a known SR document.

1. Create/modify the SQL script to identify the Image Display under test.
2. Start the MESA servers as described in section 1.5 above.

3. Load the SR data sets into the MESA Image Manager:

```
perl 20631/load_img_mgr.pl
```

Evaluation: No MESA test script required for evaluation. The vendor should create a word file using the document naming convention of: *CompanyName_Product_ 20631_ID_2005.doc* . Using any vendor tool cut and paste in a screen snapshot from your own product which demonstrates that the DICOM SR information was displayed.

## 5.4 Image Display Test Case 20650: Evidence Display – Cath –Vendor Interoperability

Test 20650 tests the display of SR objects created by other vendors. Every cath vendor SR object submitted to the MESA test tool must be tested and properly displayed.

MESA: No MESA software required.

| Identifier | Description | Source | Destination | Verify |
|---|---|---|---|---|
| | C-Store and Display every (all) cath SR objects which are submitted by SR vendors | Image Manager/ Image Archive (with IHE web tool acting as SR repository) | Image Display | Visually verify that, in some reasonable format, the template data is displayed. |

Evaluation: No MESA test script required for evaluation. The vendor should create a word file using the document naming convention of: YourCompanyName_YourProduct_ 20650_ID__n_2005.doc , where n is any number to that you make up to differentiate the files if your company has submitted multiple objects. Using any tool cut and paste in a screen snapshot from your own product which demonstrates that Vendor-created DICOM SRs object's information was displayed as applicable.

## 5.5 Test Case 20651: Evidence Display – Echo –Vendor Interoperability

Test 20651 tests the display of SR objects created by other vendors. Every vendor echo SR object submitted to the MESA test tool must be tested and properly displayed.

MESA: No MESA software required.

| Identifier | Description | Source | Destination | Verify |
|---|---|---|---|---|
| | C-Store and Display every (all) echo SR objects which are submitted by SR vendors | Image Manager/ Image Archive (with IHE web tool acting as repository) | Image Display | Visually verify that, in some reasonable format, the template data is displayed. |

Evaluation: No MESA test script required for evaluation. The vendor should create a word file using the document naming convention of: YourCompanyName_YourProduct_ 20651_ID_n_2005.doc , where n is any number to that you make up to differentiate the files if your company has submitted multiple objects. Using any tool cut and paste in a screen snapshot from your own product which demonstrates that theVendor-created DICOM SRs object's information was displayed as applicable.