
HIMSS and RSNA
Integrating the Healthcare Enterprise

IHE/MESA Report Creator Tests

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1 Report Creator Tests

1.1 Introduction

We invent the term Diagnostic Reporting Station for use in this document. This is not an IHE term, but we use it to describe workstations that are used to create reports in the context of the user reviewing other evidence first (such as images). This term will be used to designate tests that are mandatory for your system. This does not imply that your system must display images.

We use the term Measurement Station to describe a device that creates original data (such as numeric measurements in an Ultrasound report). Again, this is not an IHE term but is needed to document test requirements.

If your Report Creator is not described by either category, you should contact the Technical Project Manager and describe your application. This will allow us to construct reasonable tests for your system.

For more details on this template, please reference Supplement 53: DICOM Content Mapping Resource.

1.1.1 Integration Profiles and Test Procedures

This document lists a number of tests for Report Creator 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

DICOM SR Objects contain attributes that are not used or required by the IHE Technical Framework: Year 3. This section contains a table defining those attributes that will be evaluated in the Report Creator tests. Other values may be required by the Technical Framework but not evaluated with this software.

In the table below, the columns marked *Value* and *Present* indicate the scope of the evaluation for these messages. Fields that are marked in the *Value* column indicate the tests will expect a specific value in the field (for example, we specify the patient name). Fields marked in the *Present* column are tested to see if the field contains a value, but the tests cannot evaluate for a specific value.

Tag	Attribute Name	Value	Present
0008 0016	SOP Class UID	x	

0008 0050	Accession Number	x	
0008 0060	Modality	x	
0010 0010	Patient Name	x	
0010 0020	Patient ID	x	
0020 000D	Study Instance UID	x	
0040 A040	Value Type	x	
0040 A043	Concept Name Code Sequence (Report Title)		
> 0008 0100	Code Value	x	
> 0008 0102	Coding Scheme Designator	x	
> 0008 0104	Code Meaning	x	
0040 A491	Completion Flag	x	
0040 A493	Verification Flag	x	
0040 A504	Content Template Sequence		
> 0008 0101	Mapping Resource	x	
> 0040 DB00	Template Identifier	x	
0040 A730	Content Sequence		
> 0040 A010	Rerelationship Type	x	
> 0040 A040	Relationship Value	x	
Other attributes	As needed for the Relationship Value	x	

1.3 Message Values

1.4 Configuration

1.4.1 General Configuration Information

The table below gives parameters for MESA servers that will receive messages from your system.

Application	AE Title	Port Number
MESA Image Manager	MESA_IMG_MGR	2350
MESA Report Manager	REPORT_MANAGER	2700
MESA Audit Record Repository	<none>	4000
MESA Report Manager for HL7 message	MESA_RPTMGR	2750

1.4.2 Configuration of MESA Tools for Report Creator/Image Display

This section details configuration information if the Report Creator under test is coupled to an Image Display. It describes configuration for the Image Display.

The MESA Image Manager maintains a database of DICOM applications used for C-Move operations. Add an entry for the storage SCP 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
```

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 Order Placer and MESA Order Filler servers. Make sure the appropriate database is running (PostgreSQL, SQL Server). To start the MESA servers:

1. Enter the Image Display exam fileder: mesa_tests/rad/actors/rpt_crt
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/rpt_manager/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`.

For the security tests, the MESA servers are started with different scripts. These are `scripts/start_mesa_secure.csh` and `scripts\start_mesa_secure.bat`. The log levels are the same as for the standard tests. The MESA servers are stopped using these scripts: `scripts/stop_mesa_secure.csh` and `scripts\stop_mesa_secure.bat`.

1.6 Loading Test Data

Some Report Creator tests will make use of images retrieved from the MESA Image Manager. If the Report Creator under test is coupled with an Image Display, you should load test images into the MESA Image Manager.

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

```
perl 60x/load_img_mgr.pl
```

1.7 Evaluation Scripts

As of Year 5, the test and evaluation scripts are modified to take a `<log>` parameter. This number indicates how much logging to include in the output. Defined values are listed in the table below.

Level	Meaning
1	Errors only
2	Warnings + level 1
3	Verbose mode + level 2
4	References in Technical Framework + level 3

Not all test and evaluation scripts have been updated as of this release. When you run the scripts with no arguments, they will tell you what the real arguments are. Each test description that follows in this document will be updated correctly when the test script is updated.

1.8 Submission of Results

Test descriptions below inform the reader to “submit results to the Project Manager”. This 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 for Diagnostic Workstations

2.1 Test 600: Example SR Object

In test 600, the Report Creator creates a sample SR object and submits it to the Project Manager. The purpose is to distribute the SR document to other participants.

1. Create a DICOM SR object that is representative of the types of reports created by your system.
2. Format the Patient Name field (0010 0010) using the format: COMPANY^SYSTEM_NAME.
3. Format the Patient ID field (0010 0020) using the format: 600COMPANY.
4. Submit the sample SR object to the Project Manager for distribution to other vendors
5. Please submit the sample 3 weeks in advance of the normal deadline of possible.

2.2 Report Creator Test 601: Simple Imaging Report

Test 601 is required of Diagnostic Reporting Stations. This test will require you to create a structured report according to the *Basic Diagnostic Imaging Report* template (TID 2000). All items in the template that are marked mandatory will be tested. In addition, values in the following tables will also be required. Items not specified in the tables may be assigned any value. Table 2.1-1 lists the header attributes that will be tested. Report Creators may be standalone or coupled with an Image Display. Standalone Report Creators are expected to fill in most attributes found in Table 2.1-1, but not all. The attributes marked with x in the Standalone or w/Image Display columns indicate those values for which the tests expect an exact match. For example, a Report Creator coupled with an Image Display is expected to reuse the Study Instance UID from the images and not create a new study for this report.

Table 2.1-1 Selected Attributes tested in Test 601

Attribute Name	Tag	Standalone	w/Image Display
Patient Name	0010 0010	x	x
Patient ID	0010 0020	x	x
Patient Sex	0010 0040	x	x
Accession Number	0008 0050	x	x
Requested Procedure ID			x
Study Instance UID	0020 000D		x
Completion Flag	0040 A491	x	x
Verification Flag	0040 A493	x	x

The 601 suite of tests require you to create a report according to TID2000, but we specify observation context and three sections of the report. Figure 2-1 below shows the overall

structure and relationship of content items required for the 601 tests. You are expected to create a report with the section headings as defined in the tables found in the following sections. We do not require the text in the sections to match the text in our samples. The text is only provided as an example.

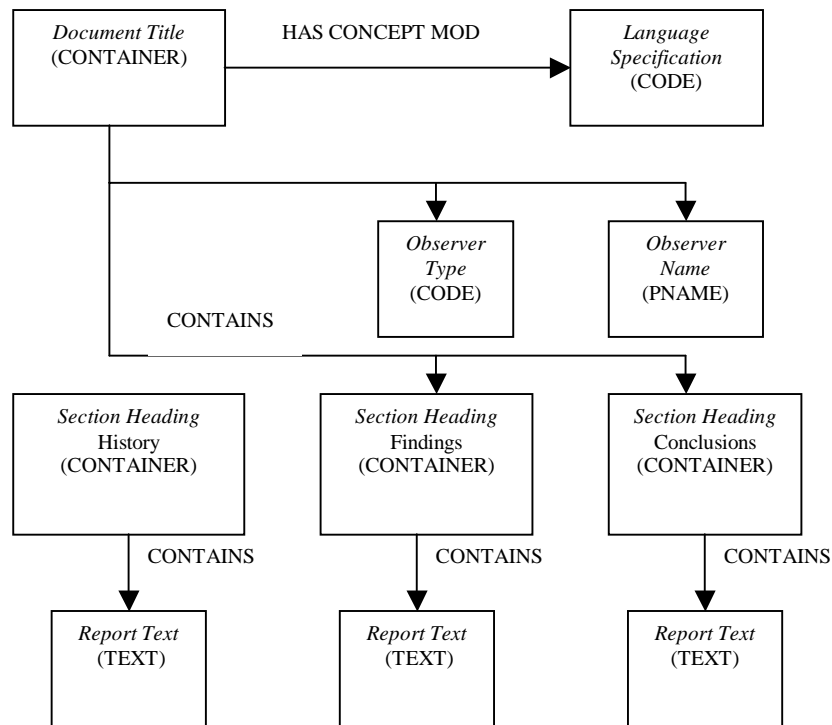


Figure 2-1 Content Item Requirements for Test 601

The 601 tests are broken down further by imaging modality: CR, CT, or MR. If your Report Creator is not coupled with an Image Display, run test 601. If you are coupled with an Image Display, run test 601CR, 601CT, or 601MR as appropriate. You may run all four tests, but are only required to submit results for one. Values for content items (listed in Value Set Constraint) that are italicized are suggested for each modality, and not required. That is, the software tests report headings but not the exact text in a section of the report.

2.2.1 Report Creator Test 601: No Image Display

1. Clear existing reports from the MESA Report Manager:
-

```
perl scripts/reset_rpt_mgr.pl
```

2. Create a DICOM SR object according to the values in the tables below.
3. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
4. Evaluate your DICOM SR object:

```
perl 601/eval_601.pl
```

Attribute	Value
Patient Name	CRTHREE^PAUL
Patient ID	CR3
Patient Sex	M
Accession Number	2001C30
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 11528-7, "Radiology Report")
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendents")	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	<i>MOORE^STEVE</i>
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	<i>"Cough"</i>
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	<i>"PA evaluation of the chest demonstrates the lungs to be expanded and clear."</i>
9	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
10	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>"Normal PA chest x-ray."</i>

2.2.2 Report Creator Test 601: CR Images

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

1. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001C30.
2. Create a DICOM SR object according to the values in the tables below.
3. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
4. Evaluate your DICOM SR object:

```
perl 601/eval_601_cr.pl
```

Attribute	Value
Patient Name	CRTHREE^PAUL
Patient ID	CR3
Patient Sex	M
Accession Number	2001C30
Study Instance UID	1.113654.1.2001.30
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 11528-7, "Radiology Report")
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendants")	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	MOORE^STEVE
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	"Cough"
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	"PA evaluation of the chest demonstrates the lungs to be expanded and clear."

9	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
10	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>“Normal PA chest x-ray.”</i>

2.2.3 Report Creator Test 601: CT Images

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001B20.
3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700)
5. Evaluate your DICOM SR object:

```
perl 601/eval_601_ct.pl
```

Attribute	Value
Patient Name	CTFIVE^JIM
Patient ID	CT5
Patient Sex	M
Accession Number	2001B20
Study Instance UID	1.113654.1.2001.20
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 18747-6, “CT Report”)
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,“Language of Content Item and Descendents”)	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, “Observer Type”)	(DCM, 121006, Person)
4	>	HAS OBS	PNAME	(DCM, 121008, “Person Observer Name”)	<i>MOORE^STEVE</i>

		CONTEXT			
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	<i>“46-year-old male presented to the emergency room with parasternal and epigastric pain.”</i>
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	<i>“There is an aneurysm of the entire thoracic aorta measuring up to 6.2 cm in diameter.”</i>
9	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
10	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>“Aneurysm of thoracic aorta with dissection affecting ascending and descending aorta.”</i>

2.2.4 Report Creator Test 601: MR Images

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001A10.
3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
5. Evaluate your DICOM SR object:

```
perl 601/eval_601_mr.pl
```

Attribute	Value
Patient Name	MRTHREE^STEVE
Patient ID	MR3
Patient Sex	M
Accession Number	2001A10
Study Instance UID	1.113654.1.2001.10
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with	VT	Concept Name	Value Set Constraint
--	----	----------	----	--------------	----------------------

		Parent			
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 18755-9, "MRI Report")
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendents")	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	MOORE^STEVE
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	"Rule out internal derangement."
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	"Within the posterior horn of the medial meniscus there is minimal increase in signal intensity."
9	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
10	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	"Joint diffusion with superior joint plicae."

2.3 Report Creator Test 602: Simple Imaging Report with Image Reference

Test 602 is required of Diagnostic Reporting Stations that are coupled with an Image Display. This test uses the same format as Report Creator Test 601. This test requires the Report Creator to add a reference to an image in the SR document.

Table 2.1-1 lists the header attributes that will be tested.

The 602 suite of tests require you to create a report according to TID2000, but we specify observation context and three sections of the report. Figure 2-2 below shows the overall structure and relationship of content items required for the 602 tests. You are expected to create a report with the section headings as defined in the tables found in the following sections. We do not require the text in the sections to match the text in our samples. The text is only provided as an example.

The tests require you to reference a specific image in the study. The tables below will have an entry like the example show below. The rightmost column indicates the image that should be used as a reference. We use the triplet (accession number / series number / image number). In the example below, the series number happens to be blank because that is how the original image is formatted.

9	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001C30 / / 16
---	----	----------	-------	--	----------------

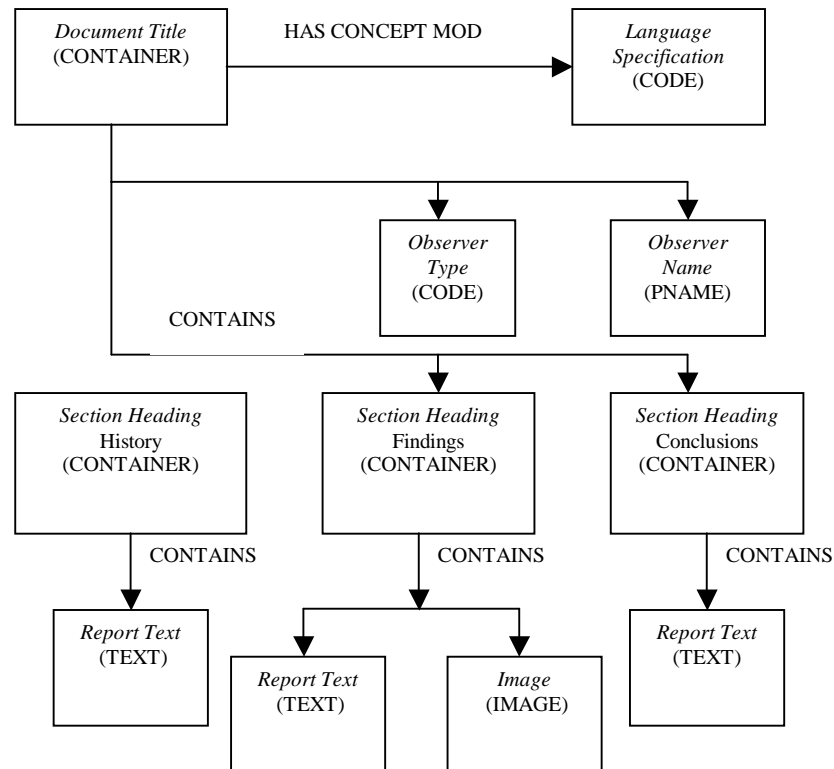


Figure 2-2 Content Item Requirements for Test 602

The 602 tests are broken down by imaging modality: CR, CT, or MR. Run test 602CR, 602CT, or 602MR as appropriate. You may run all three tests, but are only required to submit results for one. Values for content items (listed in Value Set Constraint) that are italicized are suggested for each modality, and not required. That is, the software tests report headings but not the exact text in a section of the report.

2.3.1 Report Creator Test 602: CR Images

The CR study has 3 images in one series. The original image is a normal chest image. The other two images are derived from the original image and only show the left half and right half. The SR report should use the original (full) image.

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001C30.
-

3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
5. Evaluate your DICOM SR object:

```
perl 602/eval_602_cr.pl
```

Attribute	Value
Patient Name	CRTHREE^PAUL
Patient ID	CR3
Patient Sex	M
Accession Number	2001C30
Study Instance UID	1.113654.1.2001.30
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 11528-7, "Radiology Report")
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendants")	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	MOORE^STEVE
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	"Cough"
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	"PA evaluation of the chest demonstrates the lungs to be expanded and clear."
9	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001C30 / / 16
10	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
11	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	"Normal PA chest x-ray."

2.3.2 Report Creator Test 602: CT Images

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001B20.
3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
5. Evaluate your DICOM SR object:

```
perl 602/eval_602_ct.pl
```

Attribute	Value
Patient Name	CTFIVE^JIM
Patient ID	CT5
Patient Sex	M
Accession Number	2001B20
Study Instance UID	1.113654.1.2001.20
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 18747-6, "CT Report")
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendents")	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	MOORE^STEVE
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	"46-year-old male presented to the emergency room with parasternal and epigastric pain. "

7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	<i>“There is an aneurysm of the entire thoracic aorta measuring up to 6.2 cm in diameter.”</i>
9	>>	CONTAINS	IMAGE	(DCM, 121080, “Best illustration of findings”)	2001B20 / 1 / 67
10	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
11	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>“Aneurysm of thoracic aorta with dissection affecting ascending and descending aorta.”</i>

2.3.3 Report Creator Test 602: MR Images

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001A10.
3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
5. Evaluate your DICOM SR object:

```
perl 602/eval_602_mr.pl
```

Attribute	Value
Patient Name	MRTHREE^STEVE
Patient ID	MR3
Patient Sex	M
Accession Number	2001A10
Study Instance UID	1.113654.1.2001.10
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 18755-9, “MRI Report”)
2	>	HAS	CODE	(121049,DCM,“Language of	(ISO639_2, eng, English)

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		CONCEPT MOD		Content Item and Descendents")	
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	<i>MOORE^STEVE</i>
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	<i>"Rule out internal derangement."</i>
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	<i>"Within the posterior horn of the medial meniscus there is minimal increase in signal intensity."</i>
9	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001A10 / 103 / 46
10	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
11	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>"Joint diffusion with superior joint plicae."</i>

2.4 Report Creator Test 603: Simple Imaging Report with Two Image References

Test 603 is required of Diagnostic Reporting Stations that are coupled with an Image Display. This test uses the same format as Report Creator Test 601. This test requires the Report Creator to add references to two images in the SR document. This is quite similar to the 602 test.

Table 2.1-1 lists the header attributes that will be tested. Report Creators may be standalone or coupled with an Image Display.

The 603 suite of tests require you to create a report according to TID2000, but we specify observation context and three sections of the report. Figure 2-3 below shows the overall structure and relationship of content items required for the 603 tests. You are expected to create a report with the section headings as defined in the tables found in the following sections. We do not require the text in the sections to match the text in our samples. The text is only provided as an example.

The tests require you to reference two specific images in the study. The tables below will have an entry like the example show below. The rightmost column indicates the image that should be used as a reference. We use the triplet (accession number / series number / image number). In the example below, the series number happens to be blank because that is how the original image is formatted.

9	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001C30 / / 40
---	----	----------	-------	--	----------------

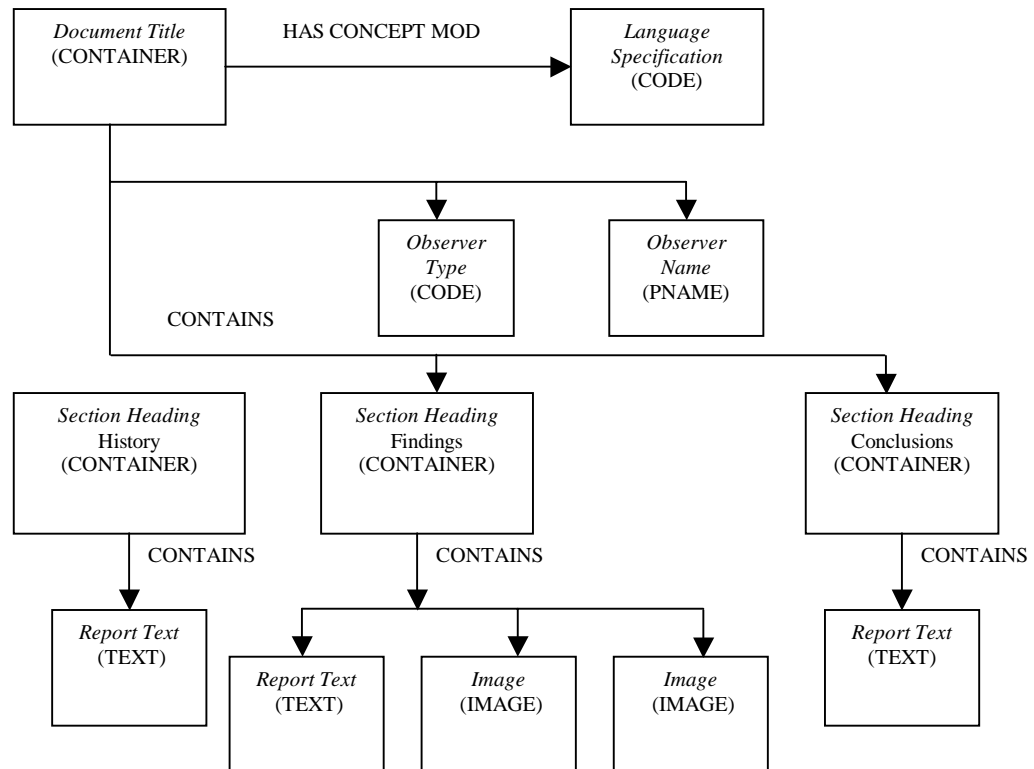


Figure 2-3 Content Item Requirements for Test 603

The 602 tests are broken down by imaging modality: CR, CT, or MR. Run test 603CR, 603CT, or 603MR as appropriate. You may run all three tests, but are only required to submit results for one. Values for content items (listed in Value Set Constraint) that are italicized are suggested for each modality, and not required. That is, the software tests report headings but not the exact text in a section of the report.

2.4.1 Report Creator Test 603: CR Images

The CR study has 3 images in one series. The original image is a normal chest image. The other two images are derived from the original image and only show the left half and right half. The SR report should use the two derived images (left view, right view).

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001C30.
3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
5. Evaluate your DICOM SR object:

```
perl 603/eval_603_cr.pl
```

Attribute	Value
Patient Name	CRTHREE^PAUL
Patient ID	CR3
Patient Sex	M
Accession Number	2001C30
Study Instance UID	1.113654.1.2001.30
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 11528-7, "Radiology Report")
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendents")	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	MOORE^STEVE
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	"Cough"
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	"PA evaluation of the chest demonstrates the lungs to be expanded and clear."
9	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001C30 / / 40
10	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001C30 / / 60

11	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
12	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>“Normal PA chest x-ray.”</i>

2.4.2 Report Creator Test 602: CT Images

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001B20.
3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
5. Evaluate your DICOM SR object:

```
perl 602/eval_602_ct.pl
```

Attribute	Value
Patient Name	CTFIVE^JIM
Patient ID	CT5
Patient Sex	M
Accession Number	2001B20
Study Instance UID	1.113654.1.2001.20
Completion Flag	COMPLETE
Verification Flag	UNVERIFIED

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 18747-6, “CT Report”)
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,“Language of Content Item and Descendents”)	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, “Observer Type”)	(DCM, 121006, Person)
4	>	HAS OBS	PNAME	(DCM, 121008, “Person Observer Name”)	<i>MOORE^STEVE</i>

		CONTEXT			
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	<i>“46-year-old male presented to the emergency room with parasternal and epigastric pain.”</i>
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	<i>“There is an aneurysm of the entire thoracic aorta measuring up to 6.2 cm in diameter.”</i>
9	>>	CONTAINS	IMAGE	(DCM, 121080, “Best illustration of findings”)	2001B20 / 1 / 66
10	>>	CONTAINS	IMAGE	(DCM, 121080, “Best illustration of findings”)	2001B20 / 1 / 67
11	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
12	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>“Aneurysm of thoracic aorta with dissection affecting ascending and descending aorta.”</i>

2.4.3 Report Creator Test 602: MR Images

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Query the MESA Image Manager and retrieve the CR study with Accession Number 2001A10.
3. Create a DICOM SR object according to the values in the tables below.
4. Transmit this DICOM SR object to the MESA Report Manager (port 2700).
5. Evaluate your DICOM SR object:

```
perl 602/eval_602_mr.pl
```

Attribute	Value
Patient Name	MRTHREE^STEVE
Patient ID	MR3
Patient Sex	M
Accession Number	2001A10
Study Instance UID	1.113654.1.2001.10
Completion Flag	COMPLETE

Verification Flag	UNVERIFIED
-------------------	------------

	NL	Rel with Parent	VT	Concept Name	Value Set Constraint
1			CONTAINER	BCID (7000) Diagnostic Imaging Report Document Titles	(LN, 18755-9, "MRI Report")
2	>	HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendents")	(ISO639_2, eng, English)
3	>	HAS OBS CONTEXT	CODE	(DCM, 121005, "Observer Type")	(DCM, 121006, Person)
4	>	HAS OBS CONTEXT	PNAME	(DCM, 121008, "Person Observer Name")	<i>MOORE^STEVE</i>
5	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121060, History)
6	>>	CONTAINS	TEXT	(DCM, 121060, History)	<i>"Rule out internal derangement."</i>
7	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121070, Findings)
8	>>	CONTAINS	TEXT	(DCM, 121071, Finding)	<i>"Within the posterior horn of the medial meniscus there is minimal increase in signal intensity."</i>
9	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001A10 / 103 / 45
10	>>	CONTAINS	IMAGE	(DCM, 121080, "Best illustration of findings")	2001A10 / 103 / 46
11	>	CONTAINS	CONTAINER	BCID (7001) Diagnostic Imaging Report Headings	(DCM, 121076, Conclusions)
12	>>	CONTAINS	TEXT	(DCM, 121077, Conclusion)	<i>"Joint diffusion with superior joint plicae."</i>

2.5 Report Creator Test 604: Partial and Unverified

This test is identical to the 601 tests, except for the values of document flags in the SR objects. The *Completion Flag* (0040 A491) should be set to PARTIAL, and the *Verification Flag* (0040 A493) should be set to UNVERIFIED.

2.6 Report Creator Test 605: Partial and Verified

This test is identical to the 601 tests, except for the values of document flags in the SR objects. The *Completion Flag* (0040 A491) should be set to PARTIAL, and the *Verification Flag* (0040 A493) should be set to VERIFIED.

2.7 Report Creator Test 606: Complete and Verified

This test is identical to the 601 tests, except for the values of document flags in the SR objects. The *Completion Flag* (0040 A491) should be set to COMPLETE, and the *Verification Flag* (0040 A493) should be set to VERIFIED.

2.8 Report Creator Test 607: Amended Report

This test is identical to Test 601 with the addition of the Predecessor Documents Sequence. The goal of this test is to create one report and then to create a second, amended report. You will send both reports to the MESA Report Manager. Follow the instructions for the 601 test, but send both the original and the amended report to the MESA Report Manager. Remember to clear the Report Manager if you need to start the test over.

After the second report has been transmitted, run the evaluation script as appropriate for your system. In addition to the attributes tested in the 601 tests, we evaluate the contents of the *Predecessor Documents Sequence* (0040 A360) found in your second report.

These tests are for functionality that might not be included with your application. This is an optional test.

3 Individual Tests for Measurement Workstations

3.1 Report Creator Test 651: SINR for Measurement Workstations

Test 651 is required of Measurement Workstations. This test will require you to create a structured report according to the *Basic Diagnostic Imaging Report* template (TID 2000). All items in the template that are marked mandatory will be tested.

1. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```

2. Create a numeric report that conforms to DICOM TID 2000. Make sure the report contains a Patient ID. Transmit that report to the MESA Report Manager.
3. Evaluate the report as follows:

```
perl 651/eval_651.pl <Patient ID> [-v]
```

4. The name of the file that is evaluated is listed in 651/grade_651.txt. Send this file to the Project Manager for further evaluation and for distribution to other participants.
-

4 Tests for Reporting Working

4.1 Report Creator Test 1601: Interpretation Worklist

Test 1601 covers the Interpretation task in the Reporting Workflow integration profile (see IHE TF, Vol I: section 13.3). This test only covers the interpretation step and does not include creation of any other items (such as transcriptions or reports).

To complete this test, your Report Creator needs to be able to:

1. Obtain the General Purpose Worklist from the MESA Report Manager.
2. Claim the one worklist entry on the Report Manager.
3. Send appropriate GPPPS messages to complete the interpretation step.
4. Release the worklist entry.

To run this test:

```
perl scripts/rptcrt_rwf.pl 1601 <log>
```

To evaluate this test:

```
perl 1601/eval_1601.pl <log> <GPPS AE title>
```

Where log is the amount of logging :

5 Basic Security Tests

This section describes tests that are specific to the IHE Basic Security integration profile. If you have the MESA servers running for the “standard” tests, you should stop those servers now. You will need to start the MESA secure servers with a different script.

5.1 Report Creator Test 1511: Simple Imaging Report

Report Creator Test 1511 uses the same structure as test 601. The Report Creator is expected to communicate with other systems using TLS negotiation and to send appropriate audit messages to the MESA syslog server.

The table below lists the Audit Messages that should be generated by your Report Creator. Please refer to the document *IHE Tests: Transaction Sequences* for the full context of these messages. You might trigger other messages to the Audit Record Repository based on your interaction with your Report Creator.

Identifier	Description	Source	Destination
1511.010	Begin-storing-instances	Report Creator	Report Manager

1. Start the secure MESA servers as instructed in section 1.5.
 2. Clear existing reports from the MESA Report Manager:

```
perl scripts/reset_rpt_mgr.pl
```
 3. Create a DICOM SR object according to the values in the tables in section 2.1.1
 4. Transmit this DICOM SR object to the MESA Report Manager (port 2700). As part of this process, you are expected to send an Audit Record to the MESA Audit Record Repository.
 5. Evaluate your DICOM SR object and Audit Record:

```
perl 1511/eval_1511.pl
```
 6. Grab all of the files (tar/zip) in `$MESA_TARGET/logs/syslog` and send these to the Project Manager.
-

6 Individual Tests for Cardiology

6.1 Report Creator Test 20501: Verify HL7 Encapsulated Report Message Content (CARD-7)

Test 20501 tests the creation and content of an HL7 message with an encapsulated PDF report.

This test will require your system to create a HL7 ORU(encapsulated report - unsolicited) according to the *IHE Cardiology Technical Framework Year2:2005-2006 Volume II, Section 4.7*.

6.1.1 References

6.1.2 Instructions

To run this test, follow these steps using a DOS window or terminal emulator:

1. Set the current directory to `$MESA_TARGET/ mesa_tests/card/actors/rpt_crt`.
2. Make sure the MESA servers have been started as described in section 1.5 above.
3. Reset the MESA report manager server:

```
perl scripts/reset_rpt_mgr.pl
```
4. Construct an ORU message with an encapsulated PDF report. Send the message to the MESA Report Manager (port 2750).
5. Run the evaluation script below.

6.1.3 Evaluation

1. Run the evaluation script

```
perl 20501/eval_20501.pl <log level>
```
2. The evaluation output is found in `20501/grade_20501.txt`. The final result should indicate 0 errors. Submit the result run at log level 4 to the Project Manager.

6.1.4 Evaluation Notes

For this test, the MESA tools evaluate the following elements:

- OBR25 = R/P/F/C

For OBX w/ Study Instance UID, verify:

- OBX3= “113014/DICOM Study/DCM”
- OBX5 = valid format for SIU
- OBX11 = “O”

For OBX w/ PDF report, verify:

- OBX3 = a (any) Report Title, e.g., a Report Title from Vol 2 Appendix D
-

- OBX 5 Source Application ID = a valid ISO OID
- OBX5 Type of Data = “Application”
- OBX5 Data Subtype = “PDF”
- OBX11= R/P/F/C and matches OBR25

Any missing or incorrect elements will result in a “failure”. You cannot ignore this failure.

6.2 Test Case 20502: Visual Verify of PDF Content (CARD-7)

Test 20502 is the simple visual verification of the PDF content. This test tests the case where the PDF becomes disassociated with the PDF message content.

In this test there is no MESA software or scripts involved. Any patient name and ID can be used.

Using a “good” report within your Report Creator, the vendor should create a word or pdf file using the document naming convention of: CompanyName_Product_20502_RC_2005.doc . Using any vendor report viewing tool cut and paste in information from your own product which demonstrates that the following data elements are visible in a report:

- Identity of signing clinician (legal signature)

The following items are recommended, but not required (please note which are included in an email):

- Patient name
- Patient ID
- Date of Procedure
- Type of Procedure
- Date of Report
- Status of Report

6.3 Test Case 20510: Describe Report Creator Methods

Do not divulge any proprietary information. Create a Word document with the following naming convention: CompanyName_Product_20510_RC_2005.doc and submit it to the Project Manager.

In 500 words or less for each, describe the following for the Report Creator’s:

- a. What report statuses are sent by this Report Creator?
 - b. Describe how the physicians identity is conveyed in the PDF for results status P, F, and C (e.g., “signature on file” mechanism? Other?).
 - c. Describe the Report Signature and Verification process.
-