

2015 Edition §170.315(h)(1) Direct Project				
Testing Components:				
				ONC Supplied Test Data
Test Procedure Version 1.1 – Last Updated 3/21/16				

Please consult the Final Rule entitled: *2015 Edition Health Information Technology (Health IT) Certification Criteria, 2015 Edition Base Electronic Health Record (EHR) Definition, and ONC Health IT Certification Program Modifications* for a detailed description of the certification criterion with which these testing steps are associated. We also encourage developers to consult the Certification Companion Guide in tandem with the test procedure as they provide clarifications that may be useful for product development and testing.

Note: The order in which the test steps are listed reflects the sequence of the certification criterion and does not necessarily prescribe the order in which the test should take place

Required Tests

(h)(1)(i) Applicability Statement for Secure Health Transport

Able to send and receive health information in accordance with the standards specified in § 170.202(a)(2), including formatted only as a “wrapped” message.

Standards: § 170.202 (a)(2) [Applicability Statement for Secure Health Transport v1.2](#) (incorporated by reference in § 170.299).

Tools: [Edge Testing Tool \(ETT\)](#)

[2015 Direct Certificate Discovery Tool \(DCDT\)](#)

(i) – Send

Criteria ¶	System Under Test	Test Lab Verification
(i)	<p>Discover Certificates</p> <ol style="list-style-type: none"> The user performs setup tasks to discover 2015 Direct Certificate Discovery Tool (DCDT) certificates by downloading the DCDT Trust Anchor, uploading it into the Health IT Module’s Direct instance, and mapping the Direct address to a non-Direct email address for receiving results. The user can discover and use address-bound and domain-bound certificates hosted in both DNS and LDAP in DCDT using identified health IT function(s). <p>Register Direct Address</p> <ol style="list-style-type: none"> The user selects “Direct Testing” within the Edge Testing Tool (ETT). The user registers a Direct address within the ETT and corresponding Contact Email address for receipt of the ETT validation report within the “Register Direct” tab. 	<p>Discover Certificates</p> <ol style="list-style-type: none"> The tester verifies the Health IT Module can discover and use address-bound and domain-bound certificates hosted in both DNS and LDAP in order to create and store a listing of Direct recipients using the Direct Certificate Discovery Tool. All listed certificates listed in both DNS and LDAP must be tested corresponding to the ONC Applicability Statement for Secure Health Transport v1.2. <p>Register Direct Address</p> <ol style="list-style-type: none"> The tester verifies that the Health IT Module can register a Direct email address using the ETT and has supplied a corresponding Contact Email address for receipt of the ETT validation report.

Criteria ¶	System Under Test	Test Lab Verification
(i), continued	<p><u>Send Health Information Using Direct</u></p> <ol style="list-style-type: none"> 5. The user identifies the payload for sending to the ETT. ONC-supplied payloads are available for download from the ETT-Direct home page. 6. The user sends encrypted and signed health information to a third party (ETT) using Direct in accordance with the standard specified at §170.202(a)(2): Applicability Statement for Secure Health Transport v1.2 using identified health IT function(s). 7. Based upon the types of Direct messages the Health IT Module supports for sending of information (“wrapped” RFC-5751 messages required), the user sends health information to a third party using Direct in accordance with the standard specified at §170.202(a)(2) ONC Applicability Statement for Secure Health Transport. 	<p><u>Send Health Information Using Direct</u></p> <ol style="list-style-type: none"> 3. Using the ETT validation report, the tester verifies the payload sent to the ETT is encrypted using the ETT’s Public Key and signed using the Health IT Module’s Private Key. 4. Using the ETT validation report, the tester verifies the identified health information is successfully transmitted to a third party using Direct in accordance with the standard specified at §170.202(a)(2), using the RFC-5751 “wrapped” message format. 5. Using the validation report, the tester verifies that the payload was successfully received by the ETT, and that the ETT was able to successfully decrypt the message.

(i) – Receive

Criteria ¶	System Under Test	Test Lab Verification
(i)	<p><u>Hosting Certificates</u></p> <ol style="list-style-type: none"> The user performs setup tasks to test hosting of certificates by entering the Health IT Module’s Direct address within DCDT. The user executes test cases based upon whether the Health IT Module is able to host either address-bound or domain-bound certificates in either DNS or LDAP servers using the DCDT. <p><u>Receive Direct Message</u></p> <ol style="list-style-type: none"> The user selects “Direct Testing” within the ETT. The user selects the “Send Direct Message” tab and completes the required information, identifying the Direct Address for testing receipt and digital signing of health information in accordance with the standard specified at §170.202(a)(2): Applicability Statement for Secure Health Transport v1.2. The user installs the ETT’s Valid Trust Anchor within the Health IT Module. The user identifies the Health IT Module’s Public Key for encryption of messages to be sent by ETT to the Health IT Module. The user receives RFC-5751 “wrapped” health information sent from ETT using Direct in accordance with the standard specified at §170.202(a)(2) Applicability Statement for Secure Health Transport v1.2 and sends corresponding Message Delivery Notifications (MDNs). <p><u>Reject Receipt of Direct Message (Negative Testing)</u></p> <ol style="list-style-type: none"> The user rejects health information that is not in accordance with the standard specified at §170.202(a)(2) Applicability Statement for Secure Health Transport v1.2 sent from the ETT to the Health IT Module using the following tool options: <ul style="list-style-type: none"> Invalid Certificate; Invalid Trust Anchor; Expired Certificate; 	<p><u>Hosting Certificates</u></p> <ol style="list-style-type: none"> The tester verifies that the Health IT Module’s hosted certificates are discoverable as displayed on screen for the DCDT test cases executed. <p><u>Receive Direct Message</u></p> <ol style="list-style-type: none"> The tester verifies that health information can be successfully received by the Health IT Module from the ETT accordance with the standard specified at §170.202(a)(2), using “wrapped” RFC-5751 messages. The tester verifies that an MDN from the Health IT Module was received from the ETT for all messages in Step 2. <p><u>Reject Receipt of Direct Message (Negative Testing)</u></p> <ol style="list-style-type: none"> Negative Test: The tester verifies that the Health IT Module rejects Direct messages received with an invalid Trust Anchor and that no corresponding MDN was received by the ETT from the Health IT Module. Negative Test: The tester verifies that the Health IT Module rejects Direct messages received with an invalid Trust Anchor and invalid certificate. The tester verifies that no corresponding MDN was received by the ETT from the Health IT Module. Negative Test: The tester verifies that the Health IT Module rejects Direct messages received with an expired certificate. The tester verifies that no corresponding MDN was received by the ETT from the Health IT Module. Negative Test: The tester verifies that the Health IT Module rejects Direct messages received with an invalid Trust Relationship. The tester verifies that no corresponding MDN was received by the ETT from the Health IT Module.

Criteria ¶	System Under Test	Test Lab Verification
(i), continued	<ul style="list-style-type: none"> • Invalid Trust Relationship (Different Trust Anchor); • No Authority Information Access (AIA) Extension; and • Invalid Message Digest. 	<p>8. Negative Test: The tester verifies that the Health IT Module rejects Direct messages received without an Authority Information Access (AIA) extension. The tester verifies that no corresponding MDN was received by the ETT from the Health IT Module.</p> <p>9. Negative Test: The tester verifies that the Health IT Module rejects Direct messages received with an invalid message digest. The tester verifies that no corresponding MDN was received by the ETT from the Health IT Module.</p>

(ii) Applicability Statement for Secure Health Transport and Delivery Notification in Direct

Able to send and receive health information in accordance with the standard specified in § 170.202(e)(1).

Standards: § 170.202 (e)(1)Delivery Notification - [Implementation Guide for Delivery Notification in Direct v1.0](#).

Tools: [Edge Testing Tool \(ETT\)](#)

(ii) – Send

Criteria ¶	System Under Test	Test Lab Verification
(ii)	<ol style="list-style-type: none"> The user selects “HISP Testing & Delivery Notification” within the ETT. The user selects the “Message Tracking” tab and selects the option for Your system as “Sender.” <p><u>Disposition-Notification-Options Header</u></p> <ol style="list-style-type: none"> The Health IT Module is able to successfully process the Disposition-Notifications-Options-Header received from the ETT (as Sending Edge) and include it in the message to the destination (ETT as Destination HISP): <ul style="list-style-type: none"> Using SMTP: SMTP MT Test 21 Using IMAP: SMTP/IMAP MT Test 21 (Alternative) Using POP3: SMTP/POP MT Test 21 (Alternative) <p><u>Delivery Failure Due to Bad Destination Address</u></p> <ol style="list-style-type: none"> The Health IT Module is able to successfully process a message from the ETT (as Sending Edge) with a bad address (non-existent) for the destination, send the message to the ETT (as Destination HISP), which will return an error as it will be unable to deliver the message to the address. The Health IT Module sends the ETT (as Sending Edge) a negative delivery status notification message via: <ul style="list-style-type: none"> SMTP MT Test 23 SMTP/IMAP MT Test 23 (Alternative) SMTP/POP MT Test 23 (Alternative) 	<p><u>Disposition-Notification-Options Header</u></p> <ol style="list-style-type: none"> The ETT test results for the following tests are successful: <ul style="list-style-type: none"> SMTP MT Test 21 SMTP/IMAP MT Test 21 (Alternative) SMTP/POP MT Test 21 (Alternative) <p><u>Delivery Failure Due to Bad Destination Address</u></p> <ol style="list-style-type: none"> The ETT test results for the following tests are successful: <ul style="list-style-type: none"> SMTP MT Test 23 SMTP/IMAP MT Test 23 (Alternative) SMTP/POP MT Test 23 (Alternative) <p><u>Delivery Failure Due to Untrusted Destination HISP</u></p> <ol style="list-style-type: none"> The ETT test results for the following tests are successful: <ul style="list-style-type: none"> SMTP MT Test 24 SMTP/IMAP MT Test 24 (Alternative) SMTP/POP MT Test 24 (Alternative) <p><u>Delivery Failure Due to Unpublished Certificate for Destination HISP</u></p> <ol style="list-style-type: none"> The ETT test results for the following tests are successful: <ul style="list-style-type: none"> SMTP MT Test 25 SMTP/IMAP MT Test 25 (Alternative) SMTP/POP MT Test 25 (Alternative) <p><u>Delivery Failure Timeout for Processed MDN</u></p> <ol style="list-style-type: none"> The ETT test results for the following tests are successful: <ul style="list-style-type: none"> SMTP MT Test 26 SMTP/IMAP MT Test 26 (Alternative) SMTP/POP MT Test 26 (Alternative)

Criteria ¶	System Under Test	Test Lab Verification
(ii), continued	<p><u>Delivery Failure Due to Untrusted Destination HISP</u></p> <p>5. The Health IT Module is able to successfully process a message from the ETT (as Sending Edge) with a valid address for the destination and send the message to the ETT (as an untrusted Destination HISP). The Health IT Module sends the ETT (as Sending Edge) a negative delivery status notification message via:</p> <ul style="list-style-type: none"> • SMTP MT Test 24 • SMTP/IMAP MT Test 24 (Alternative) • SMTP/POP MT Test 24 (Alternative) <p><u>Delivery Failure Due to Unpublished Certificate for Destination HISP</u></p> <p>6. The Health IT Module is able to successfully process a message from the ETT (as Sending Edge) with a valid address for the destination and send the message to the ETT (as Destination HISP). Due to the unpublished certificate, security and trust processing fails. The Health IT Module sends the ETT (as Sending Edge) a negative delivery status notification message via:</p> <ul style="list-style-type: none"> • SMTP MT Test 25 • SMTP/IMAP MT Test 25 (Alternative) • SMTP/POP MT Test 25 (Alternative) <p><u>Delivery Failure Timeout for Processed MDN</u></p> <p>7. The Health IT Module is able to successfully process a message from the ETT (as Sending Edge) with a valid address for the destination and send the message to the ETT (as Destination HISP). The wait time for the Health IT Module to receive a Processed MDN from the Destination HISP is exceeded. The Health IT Module sends the ETT (as Sending Edge) a negative delivery status notification message via:</p> <ul style="list-style-type: none"> • SMTP MT Test 26 • SMTP/IMAP MT Test 26 (Alternative) • SMTP/POP MT Test 26 (Alternative) 	<p><u>Delivery Failure for Dispatched MDN</u></p> <p>6. The ETT test results for the following tests are successful:</p> <ul style="list-style-type: none"> • SMTP MT Test 27 • SMTP/IMAP MT Test 27 (Alternative) • SMTP/POP MT Test 27 (Alternative) <p><u>Delivery Failure Timeout for Dispatched MDN</u></p> <p>7. The ETT test results for the following tests are successful:</p> <ul style="list-style-type: none"> • SMTP MT Test 28 • SMTP/IMAP MT Test 28 (Alternative) • SMTP/POP MT Test 28 (Alternative) <p><u>Delivery Failure Timeout for Dispatched MDN</u></p> <p>8. The ETT test results for the following tests are successful:</p> <ul style="list-style-type: none"> • SMTP MT Test 29 • SMTP/IMAP MT Test 29 (Alternative) • SMTP/POP MT Test 29 (Alternative)

Criteria ¶	System Under Test	Test Lab Verification
<p>(ii), continued</p>	<p><u>Delivery Failure for Dispatched MDN</u></p> <p>8. The Health IT Module is able to successfully process a message from the ETT (as Sending Edge) with a valid address for the destination and send the message to the ETT (as Destination HISP), which provides a Processed MDN but does not provide a Dispatched MDN to the Health IT Module. The Health IT Module sends the ETT (as Sending Edge) a negative delivery status notification message via:</p> <ul style="list-style-type: none"> • SMTP MT Test 27 • SMTP/IMAP MT Test 27 (Alternative) • SMTP/POP MT Test 27 (Alternative) <p><u>Delivery Failure Timeout for Dispatched MDN</u></p> <p>9. The Health IT Module is able to successfully process a message from the ETT (as Sending Edge) with a valid address for the destination and send the message to the ETT (as Destination HISP), which provides a Processed MDN to the Health IT Module. The Health IT Module receives a Dispatched MDN after the expected wait time is exceeded. The Health IT Module sends the ETT (as Sending Edge) a negative delivery status notification and does not forward the dispatched MDN to the ETT (as Sending Edge) message via:</p> <ul style="list-style-type: none"> • SMTP MT Test 28 • SMTP/IMAP MT Test 28 (Alternative) • SMTP/POP MT Test 28 (Alternative) <p><u>Positive Delivery Notification</u></p> <p>10. The Health IT Module is able to successfully process a message from the ETT (as Sending Edge) with a valid address for the destination and send the message to the ETT (as Destination HISP), which provides a Processed MDN and Dispatched MDN to the Health IT Module. The Health IT Module only sends the ETT (as Sending Edge) a positive delivery status notification (dispatched MDN) message via:</p>	<p>.</p>

Criteria ¶	System Under Test	Test Lab Verification
(ii), continued	<ul style="list-style-type: none">• SMTP MT Test 29• SMTP/IMAP MT Test 29 (Alternative)• SMTP/POP MT Test 29 (Alternative)	

(ii) – Receive

Criteria ¶	System Under Test	Test Lab Verification
(ii)	<ol style="list-style-type: none"> 1. The user selects “HISP Testing & Delivery Notification” within the ETT. 2. The user selects the “Message Tracking” tab and selects the option for Your system as “Receiver.” <p><u>SMTP: Disposition-Notification-Options Header</u></p> <ol style="list-style-type: none"> 3. The Health IT Module is able to receive and successfully process a message from the ETT (as Sending HISP) that contains a valid Disposition-Notification-Options Header and includes it in the message to the destination via SMTP/IMAP MT Test 39. 4. Negative Testing: The Health IT Module is able to receive and successfully process a message from the ETT (as Sending HISP) that contains an invalid Disposition-Notification-Options Header and includes it in the message to the destination via SMTP/IMAP MT Test 40. <p><u>SMTP: Failure Notification (Configurable Wait Time Exceeded)</u></p> <ol style="list-style-type: none"> 5. The Health IT Module receives a message from the ETT (as Sending HISP) and is unable to deliver the message to its final destination (ETT as Destination Edge). The Health IT Module delivers a Processed MDN to the ETT (as Sending HISP) followed by a delivery failure message to the ETT (as Sending HISP) after the wait time has exceeded for delivering the message to its final destination via SMTP/IMAP MT Test 41. <p><u>SMTP: Failure Notification</u></p> <ol style="list-style-type: none"> 6. The Health IT Module receives a message from the ETT (as Sending HISP), and is unable to deliver the message to its final destination (ETT as Destination Edge) due to a bad address. The Health IT Module delivers a Processed MDN to the ETT (as Sending HISP) followed by a delivery failure message to the ETT (as Sending HISP) due to the bad address via SMTP/IMAP MT Test 42. 	<p><u>SMTP: Disposition-Notification-Options Header</u></p> <ol style="list-style-type: none"> 1. The ETT test results for XDR MT Test 39 are successful. 2. The ETT test results for XDR MT Test 40 are successful. <p><u>SMTP: Failure Notification (Configurable Wait Time Exceeded)</u></p> <ol style="list-style-type: none"> 3. The ETT test results for XDR MT Test 41 are successful. <p><u>SMTP: Failure Notification</u></p> <ol style="list-style-type: none"> 4. The ETT test results for XDR MT Test 42 are successful. <p><u>XDR: Failure Notification (Configurable Wait Time Exceeded)</u></p> <ol style="list-style-type: none"> 5. The ETT test results for XDR MT Test 43 are successful. <p><u>XDR: Failure Notification</u></p> <ol style="list-style-type: none"> 6. The ETT test results for XDR MT Test 44 are successful.

Criteria ¶	System Under Test	Test Lab Verification
(ii), continued	<p><u>XDR: Failure Notification (Configurable Wait Time Exceeded)</u></p> <p>7. The Health IT Module receives a message from the ETT (as Sending HISP) and is unable to deliver the message to its final destination (ETT as Destination Edge). The Health IT Module delivers a Processed MDN to the ETT (as Sending HISP) followed by a delivery failure message to the ETT (as Sending HISP) after the wait time has exceeded for delivering the message to its final destination via XDR MT Test 43.</p> <p><u>XDR: Failure Notification</u></p> <p>8. The Health IT Module receives a message from the ETT (as Sending HISP), and is unable to deliver the message to its final destination (ETT as Destination Edge) due to a bad address. The Health IT Module delivers a Processed MDN to the ETT (as Sending HISP) followed by a delivery failure message to the ETT (as Sending HISP) due to the bad address via XDR MT Test 44.</p>	

Required Enhanced Testing

The Health IT Module submits evidence of multi-partner testing with three different and unrelated partner HISPs using Direct v1.2 (in accordance with the standard specified at §170.202(a)(2): Applicability Statement for Secure Health Transport v1.2, formatted only as a “wrapped” message.

(i) – Send

Criteria ¶	System Under Test	Test Lab Verification
<p>(i) Required Enhanced Testing</p>	<p>The Health IT Module provides evidence and demonstration of successful send of encrypted and signed health information from the Health IT Module to three partners (e.g., other vendor Health IT Modules (HISPs) that have implemented (h)(1) or (h)(2) capabilities), using Direct v1.2 in accordance with the standard specified at §170.202(a)(2): Applicability Statement for Secure Health Transport v1.2, which includes:</p> <ul style="list-style-type: none"> • Documentation of the Health IT Module sending “Wrapped” RFC-5751 messages to three partner HISPs; and • Documentation of the Health IT Module receiving processed MDNs from each of the three partner HISPs, generated by the partner HISPs upon receiving the Direct message from the Health IT Module. 	<p>The tester verifies that the Health IT Module has successfully sent encrypted and signed health information to three partner HISPs using Direct v1.2 in accordance with the standard specified at §170.202(a)(2): Applicability Statement for Secure Health Transport v1.2. The verification includes:</p> <ul style="list-style-type: none"> • Indication through documentation that the Health IT Module sent “Wrapped” RFC-5751 messages to three separate and unrelated HISP partners. • Indication through documentation of the Health IT Module receiving processed MDNs from each of the three partner HISPs, generated upon receiving the Direct message from the Health IT Module.

(i) – Receive

Criteria ¶	System Under Test	Test Lab Verification
<p>(i) Required Enhanced Testing</p>	<p>The user provides evidence of successful receipt of encrypted and signed health information from three partners (e.g., other vendor Health IT Modules (HISPs) that have implemented (h)(2) capabilities) using Direct v1.2 in accordance with the standard specified at §170.202(a)(2): Applicability Statement for Secure Health Transport v1.2. The evidence includes:</p> <ul style="list-style-type: none"> • Documentation of the Health IT Module receiving “Wrapped” RFC-5751 messages from 3 partner HISPs; and • Documentation that the Health IT Module generates and sends processed MDNs that are transmitted to each of the three partner HISPs, generated upon successfully receiving a Direct message from the Health IT Module. 	<p>The tester verifies that the Health IT Module has received encrypted and signed health information from three partner HISPs using Direct v1.2 in accordance with the standard specified at §170.202(a)(2): Applicability Statement for Secure Health Transport v1.2. The documentation includes:</p> <ul style="list-style-type: none"> • Indication that the Health IT Module successfully received “Wrapped” RFC-5751 messages from three separate and unrelated HISP partners; and • Indication of the Health IT Module generating and transmitting processed MDNs to each of the three partner HISPs, generated upon receiving the Direct message from each partner HISP.

Document History

Version Number	Description of Change	Date
1.0	Final Test Procedure	January 29, 2016
1.1	<p>Update documentation Icon. Corrected reference to TTT to ETT for section (i) – Receive System Under Test Step 6. Removed all the XDR related delivery notification tests. (ii) – Send – removed negative test SMTP/IMAP/POP MT Test 22</p>	March 21, 2016

Dependencies: For all related and required criteria, please refer to the [Master Table of Related and Required Criteria](#).