January 20, 2015
Revision 1.3

USER GUIDE

Edge Testing Tool

National Institute of Standards and Technology

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1.0 OVERVIEW

1.1 Role of NIST

Since its foundation in 1901, the National Institute of Standards and Technology (NIST) has been devoted to promoting innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve human qualities of life. In support of this mission, NIST has strategically acknowledged the need for opportunity discovery within the private sector's range of vital industries and technology areas. Under the American Recovery and Reinvestment Act of 2009 (Recovery Act), NIST was called upon to consult the Office of the National Coordinator (ONC) in its mission to encourage greater adoption of interoperable health IT technologies and capabilities. To accomplish this mission, NIST is collaborating with ONC to develop a structured program that eligible professionals, hospitals, and critical access hospitals (CAHs) can achieve that demonstrates compliance with applicable Meaningful Use Stage 2 (MU2) [1] criteria and requirements. NIST's primary role is to assist ONC in establishing the necessary functional and conformance testing requirements, Test Cases, and testing tool sets need to successfully implement a voluntary health IT certification program.

1.2 Edge Testing Tool

NIST has developed a tool to test requirements and standards related to message transport specifications expressed within the 2014 R2 Edition of the ONC Standards & Certification Criteria[2]. The tool, commonly referred to within this document and accompanying resources as the Edge Testing Tool (ETT), tests for adherence to the Edge Protocol standards during valid communication sessions between the ETT and a System Under Test (SUT).

At a broad level of applicability and usage, ONC-Authorized Testing Laboratories (ATLs) and Associated Certification Bodies (ONC ACBs) of electronic health record (EHR) providers can utilize the ETT to certify EHR module achievement against 2014 R2 Edition Objectives of selected ONC Standards & Certification Criteria. The methods by which messages should be sent and received are outlined further within this User Guide.

1.3 Purpose

To perform certification testing to the Direct and Edge Protocols of 2014 MU2 R2 Edition Objectives for message transport, NIST has developed the Transport Testing Tool (TTT) and ETT. Edge Systems (e.g., EHRs) and Health Information Service Providers (HISPs) can specifically use the TTT to perform certification testing against Direct standards and ETT to perform certification testing against Edge Protocols.

***Note**: The TTT has a separate stand-alone User Guide and is not discussed in detail within the ETT User Guide. It is only used for certification testing for EHR and/or HISP Tester reference.*

The purpose of this ETT User Guide is to outline the process by which Edge Systems (e.g., EHRs) and HISPs may send and receive messages and C-CDA attachments to the ETT for the purposes of transport testing as required by ONC.

Figure 1 below depicts the high level testing objectives the ETT and TTT perform in relationship to one another and EHR / HISP interaction.

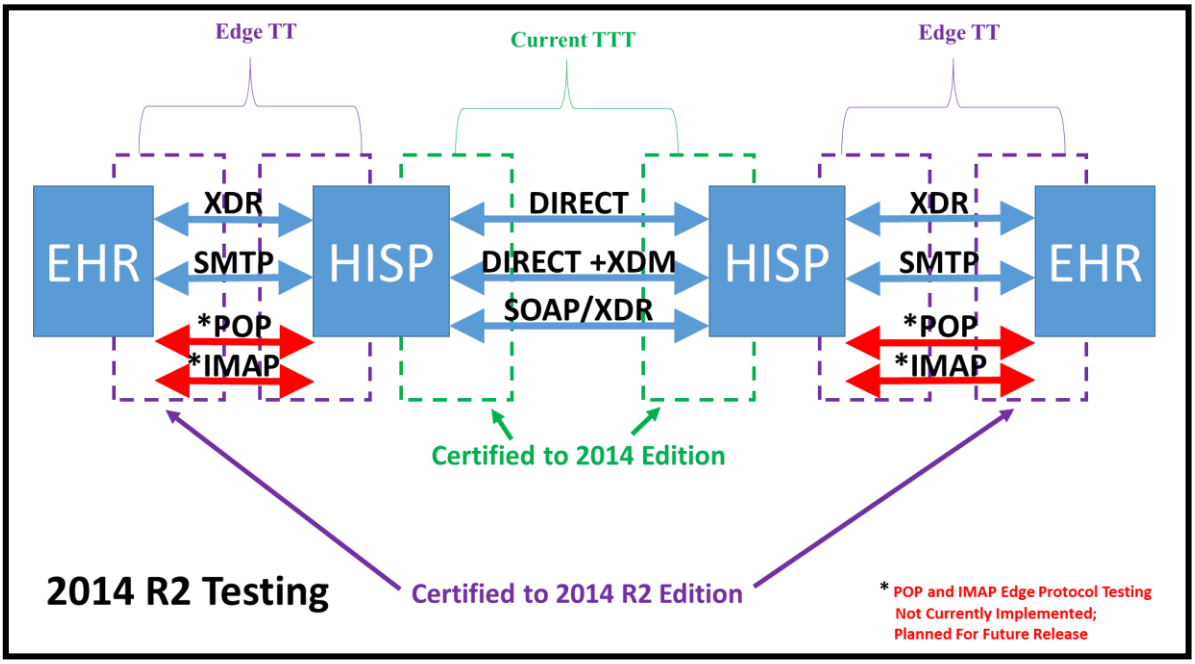


Figure 1: Testing Certification Criteria

An Edge System (e.g., EHR) or HISP Vendor can leverage the TTT to certify against Direct, Direct + XDM, or SOAP / XDR and the ETT to certify against the four Edge Protocols. To maintain security while exchanging XDR message information and authentication/authorization data, the ETT implements TLS and the TTT implements SAML.

***Note**: In its current Alpha build, the ETT does not currently implement POP and IMAP Edge Protocol certification testing. This is a planned feature of a future build.*

Within the scope of testing and Test Procedure context for ETT Test Cases, the term 'SUT' in commonly used in an abstract form. The SUT can act as either an Edge System (e.g., EHR) or HISP, depending on the specific testing need. Both can send and receive as a SUT. Typically, the Edge System (e.g., EHR) can act as the SUT for Edge testing, and the HISP for both Edge and Direct testing.

1.4 Access

The ETT can be accessed through two (2) interfaces: Web and Local.

- **Web Interface –** The ETT is accessible online through the following link: http://hit-dev.nist.gov:12080/ttt/#/home. This web interface link is referred to within the ETT User Guide and accompanying resources as the 'Home Page'. The ETT User Guide describes the 2014 MU R2 Edition of the ONC Standards & Certification Criteria[2] processes.
- **Local Interface –** A downloadable and executable file (.war) is not currently available for the ETT. However, this functionality will be enabled in future releases of the tool.

1.5 Testing Overview

The ETT will allow Testers (e.g., Vendor) to send and receive messages using various transport methods to and from the SUT (acting as either a HISP and/or Edge System) dependent upon specific 2014 MU2 R2 Edge Protocol testing objectives. The identified objectives that have been selected and outlined for testing purposes are:

- **170.314(b)(8)** Transitions of Care, Optional (*Optional*); and
- **170.314(e)(1)** View, Download, Transmit to 3rd Party (*Edge Protocol Testing*).

2.0 TESTING CONFIGURATION FOR EDGE SYSTEM

This section guides the Tester (e.g., Vendor) through the necessary configurations and preparation steps for Profile creation and Test Case execution.

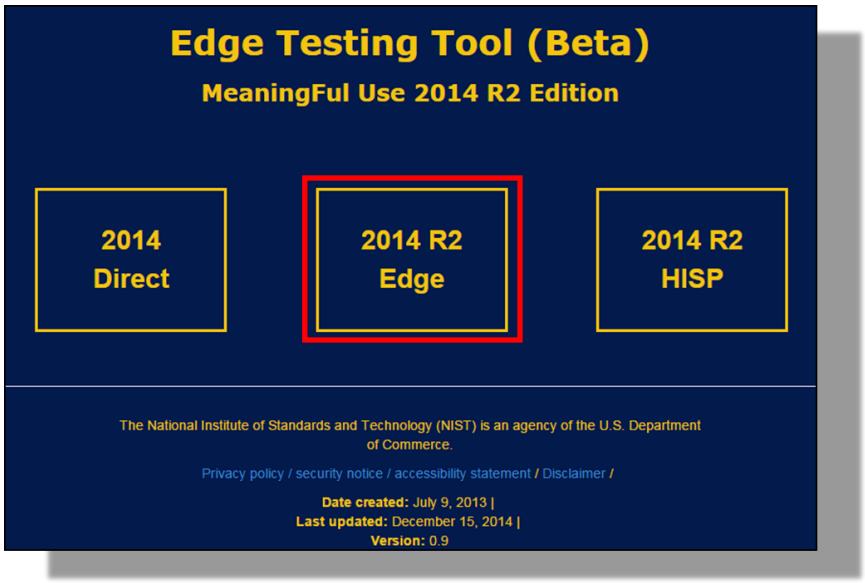
2.1 Configuration Steps

In order to operate the ETT as intended and generate expected/successful testing results per Test Case executed, the Tester (e.g., Vendor) must perform the following series of steps.

2.2 Registration

1. Navigate to the ETT '**Home Page**' by either clicking the following link or entering it directly into a web browser: http://hit-dev.nist.gov:12080/ttt/#/home.

2. On the ETT '**Home Page**', select the '**2014 R2 Edge***'* option.

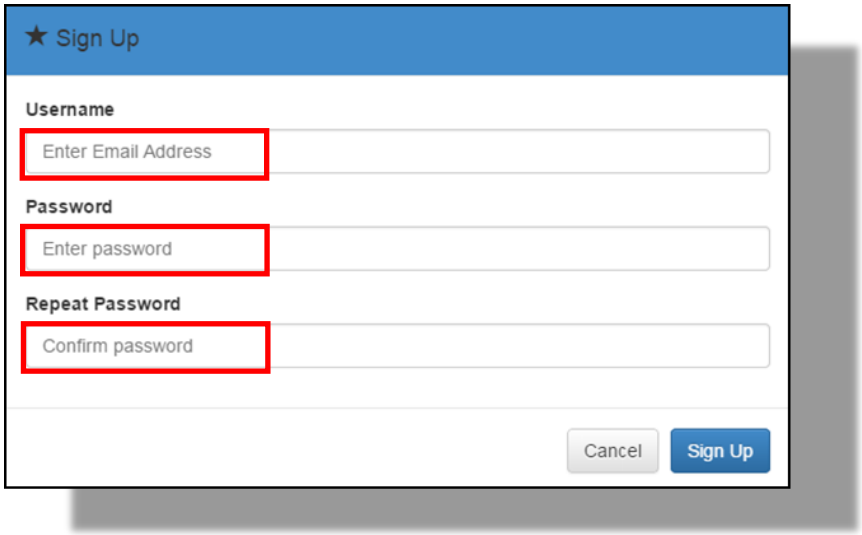


***Note**: Tool inception date, most recent update, and current version can be found on the ETT's 'Welcome Screen' under the **Date Created**, **Last Update**, and **Version** headings.*

3. Selecting the '**2014 R2 Edge***'* option will bring up the tool's 'Welcome Screen'. From here, the Tester (e.g., Vendor) can select the intended MU2 2014 R2 Test Case(s) that will be targeted to test against.

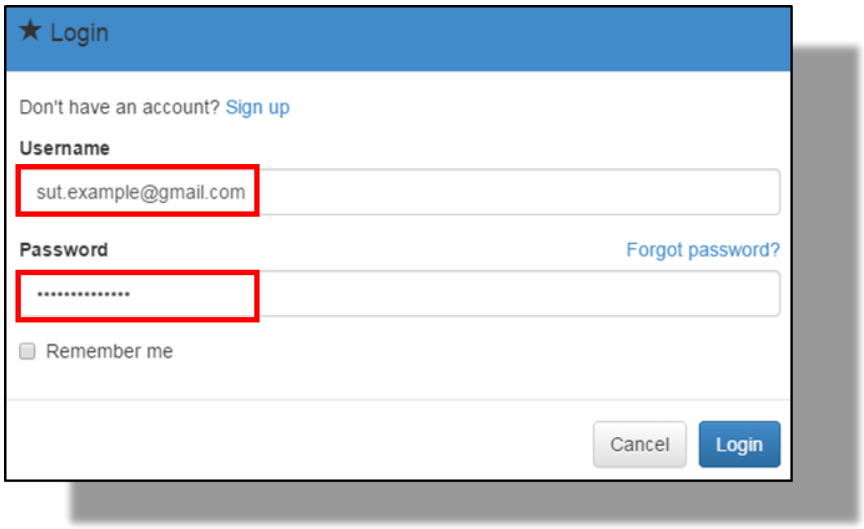
***Note**: In its current version and build, the ETT supports the functionality and feature sets to test against the loaded Simple Mail Transfer Protocol (SMTP), External Data Representation (XDR), and tracking of Message Display Notifications (MDNs) using SMTP and XDR.*

4. Click '**Login/Sign up**' and '**Sign up**' to create a unique user account within the ETT. Enter a Username email address and Password and click '**Sign Up**'.



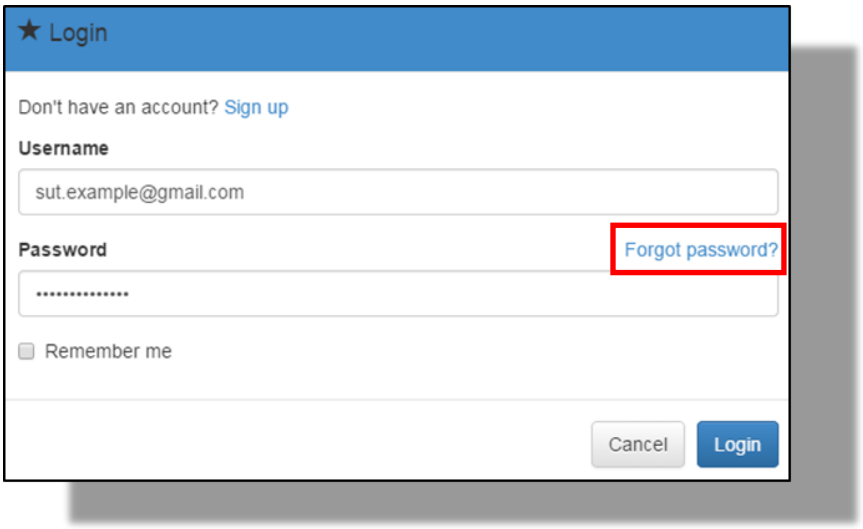
***Note**: The Username email address connects to the ETT's authentication based Test Cases. Some SMTP servers do not allow any operations to persist without first being properly authenticated.*

5. Before executing any tests within the ETT, '**Login**' using the credentials created during '**Sign Up**'.

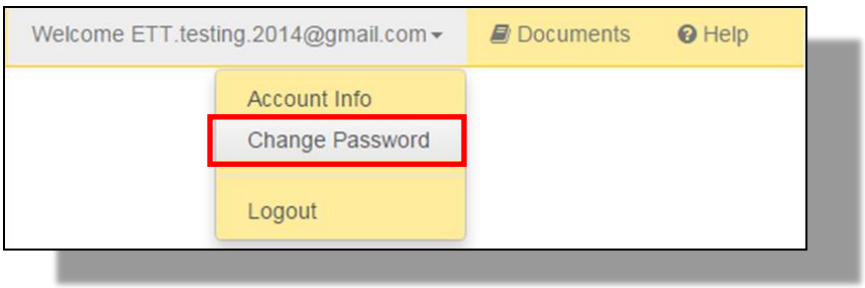


If either the 'Login' Username or Password is entered incorrectly, an error message will appear prompting the Tester (e.g., Vendor) to reenter credentials.

6. To reset an ETT account Password, click the '**Forgot password?**' link within the '**Login**' prompt box.

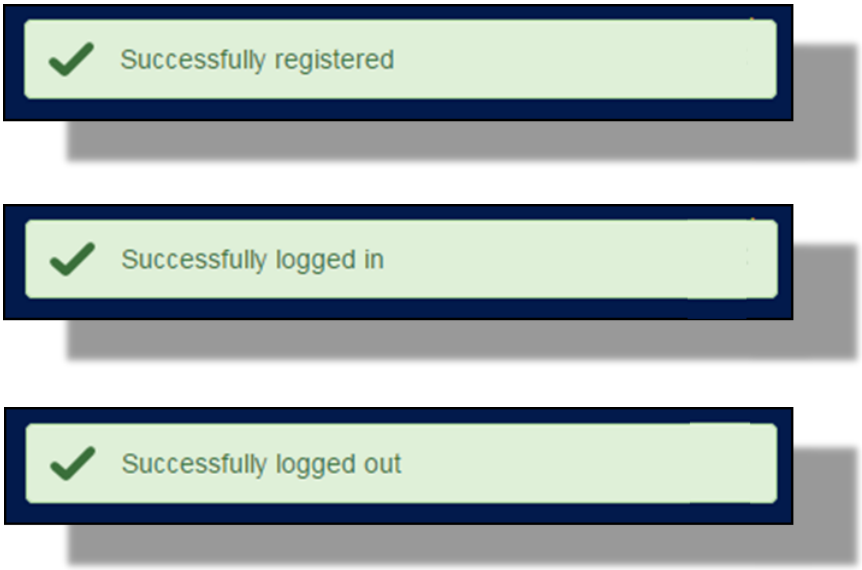


An account Password can also be reset after successful Login through the Navigation Bar.



***Note**: The account Password reset is a self-service feature within the ETT. No assistance from ETT administrator is needed. The Tester (e.g., Vendor) will follow the on screen prompts and/or email instructions for Password reset.*

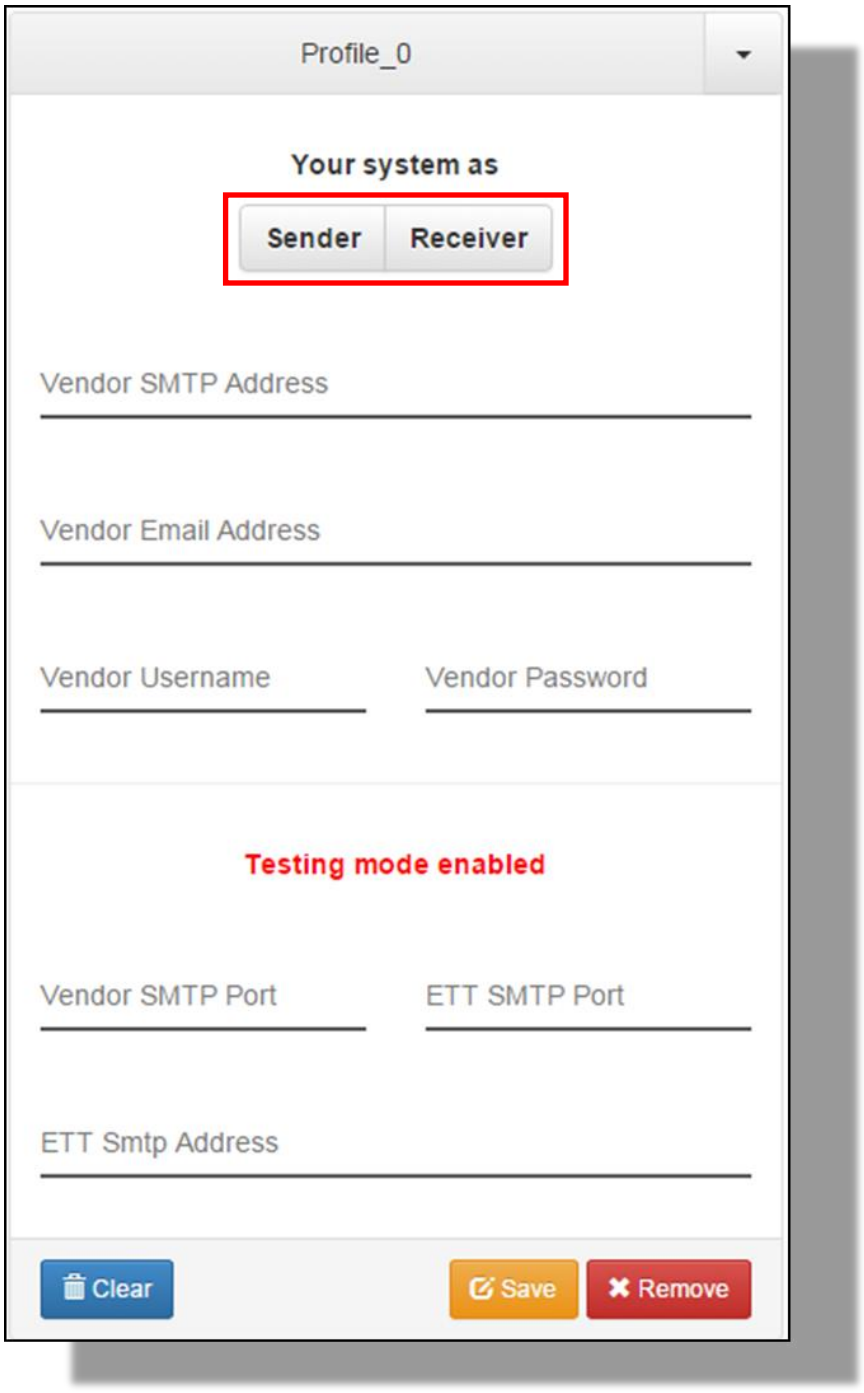
7. A success message will appear upon successful '**Sign Up**', '**Login**', and '**Logout**'.



2.3 Profile Creation

1. Select the testing target of '**SMTP Test Cases'** or '**XDR Test Cases**' from the Navigation Bar. This enables the testing Profile feature of the ETT.

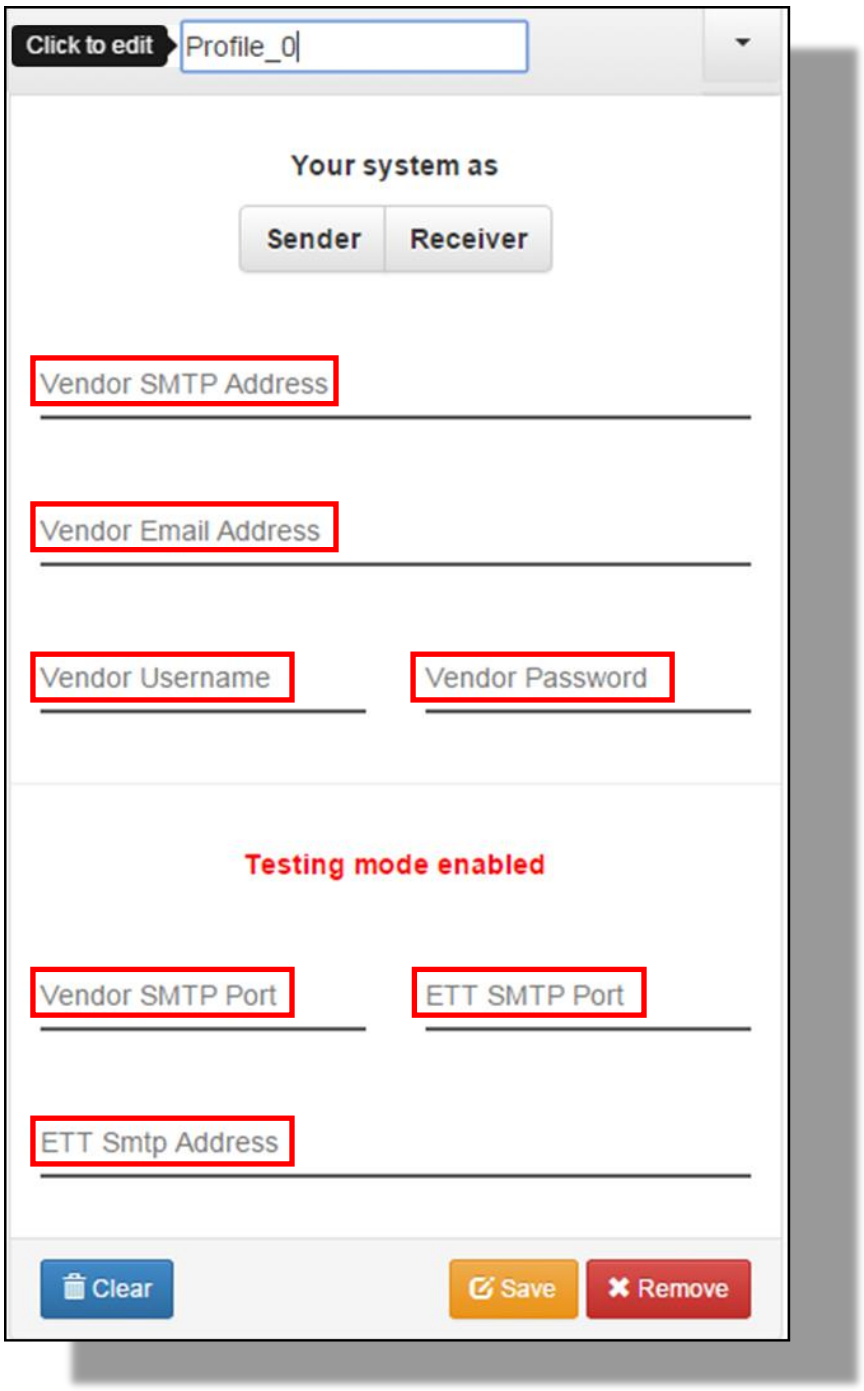
2. From the testing Profile, select either '**Sender**' or '**Receiver**'.



3. From the testing Profile, enter the:

Profile Data Field	Description
Profile Name	The Profile name can be edited and customized based on testing needs by the Tester (e.g., Vendor). This feature can be accessed by clicking on the '**Profile**' header. Saved Profiles can be accessed from within

	the ETT account created during 2.2 Registration.
Vendor SMTP Address	SMTP address of the Tester's (e.g., Vendor's) email server. * This should directly connect to the '**Vendor Email Address**'
Vendor Email Address	'**Vendor Email Address'** should correspond to the '**Vendor SMTP Address**'. This should be the same email address created during 2.2 Registration Step 4 and will be used to receive/send ETT Test Case validation messages.
Vendor Username **Vendor Password**	ETT Username and Password created during 2.2 Registration Step 4. This should correspond to the '**Vendor Email Address'**. The Username and Password are mainly used for authentication based Test Cases so the ETT can login to the SUT.
Vendor SMTP Port	Designated SMTP ports for the SUT. With '**TLS**' '**ON**', use port 587. With '**TLS**' '**OFF**', use port 25. *By default within the ETT testing Profile, TLS is always enabled ('**Testing mode enabled**', '**ON**').
ETT SMTP Port	Designated SMTP ports for the ETT. Operating in '**TLS**' '**ON**' mode, use port 587. Operating in '**TLS**' '**OFF**' mode, use port 25. *By default within the ETT testing Profile, TLS is always enabled ('**Testing mode enabled**', '**ON**').
ETT SMTP Address	Designated SMTP address for the ETT email server. Default should be '**hit-testing2.nist.gov**'.

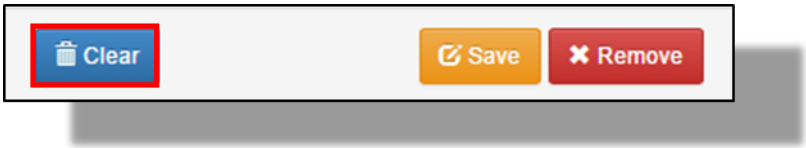


***Note**: For information on how to find the SMTP address of your email client/server or recommended ports for use with SMTP, please reference vendor specific documentation. For information on recommended ETT SMTP address and ports, please consult the 'Help' button located on tool's Navigation Bar. The '**ETT SMTP Address**' field should remain 'hit-testing2.nist.gov'.*

4. Before saving a Profile, assign a unique name (the default Profile name is '**Profile_0**'). Click the Profile name, delete the existing text, and type a new name. Upon population of the testing Profile, select '**Save**'.

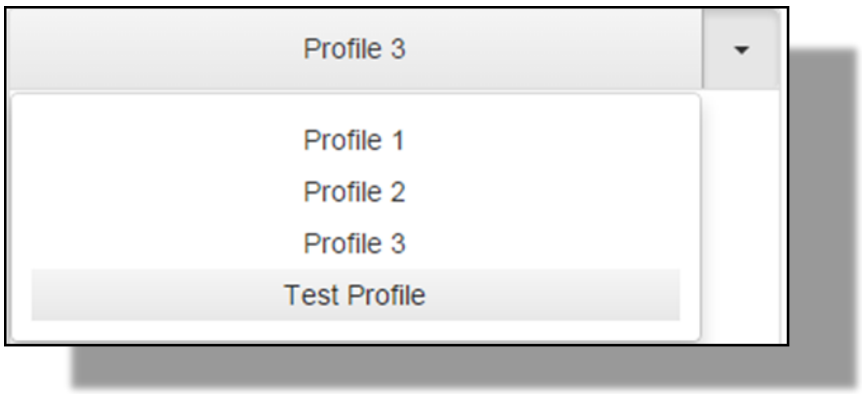
5. A successful message will appear upon successful '**Save**'.

6. If data has been entered incorrectly, selecting '**Clear**' will clear the complete Profile of all its data fields.



***Note**: If data was entered incorrectly , clicking the '**Clear**' button will remove all data fields from the Profile. To remove the saved Profile completely, use the '**Remove**' button. The 'Save' button saves the created Profile to the Tester's (e.g., Vendor's) account created during 2.2 Registration. This saved Profile can be accessed for future testing needs.*

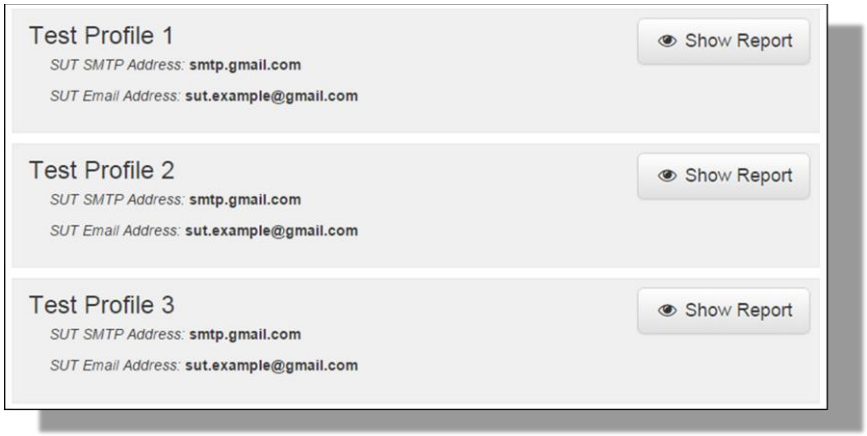
7. Saved Profiles can be retrieved and applied to subsequent/future tests by selecting the target Profile from the drop-down menu.



2.4 Reporting

1. During a testing session, the Tester (e.g., Vendor) can review a high-level synopsis of all Test Cases executed through the '**Validation Reports**' tab on the Navigation Bar.

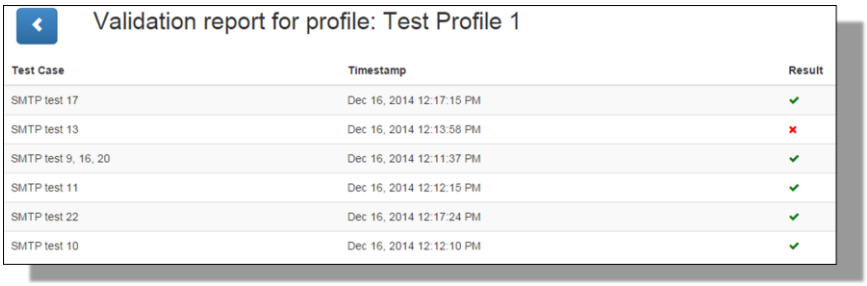
2. Within the '**Validation Reports**' tab, tests are organized by ETT testing Profiles. For reference, the '**SUT SMTP Address**' and '**SUT Email Address**' configured for each Profile are displayed.



***Note**: Per testing session, the total number of ETT testing Profiles used will be displayed. If only a single ETT testing Profile is used, only a single '**Validation Report**' will be displayed.*

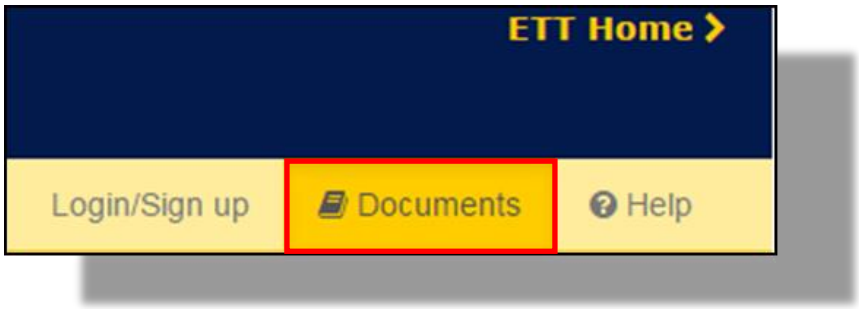
3. By clicking on the '**Show Report**' button, the Tester (e.g., Vendor) is given the Test Case executed, a time ran, and Success or Failure of the test. The '**Log**' for each

executed Test Case provides further detailed information concerning evidence to support Success or Failure.



2.5 Documentation

Documentation relevant to the ETT, Test Case execution (including this ETT User Guide), Test Procedures, 2014 MU2 R2 Edge Protocol testing objectives, NIST Health IT testing guideline, or other development related artifacts will be made available through the '**Documents**' tab on the Navigation Bar.



3.0 SUT SENDING

Within the following Test Cases, tests are executed from the following actor perspective:

Test Actor	Testing Role
SUT	Sends test message in alignment with Testing Procedures and Conformance Test Details
ETT	Receives test message and validates alignment with Testing Procedures and Conformance Test Details

3.1 SMTP Test Case 14

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender, will accept the syntax and request for TLS session initiation by a HISP (e.g., ETT), acting as the receiver.

The details for conformance testing flow are as follows: The SUT will form the correct syntax and send a valid STARTTLS command to the ETT (target endpoint recipient ETT endpoint wellformed1@hit-testing2.nist.gov). The ETT will receive the command, accept the TLS connection request, and send a valid STARTTLS command response to the SUT. The SUT will respond to the ETT and proceed in opening a secure channel. The Tester (e.g., Vendor) verifies the valid STARTTLS command sent from the SUT to the ETT conforms to the specified requirements within RFC 2487, Section 5.

This is required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.3 of the 'Implementation Guide for Direct Edge Protocols' document.

This test correlates to Test ID 14 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

3.1.1 TESTING STEPS

To execute SMTP Test Case 14 and assess the ability of the SUT to send a mail transaction to the ETT, the Tester (e.g., Vendor) must perform the following steps:

***Note**: Within the ETT User Interface (UI), SUT Sending SMTP Test Cases 1 through 8, 14, and 18 are condensed to a single executable test. Thus, the performed Testing Steps for these Test Cases will be consistent across the set.*

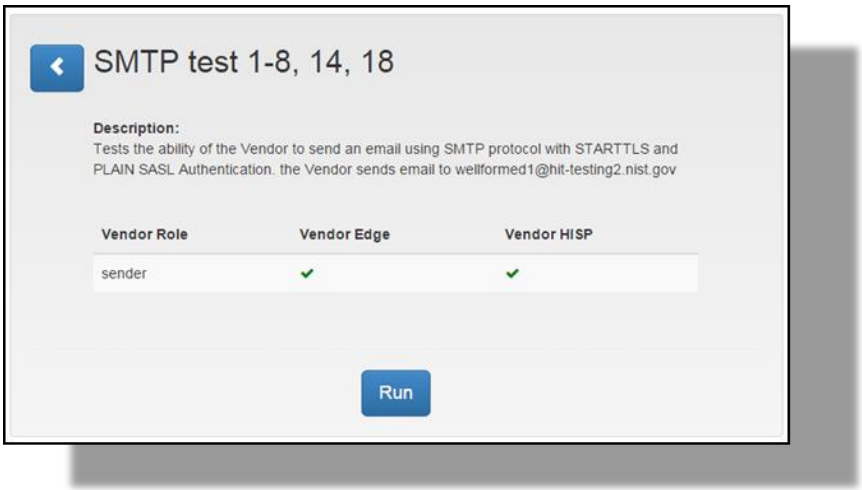
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

3. From the testing Profile, select '**Sender**'.

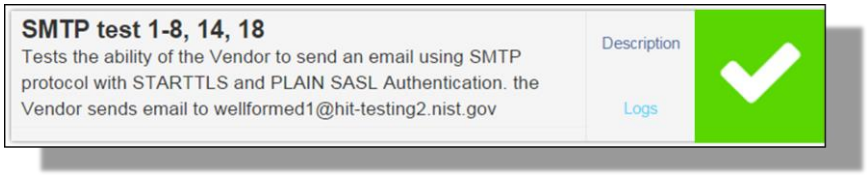
4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

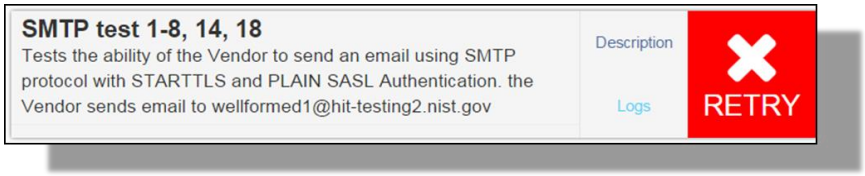
5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.



6. With the Profile saved, select the target Test Case (SMTP Test 1-8, 14, 18) from the available list, next:
   A) Compose an email from the '**SUT Email Address'** (specified in the Profile) and to the ETT endpoint recipient at 'wellformed1@hit-testing2.nist.gov'; and
   B) Once the email has been successfully sent, click '**Run**' to execute the Test Case.

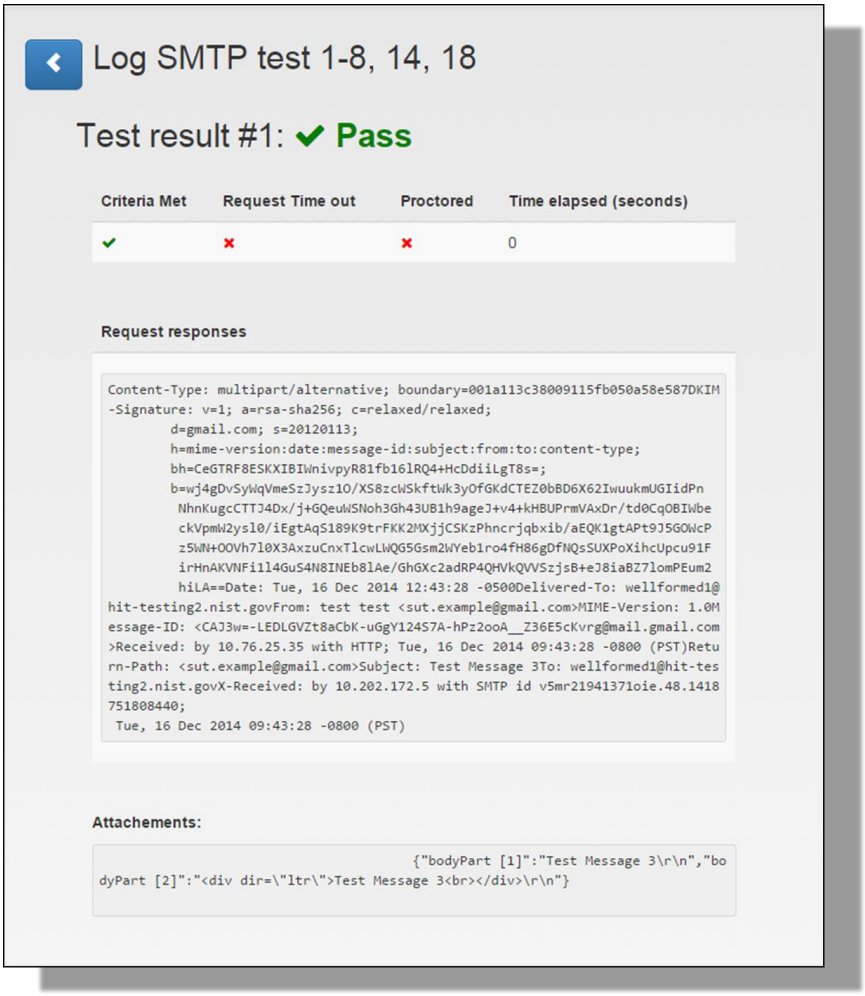
7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.





***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, the Tester (e.g., Vendor) can validate the test results conformed to the testing objective and gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP Test Cases 1 – 8, 14, and 18, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

3.2 SMTP Test Case 18

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender, can transmit credentials through a PLAIN SASL request to a HISP (e.g., ETT), acting as the receiver, and successfully authenticate.

The details for conformance testing flow are as follows: The SUT will send a valid predetermined PLAIN SASL username/password authentication scheme to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT will receive the credentials, identify/accept the credentials as valid, and perform successful authentication to the ETT. The

Tester (e.g., Vendor) will verify that the PLAIN SASL connection mechanism sent by the SUT conforms to the specified requirements within RFC 4616, Section 2.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.4 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 18 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

3.2.1 TESTING STEPS

To execute SMTP Test Case 18 and assess the ability of the SUT to send a mail transaction to the ETT, the Tester must perform the following steps:

***Note**: Within the ETT User Interface (UI), SUT Sending SMTP Test Cases 1 through 8, 14, and 18 are condensed to a single executable test. Thus, the performed Testing Steps for these Test Cases will be consistent across the set. Reference the Section 3.1.1 Testing Steps for details on Test Case execution.*

3.3 SMTP Test Case 1 through 8

The objective of the test sequences within SMTP Test Cases 1 through 8 are to determine if an Edge System (e.g., SUT), acting as the sender, can initiate and execute the correct sequence of SMTP protocols and commands to successfully establish a connection with a HISP (e.g., ETT), acting as the receiver.

All SMTP Test Cases 1 through 8 have the same general testing workflow and are required tests to maintain compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.1 and 1.2.2 of the 'Implementation Guide for Direct Edge Protocols' document.

The following table details the specific testing objectives and conformance test details for each Test Case. The tests correlate to Test IDs 1 through 8 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

***Note**: Within the ETT, SMTP Test Cases 1 through 8 have individual objectives and conformance test details, but retain same testing workflow. Thus, the ETT executes these as one single test.*

SMTP Test Case	Testing Objective / Conformance Test Detail

1	The SUT attempts to send the correct SMTP protocol command sequence to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the sent SMTP protocol command sequence, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 3.1 (Session Initiation) and 4.1.1.1 (Extended HELO or EHLO)
2	The SUT attempts to send a HELO / EHLO command sequence to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the HELO / EHLO command sequence, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 4.1.1.1 (Extended HELO or EHLO).
3	The SUT attempts to send the MAIL FROM, RCPT TO, and DATA command sequences to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the MAIL FROM, RCPT TO, and DATA command sequences, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 3.1 (Session Initiation).
4	The SUT attempts to send the MAIL command sequence to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the MAIL command sequence, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 4.1.1.2.
5	The SUT attempts to send the RCPT TO command sequence to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the RCPT TO command sequence, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 4.1.1.3.
6	The SUT attempts to send the DATA command sequence to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the DATA command sequence, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 2.3.7, 2.3.9, and 4.1.1.4.
7	The SUT attempts to send the correctly formatted Domain Name command sequence to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the correctly formatted Domain Name command sequence, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 2.3.5.

8	The SUT attempts to send the correctly configured and formatted Mailbox and Address to the ETT (target endpoint recipient wellformed1@hit-testing2.nist.gov). The ETT receives the correctly configured and formatted Mailbox and Address, performs validation, and initiates a successful connection to the SUT. The sequence of mail transaction connection commands will conform to the specified requirements within RFC 2821, Section 2.3.10 and 4.5.3.1.

3.3.1 TESTING STEPS

To execute SMTP Test Case 1 – 8 and assess the ability of the SUT to send a mail transaction to the ETT, the Tester must perform the following steps:

***Note**: Within the ETT User Interface (UI), SUT Sending SMTP Test Cases 1 through 8, 14, and 18 are condensed to a single executable test. Thus, the performed Testing Steps for these Test Cases will be consistent across the set. Reference the Section 3.1.1 Testing Steps for details on Test Case execution.*

3.4 SMTP MU2 Test Case 17

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender, can successfully generate and transmit a series of email messages containing unique message IDs to a HISP (e.g., ETT), acting as the receiver, and track the messages accurately.

The details for conformance testing flow are as follows: The SUT will create and accurately format a series of email messages. Each message will be sent to the target ETT endpoint recipient wellformed14@hit-testing2.nist.gov as a part of multiple sessions. The SUT will generate a unique ID for each message that is conformant to requirements within RFC 5322. The SUT will send the email messages to the ETT. The ETT will receive the messages and respond to the SUT with a processed MDN from the targeted email address (e.g., recipient). The Tester (e.g., Vendor) verifies that the SUT generated the email messages accurately, assigned each a unique ID (no duplicates), and a processed MDN was received per each message sent.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.5.1.2 of the 'Implementation Guide for Direct Edge Protocols' document.

This test correlates to Test ID 17 of the MU2 Tracking Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

3.4.1 TESTING STEPS

To execute SMTP MU2 (Message Tracking) Test Case 17 and assess the ability of the SUT to send a mail transaction to the ETT, the Tester (e.g., Vendor) must perform the following steps:

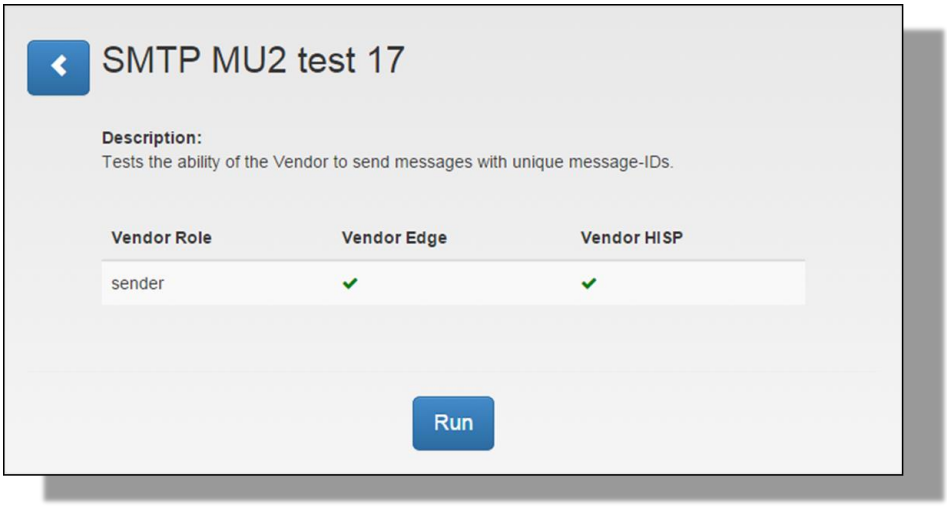
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP MU2 test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

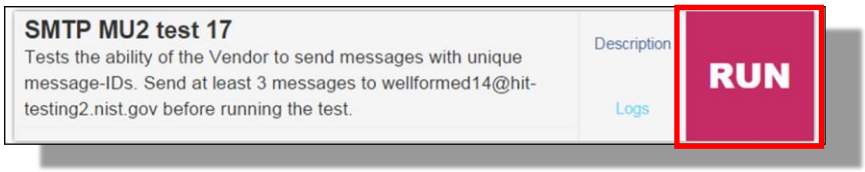
3. From the testing Profile, select '**Sender**'.

4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

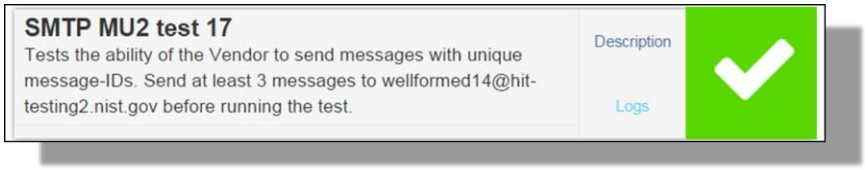
5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.

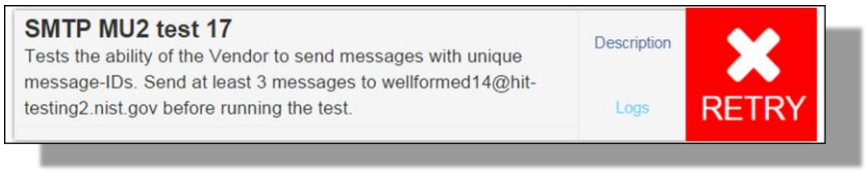


6. With the Profile saved, select the target Test Case (SMTP MU2 Test 17) from the available list, compose at least three emails from the '**SUT Email Address'** (specified in the Profile) to the ETT endpoint recipient at 'wellformed14@hit-testing2.nist.gov'. Once the emails have been successfully sent, click '**Run**' to execute the Test Case.



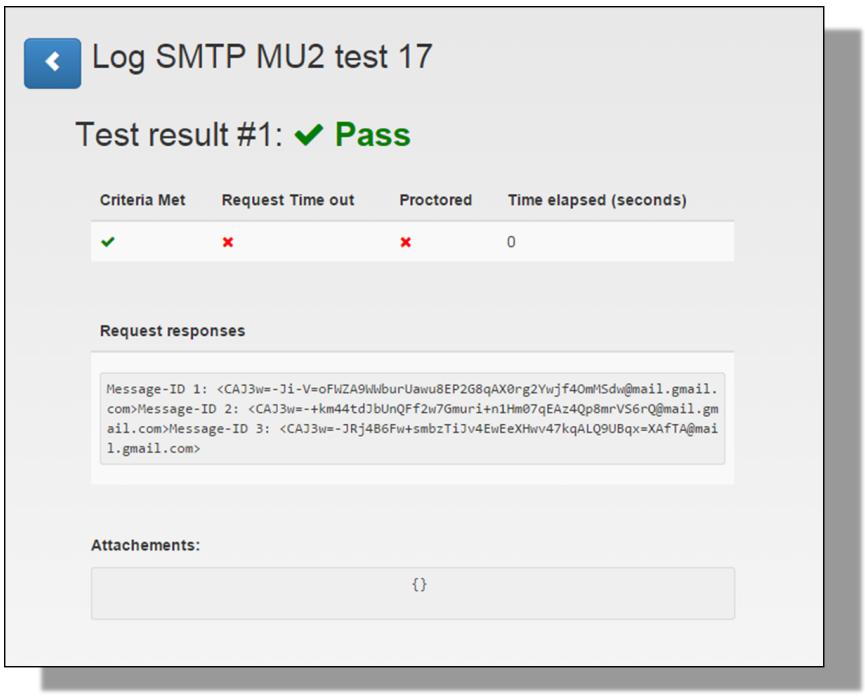
7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.





***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, the Tester (e.g., Vendor) can validate the test results conformed to the testing objective and gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP MU2 Test Cases 17, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

3.5 SMTP MU2 Test Case 45

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender, can successfully generate and transmit a series of XDR messages to a HISP (e.g., ETT), acting as the receiver, and track the messages accurately.

The details for conformance testing flow are as follows: The SUT will create and accurately format a series of XDR messages. Each message will be sent to the target ETT endpoint recipient wellformed14@hit-testing2.nist.gov as a part of multiple sessions. The SUT will generate a unique ID for each message that is conformant to requirements within RFC 5322. The SUT will send the XDR messages to the ETT. The ETT will receive the messages and respond to the SUT with a success notification from the targeted email address (e.g., recipient) that conforms to the stated requirements within the 'Implementation Guide for Delivery Notifications' document. The Tester (e.g., Vendor) verifies that the SUT generated the XDR messages accurately, assigned each a unique ID (no duplicates), and a conformant response message was received per each message sent.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message

exchanges. See Section 1.5.1.2 of the 'Implementation Guide for Direct Edge Protocols' document.

This test correlates to Test ID 45 of the MU2 Tracking Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

3.5.1 TESTING STEPS

To execute SMTP MU2 (Message Tracking) Test Case 45 and assess the ability of the SUT to send a mail transaction to the ETT, the Tester (e.g., Vendor) must perform the following steps:

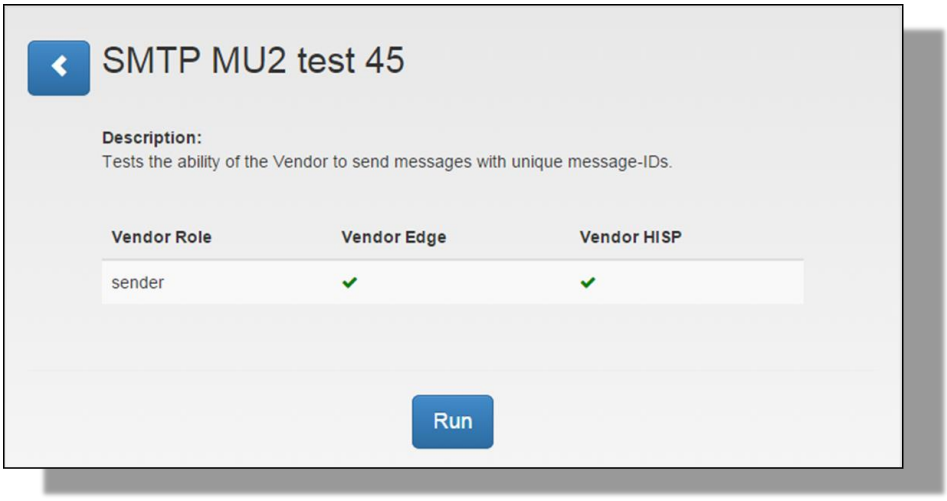
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP MU2 test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

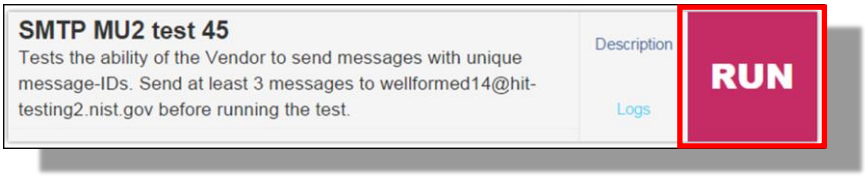
3. From the testing Profile, select '**Sender**'.

4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

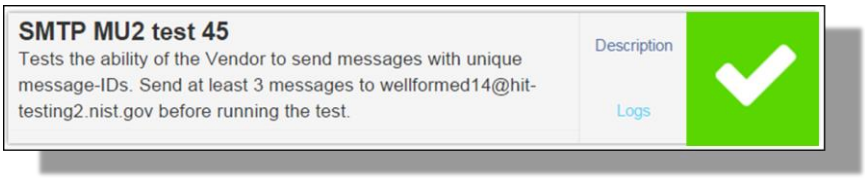
5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.

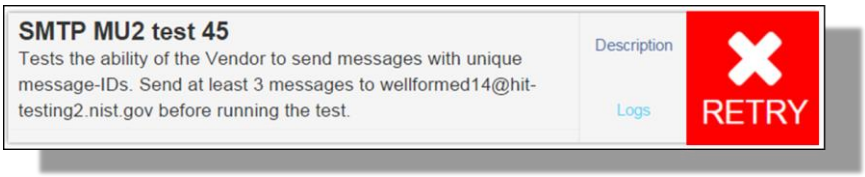


6. With the Profile saved, select the target Test Case (SMTP MU2 Test 45) from the available list, next:
   A) Compose at least three emails from the '**SUT Email Address'** (specified in the Profile) to the ETT endpoint recipient at 'wellformed14@hit-testing2.nist.gov'; and
   B) Once the emails have been successfully sent, click '**Run**' to execute the Test Case.



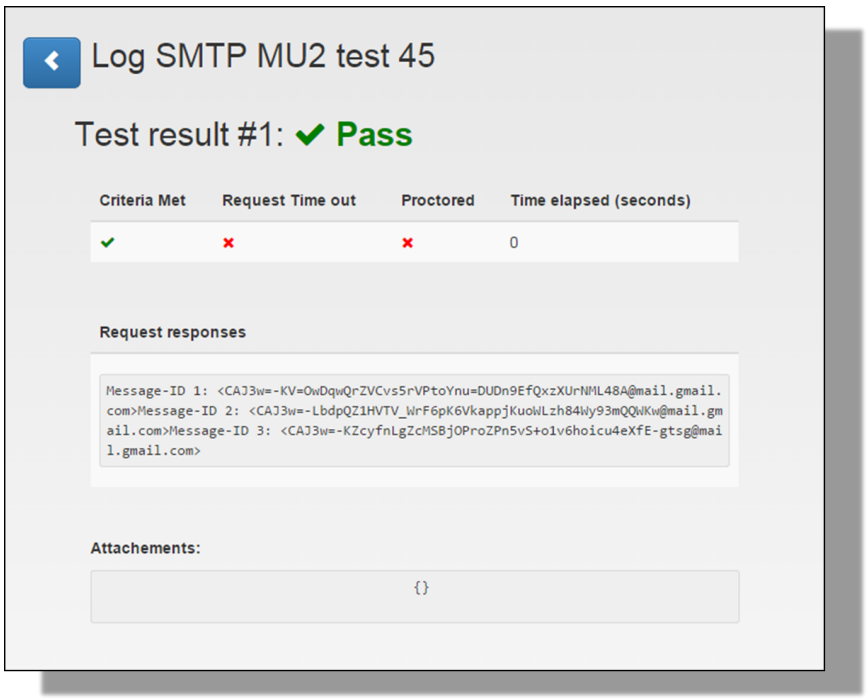
7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.





***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, the Tester (e.g., Vendor) can validate the test results conformed to the testing objective and gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP MU2 Test Cases 45, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

3.6 SMTP MU2 Test Case 46

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender, can successfully generate and transmit an XDR message to a HISP (e.g., ETT), acting as the receiver, with accurately formed header information.

The details for conformance testing flow are as follows: The SUT will create and accurately format an XDR message. The message will be sent to the target ETT endpoint recipient wellformed14@hit-testing2.nist.gov. For the message, the SUT will generate an accurately formed Disposition-Notification-Option header in conformance with the specified requirements within Section 1.3 of the 'Implementation Guide for Delivery Notifications' document. The SUT will send the XDR message to the ETT. The ETT will receive the message and respond to the SUT with a success notification from the targeted email address (e.g., recipient) that conforms to the stated requirements within the 'Implementation Guide for Delivery Notifications' document. The Tester (e.g., Vendor) verifies that the SUT generated the XDR message accurately, formed Disposition-Notification-Option header correctly, and a conformant response message was received.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.5.1.2 of the 'Implementation Guide for Direct Edge Protocols' document.

This test correlates to Test ID 46 of the MU2 Tracking Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

3.6.1 TESTING STEPS

To execute SMTP MU2 (Message Tracking) Test Case 46 and assess the ability of the SUT to send a mail transaction to the ETT, the Tester (e.g., Vendor) must perform the following steps:

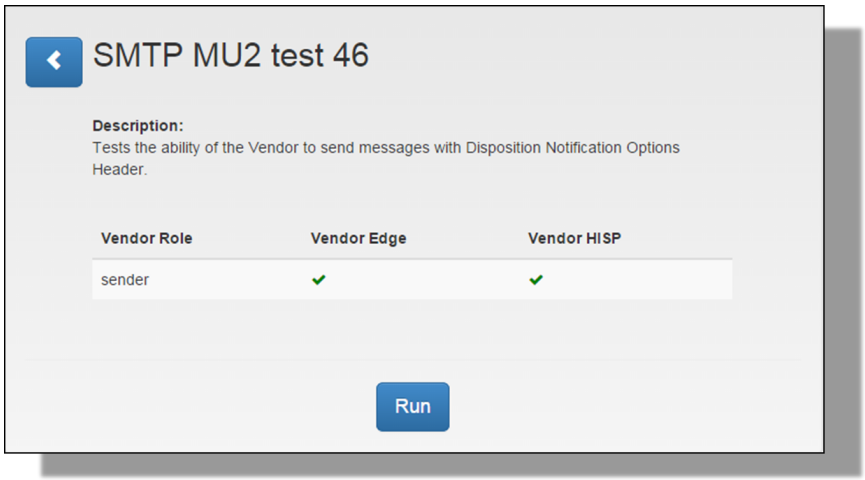
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP MU2 test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

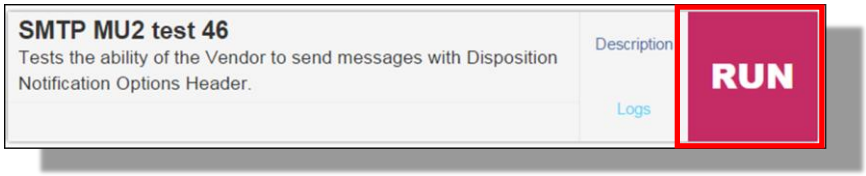
3. From the testing Profile, select '**Sender**'.

4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

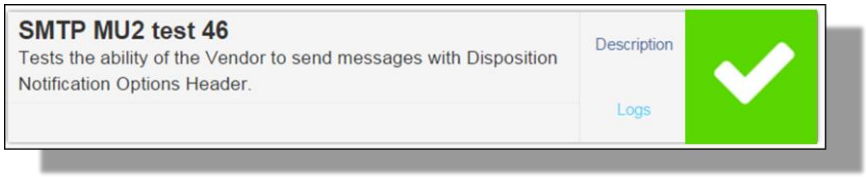
5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.

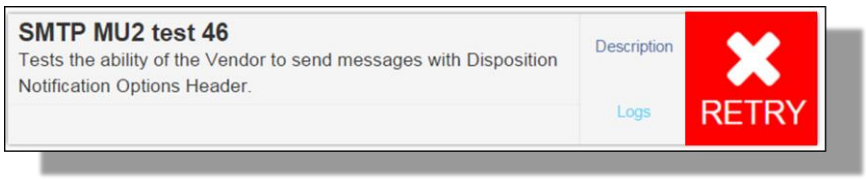


6. With the Profile saved, select the target Test Case (SMTP MU2 Test 46) from the available list, next:
   A) Compose an email from the '**SUT Email Address'** (specified in the Profile) to the ETT endpoint recipient at 'wellformed14@hit-testing2.nist.gov'; and
   B) Once the email has been successfully sent, click '**Run**' to execute the Test Case.



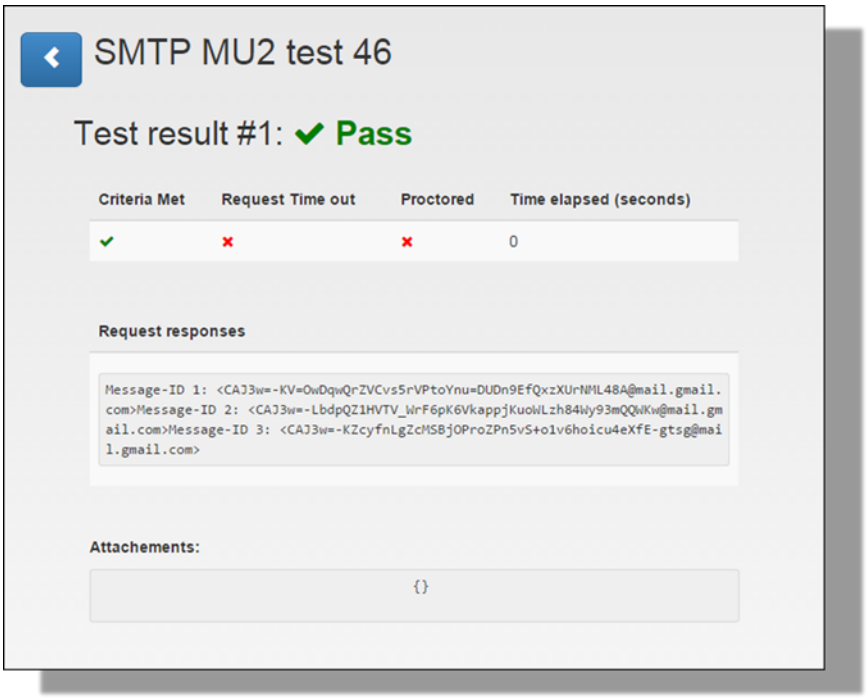
7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.





***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, the Tester (e.g., Vendor) can validate the test results conformed to the testing objective and gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP MU2 Test Cases 46, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

4.0 SUT RECEIVING

Within the following Test Cases, tests are executed from the following actor perspective:

Test Actor	Testing Role
SUT	Receives test message and validates alignment with Testing Procedures and Conformance Test Details
ETT	Sends test message in alignment with Testing Procedures and Conformance Test Details

4.1 SMTP Test Case 16

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, will accept the syntax and request for TLS session initiation by a HISP (e.g., ETT), acting as the sender.

The details for conformance testing flow are as follows: The ETT will form the correct syntax and send a valid STARTTLS command to the SUT. The SUT will accept the TLS connection request, and open a secure channel. The ETT will send a valid STARTTLS command and the SUT will send a valid response in conformance with specified requirements within RFC 2487, Section 5.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.3 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 16 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.1.1 TESTING STEPS

To execute SMTP Test Case 16 and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester must perform the following steps:

***Note**: Within the ETT User Interface (UI), SUT Receiving SMTP Test Cases 9, 16, and 20 are condensed to a single executable test. Thus, the performed Testing Steps for these Test Cases will be consistent across the set.*

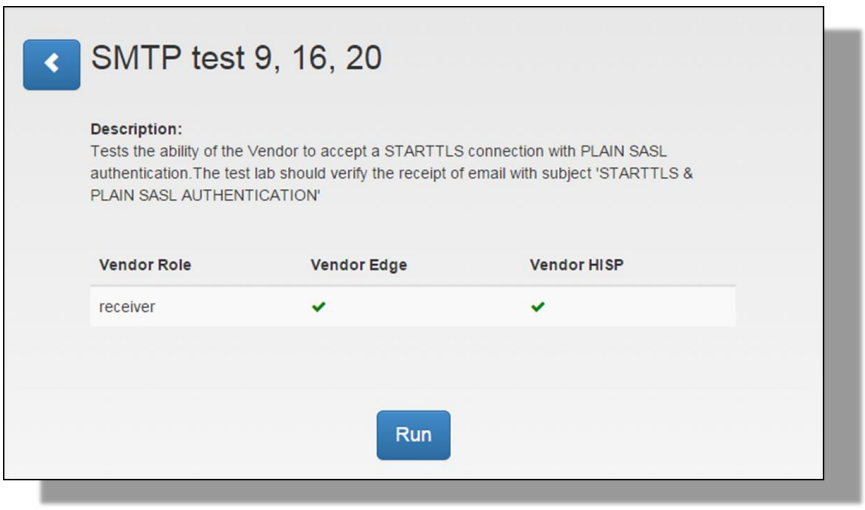
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

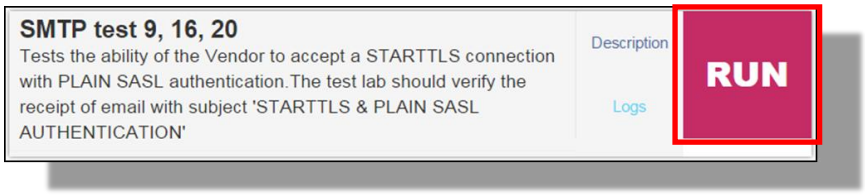
3. From the testing Profile, select '**Receiver**'.

4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.



6. With the Profile saved and all fields accurately populated, select the target Test Case (SMTP Test 9, 16, 20) from the available list and click '**Run**'.



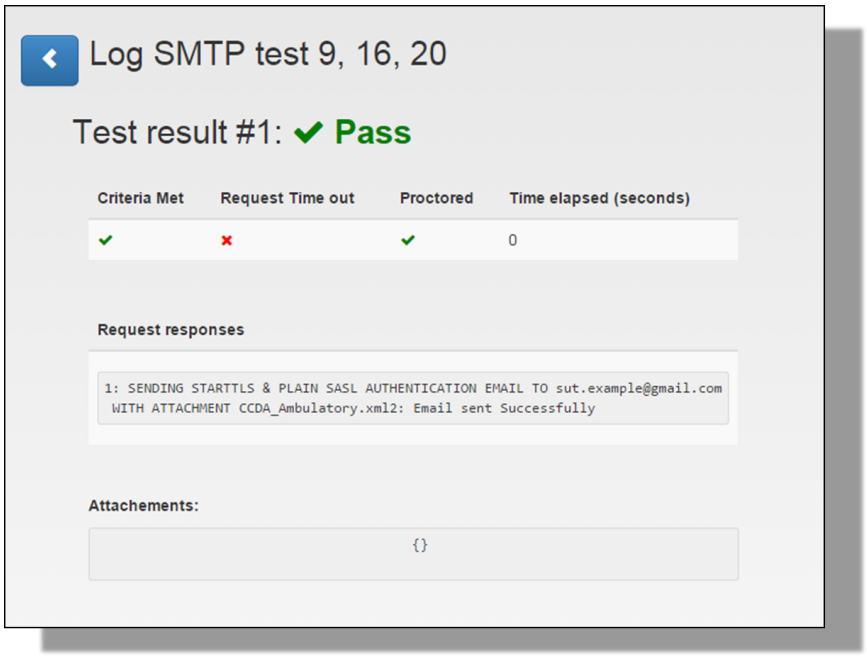
7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.

***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, validate the test results conformed to the testing objective by navigating to the email client given for the SUT ('**SUT Email Address'**) in Step 3 of Section 2.3 Profile Creation within this ETT User Guide. If Successful, an email should be present with an attachment from the ETT sending endpoint 'wellformed@hit-testing2.nist.gov'. The attachment contains information concerning the test.

***Note**: If no email is present, please consult the 'Help' button located on tool's Navigation Bar.*

9. The Tester (e.g., Vendor) can gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP Test Case 9, 16, 20, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

4.2 SMTP Test Case 17

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, will reject a request for TLS connection by a HISP (e.g., ETT), acting as the sender.

The details for conformance testing flow are as follows: The ETT will form the correct syntax and send an invalid STARTTLS command to the SUT. The SUT will acknowledge the request and reject the TLS connection and secure channel opening attempt.

This is a conditional test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.3 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 17 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.2.1 TESTING STEPS

To execute SMTP Test Case 17 and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester must perform the following steps:

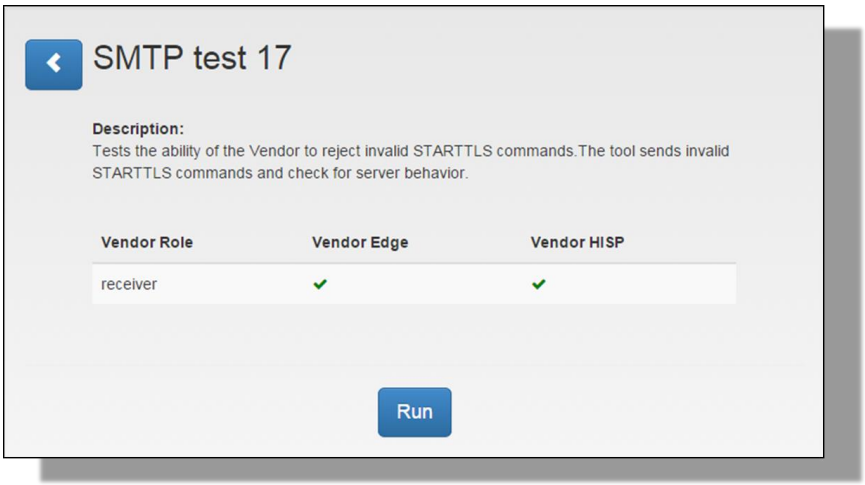
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

3. From the testing Profile, select '**Receiver**'.

4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.



6. With the Profile saved and all fields accurately populated, select target Test Case (SMTP Test 17) from the available list and click '**Run**'.

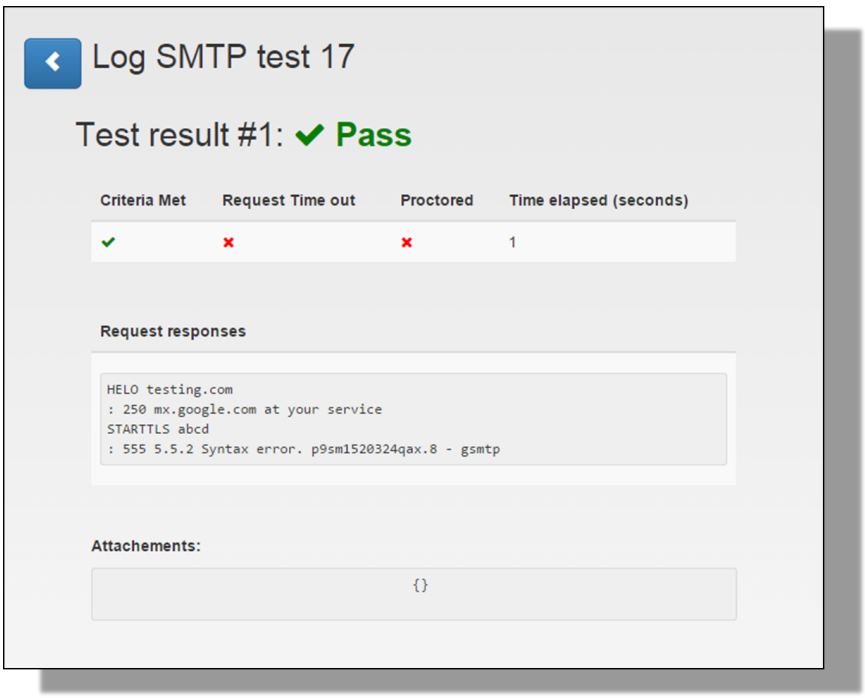
7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.

***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, validate the test results conformed to the testing objective by navigating to the email client given for the SUT ('**SUT Email Address'**) in Step 3 of Section 2.3 Profile Creation within this ETT User Guide. If Successful, an email should be present with an attachment from the ETT sending endpoint 'wellformed@hit-testing2.nist.gov'. The attachment contains information concerning the test.

***Note**: If no email is present, please consult the 'Help' button located on tool's Navigation Bar.*

9. The Tester can gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP Test Case 17, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

4.3 SMTP Test Case 20

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, will accept and authenticate a PLAIN SASL request sent from a HISP (e.g., ETT), acting as the sender.

The details for conformance testing flow are as follows: The ETT will send a predetermined PLAIN SASL username/password authentication scheme to the SUT. The SUT will receive the PLAIN SASL username/password, accept the credentials, and established authentication to the ETT. The PLAIN SASL connection mechanisms will remain in conformance of the specified requirements within RFC 4616, Section 2.

This is a conditional test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.4 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 20 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.3.1 TESTING STEPS

To execute SMTP Test Case 20 and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester must perform the following steps:

***Note**: Within the ETT User Interface (UI), SUT Receiving SMTP Test Cases 9, 16, and 20 are condensed to a single executable test. Thus, the performed Testing Steps for these Test Cases will be consistent across the set. Reference the Section 4.1.1 Testing Steps for details on Test Case execution.*

4.4 SMTP Test Case 22

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, will reject and fail to authenticate an invalid PLAIN SASL request sent from a HISP (e.g., ETT), acting as the sender.

The details for conformance testing flow are as follows: The ETT will send an invalid PLAIN SASL username/password authentication scheme to the SUT. The SUT will receive the invalid PLAIN SASL username/password, reject the credentials, and fail to established authentication to the ETT. The PLAIN SASL connection mechanisms will conform to the specified requirements within RFC 4616, Section 2.

This is a conditional test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.4 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 22 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.4.1 TESTING STEPS

To execute SMTP Test Case 22 and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester must perform the following steps:

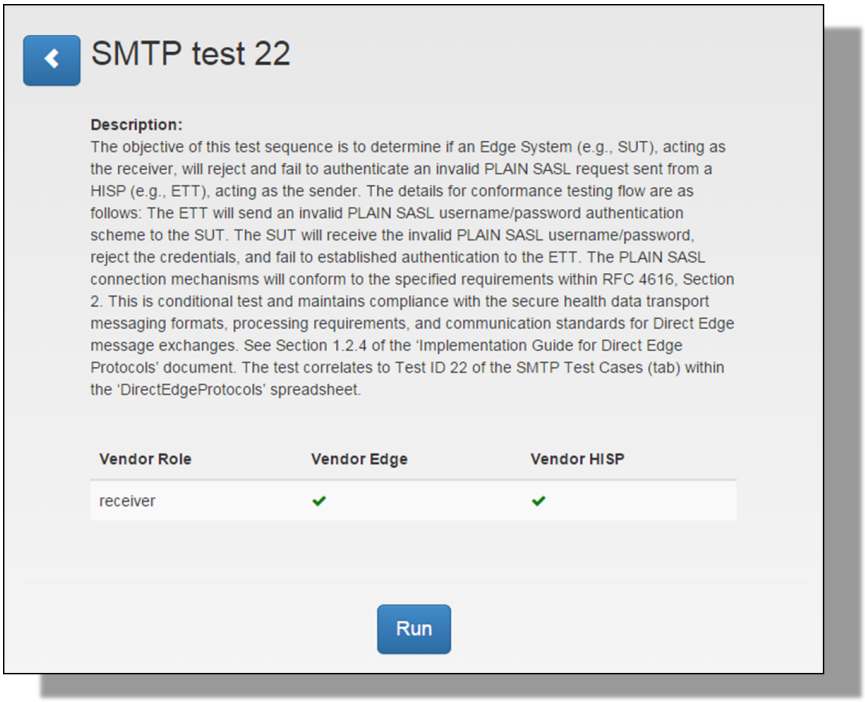
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

3. From the testing Profile, select '**Receiver**'.

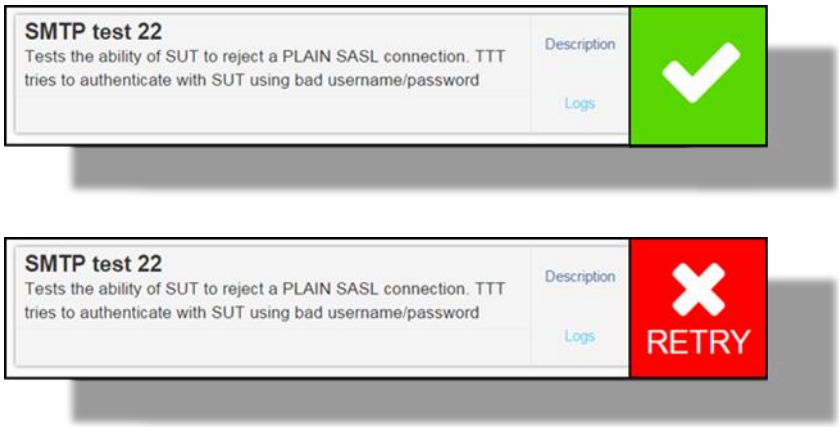
4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.



6. With the Profile saved and all fields accurately populated, select target Test Case (SMTP Test 22) from the available list and click '**Run**'.

7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.

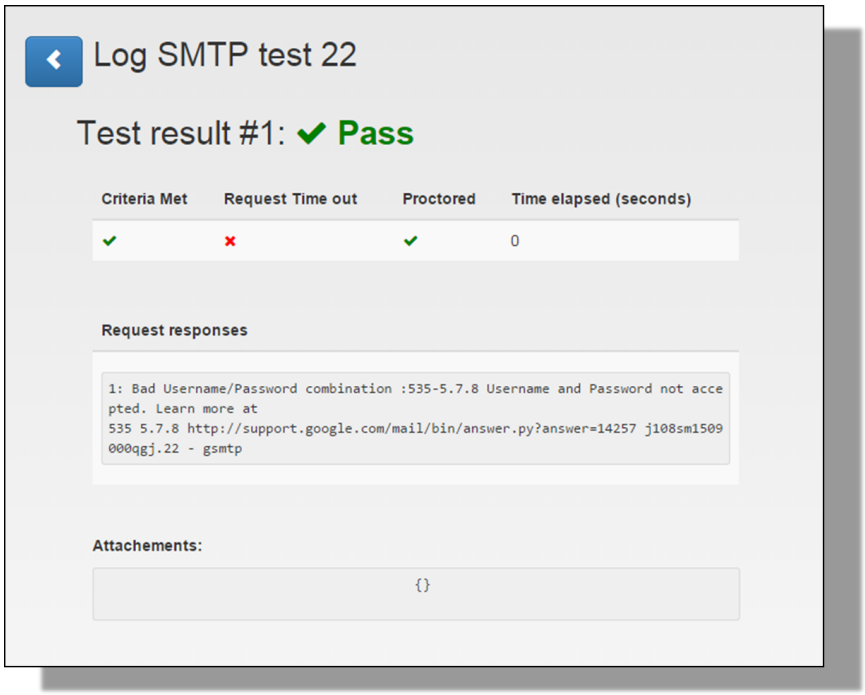


***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, validate the test results conformed to the testing objective by navigating to the email client given for the SUT ('**SUT Email Address'**) in Step 3 of Section 2.3 Profile Creation within this ETT User Guide. If Successful, an email should be present with an attachment from the ETT sending endpoint 'wellformed@hit-testing2.nist.gov'. The attachment contains information concerning the test.

***Note**: If no email is present, please consult the 'Help' button located on tool's Navigation Bar.*

9. The Tester can gain additional information concerning the results and/or outcome of particular target test case by clicking the '**Log**' link. For SMTP Test Case 22, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

4.5 SMTP Test Case 9

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, accepts and validates the commands sent from a HISP (e.g., ETT), acting as the sender, and successfully establishes an endpoint-to-endpoint connection between the two.

The details for conformance testing flow are as follows: The ETT attempts to send a valid Simple Mail Transfer Protocol (SMTP) command to the SUT to initiate a session. This is conducted in accordance with RFC 2821, Section 4.1.1 (ensure support for HELO/EHLO, MAIL FROM, RCPT TO, DATA, RESET, QUIT, NOOP, VRFY).

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.1 and 1.2.2 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 9 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.5.1 TESTING STEPS

To execute this test and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester (e.g., Vendor) must perform the following steps:

***Note**: Within the ETT User Interface (UI), SUT Receiving SMTP Test Cases 9, 16, and 20 are condensed to a single executable test. Thus, the performed Testing Steps for these Test Cases will be consistent across the set. Reference the Section 4.1.1 Testing Steps for details on Test Case execution.*

4.6 SMTP Test Case 10

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, rejects data sent from a HISP (e.g., ETT), acting as the sender, as a component of a successfully established and active session. Successful establishment of an end-point to end-point connection between the SUT and ETT is a necessary function for SMTP Test Case 10 execution.

The details for conformance testing flow are as follows: The ETT will initiate a connected session with the SUT and attempt to send an invalid data via the DATA command (e.g., bad line feeds).

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.1 and 1.2.2 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 10 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.6.1 TESTING STEPS

To execute SMTP Test Case 10 and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester must perform the following steps:

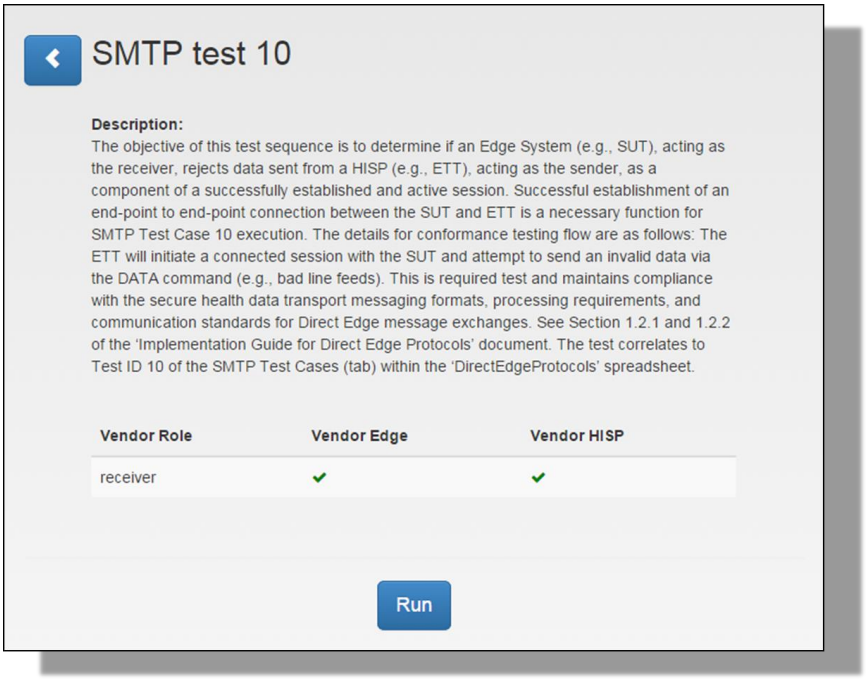
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

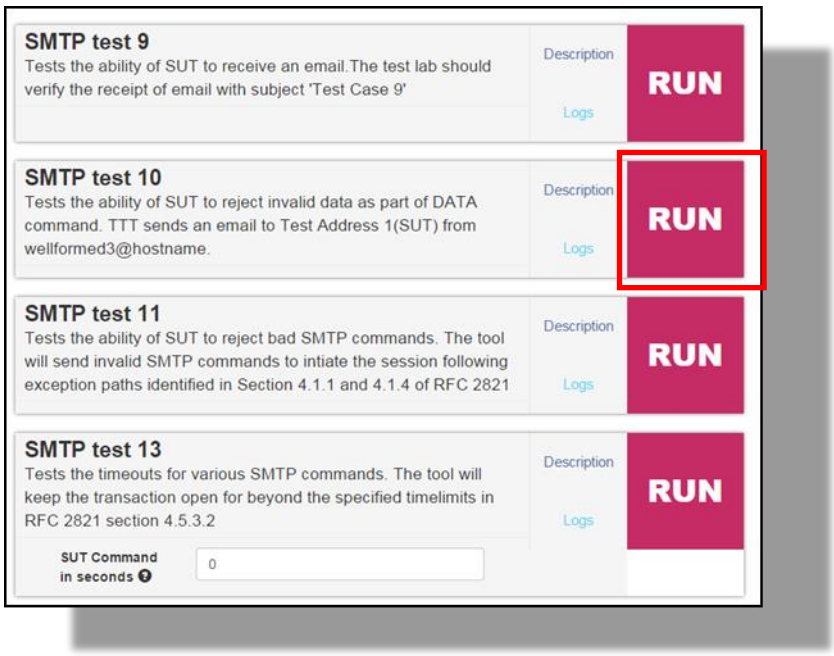
3. From the testing Profile, select '**Receiver**'.

4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.



6. With the Profile saved and all fields accurately populated, select target Test Case (SMTP Test 10) from the available list and click '**Run**'.



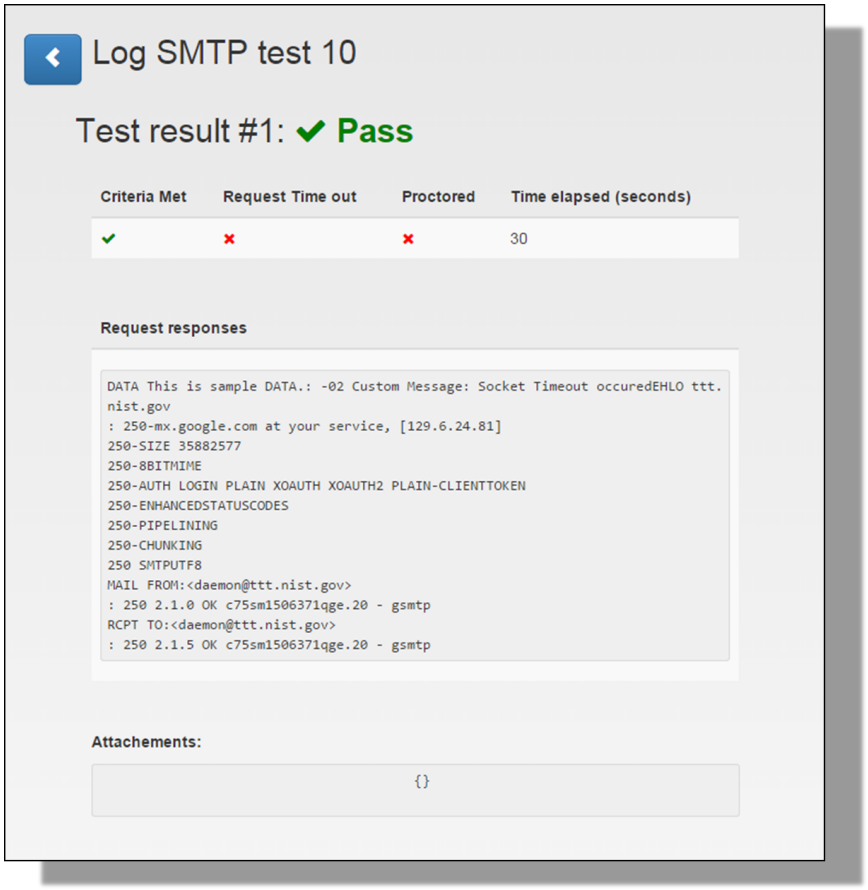
7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.

***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, validate the test results conformed to the testing objective by navigating to the email client given for the SUT ('**SUT Email Address'**) in Step 3 of Section 2.3 Profile Creation within this ETT User Guide. If Successful, an email should be present with an attachment from the ETT sending endpoint 'wellformed@hit-testing2.nist.gov'. The attachment contains information concerning the test.

***Note**: If no email is present, please consult the 'Help' button located on tool's Navigation Bar.*

9. The Tester can gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP Test Case 10, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

4.7 SMTP Test Case 11

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, rejects as invalid the commands sent from a HISP (e.g., ETT), acting as the sender.

The details for conformance testing flow are as follows: The ETT attempts to initiate a session with the SUT by sending an invalid SMTP command following identified exception paths. The test attempts to determine if the SUT rejects the command sent by the Edge Testing Tool as invalid and responds using the appropriate mechanisms. This is conducted in accordance with RFC 2821, Section 4.1.1 and 4.1.4 (e.g., closing the session abruptly).

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.1 and 1.2.2 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 11 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.7.1 TESTING STEPS

To execute this test and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester must perform the following steps:

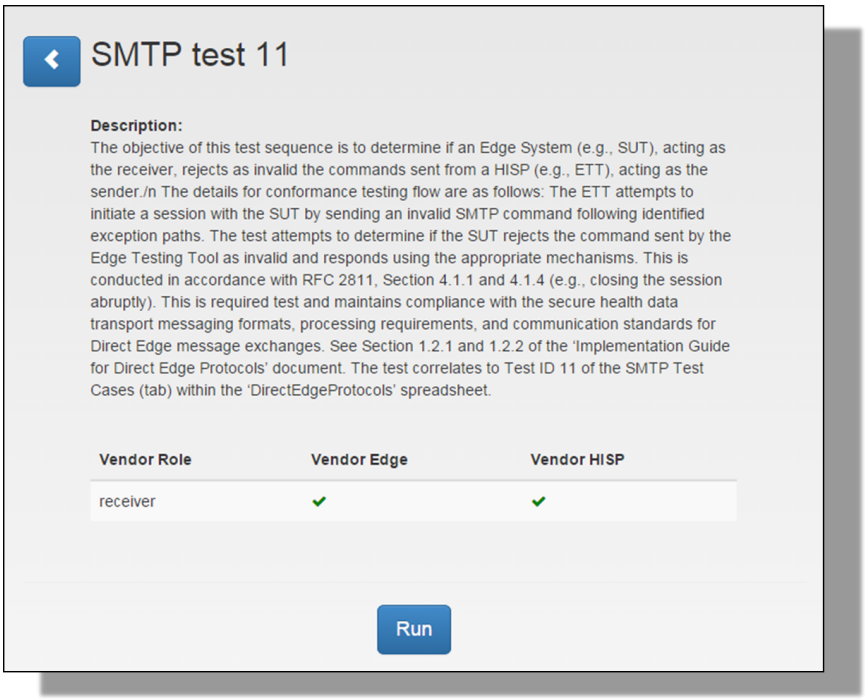
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

3. From the testing Profile, select '**Receiver**'.

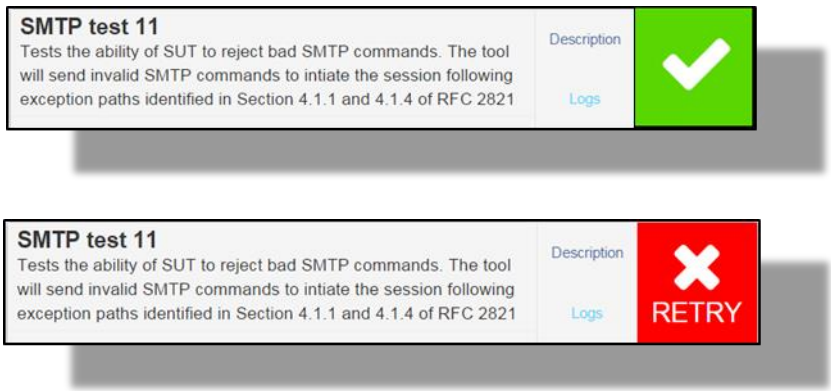
4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.



6. With the Profile saved and all fields accurately populated, select target Test Case (SMTP Test 11) from the available list and click '**Run**'.

7. The test will process and render one of two results: Success or Fail. If the test is Successful, green box with a 'check' will appear. If the test is Failed, a red box with an 'x' will appear and prompt a Retry.

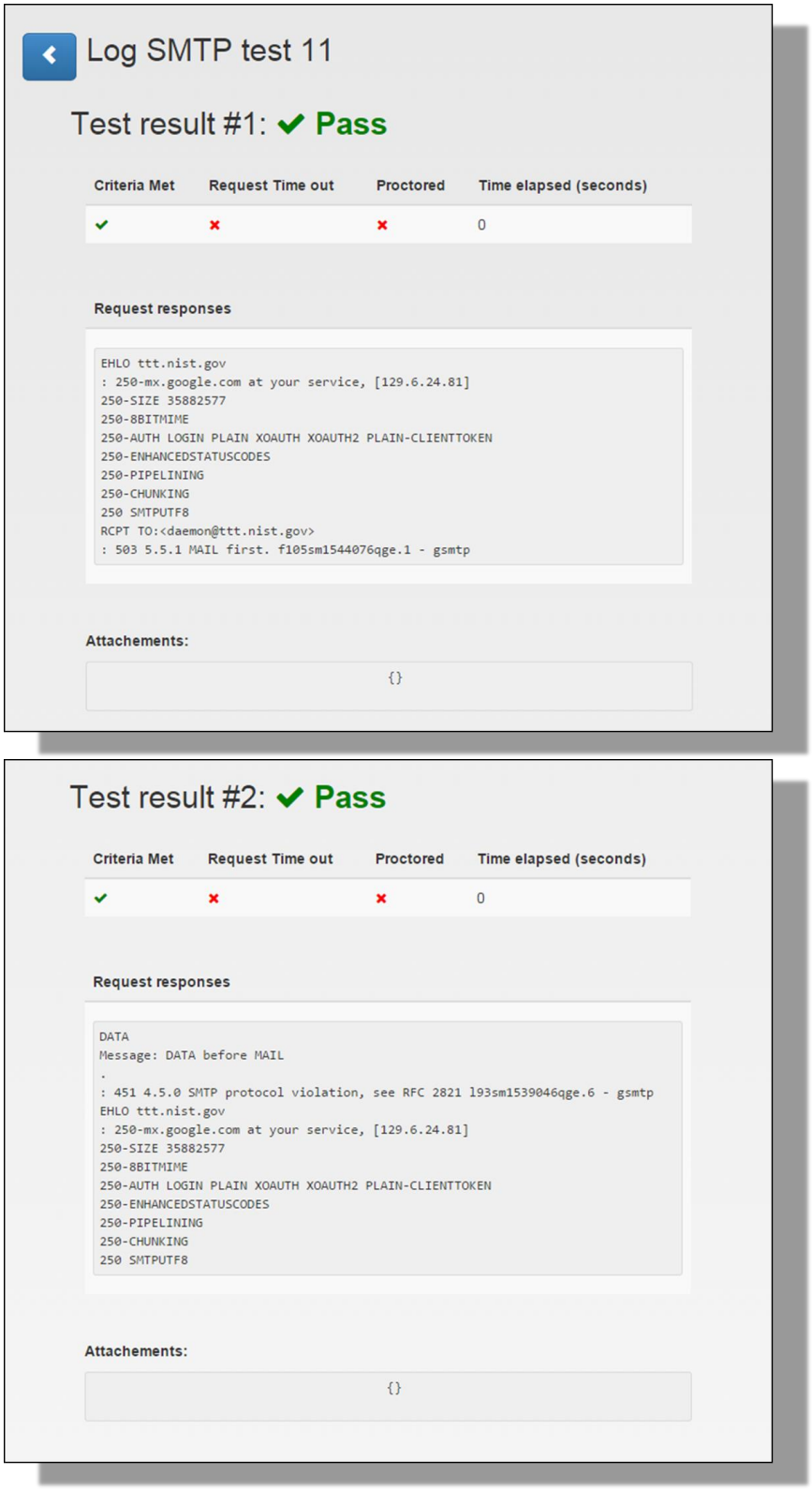


***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, validate the test results conformed to the testing objective by navigating to the email client given for the SUT ('**SUT Email Address'**) in Step 3 of Section 2.3 Profile Creation within this ETT User Guide. If Successful, an email should be present with an attachment from the ETT sending endpoint 'wellformed@hit-testing2.nist.gov'. The attachment contains information concerning the test.

***Note**: If no email is present, please consult the 'Help' button located on tool's Navigation Bar.*

9. The Tester can gain additional information concerning a target test case by clicking the '**Log**' link for a particular Test Case. For SMTP Test Case 11, the testing outcomes can be reviewed by analyzing, both for Test 1 and 2, the '**Test Result**', '**Request Response**', and '**Attachments**').



Log SMTP test 11

Test result #1: ✔ Pass

Criteria Met	Request Time out	Proctored	Time elapsed (seconds)
✔	✖	✖	0

Request responses

```
EHLO ttt.nist.gov
: 250-mx.google.com at your service, [129.6.24.81]
250-SIZE 35882577
250-8BITMIME
250-AUTH LOGIN PLAIN XOAUTH XOAUTH2 PLAIN-CLIENTTOKEN
250-ENHANCEDSTATUSCODES
250-PIPELINING
250-CHUNKING
250 SMTPUTF8
RCPT TO:<daemon@ttt.nist.gov>
: 503 5.5.1 MAIL first. f105sm1544076qge.1 - gsmtp
```

Attachements:

```
{}
```

Test result #2: ✔ Pass

Criteria Met	Request Time out	Proctored	Time elapsed (seconds)
✔	✖	✖	0

Request responses

```
DATA
Message: DATA before MAIL
.
: 451 4.5.0 SMTP protocol violation, see RFC 2821 l93sm1539046qge.6 - gsmtp
EHLO ttt.nist.gov
: 250-mx.google.com at your service, [129.6.24.81]
250-SIZE 35882577
250-8BITMIME
250-AUTH LOGIN PLAIN XOAUTH XOAUTH2 PLAIN-CLIENTTOKEN
250-ENHANCEDSTATUSCODES
250-PIPELINING
250-CHUNKING
250 SMTPUTF8
```

Attachements:

```
{}
```

***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

4.8 SMTP Test Case 13

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, can successfully establish an active session with a HISP (e.g., ETT), acting as the sender, and conform to the specific timeout requirements within the RFC and SMTP command.

The details for conformance testing flow are as follows: The ETT will initiate a connected session with the SUT. The SUT will attempt to keep a transaction open with the ETT for beyond the specified time constraints found within RFC 2821, Section 4.5.3.2.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.2.1 and 1.2.2 of the 'Implementation Guide for Direct Edge Protocols' document.

The test correlates to Test ID 13 of the SMTP Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

4.8.1 Testing Steps

To execute SMTP Test Case 13 and assess the ability of the SUT to receive a mail transaction from the sending ETT, the Tester must perform the following steps:

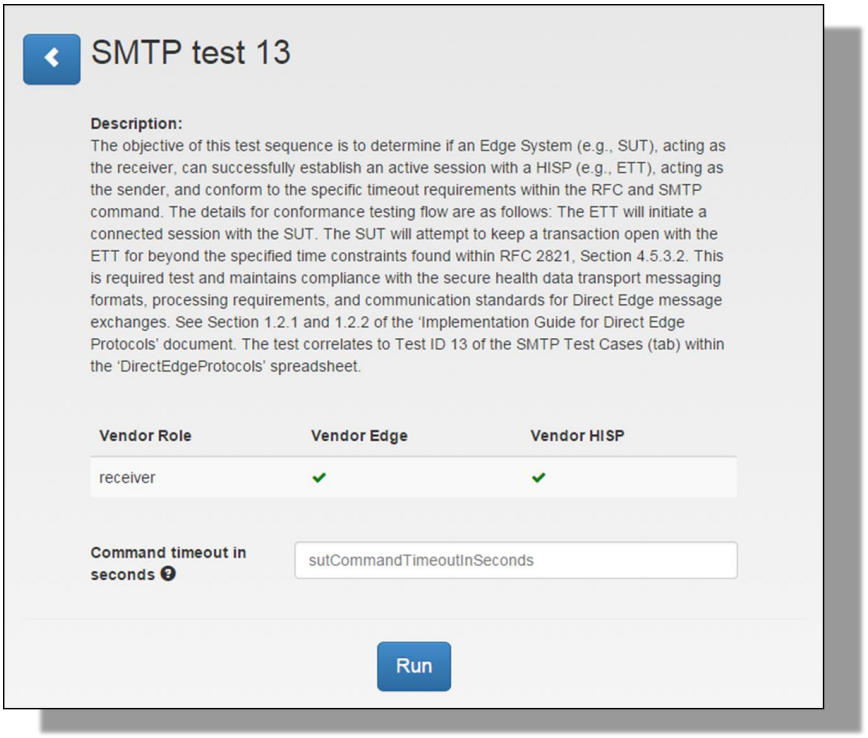
1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target SMTP test, select '**SMTP Test Cases'** from the Navigation Bar. This enables the testing Profile feature of the tool.

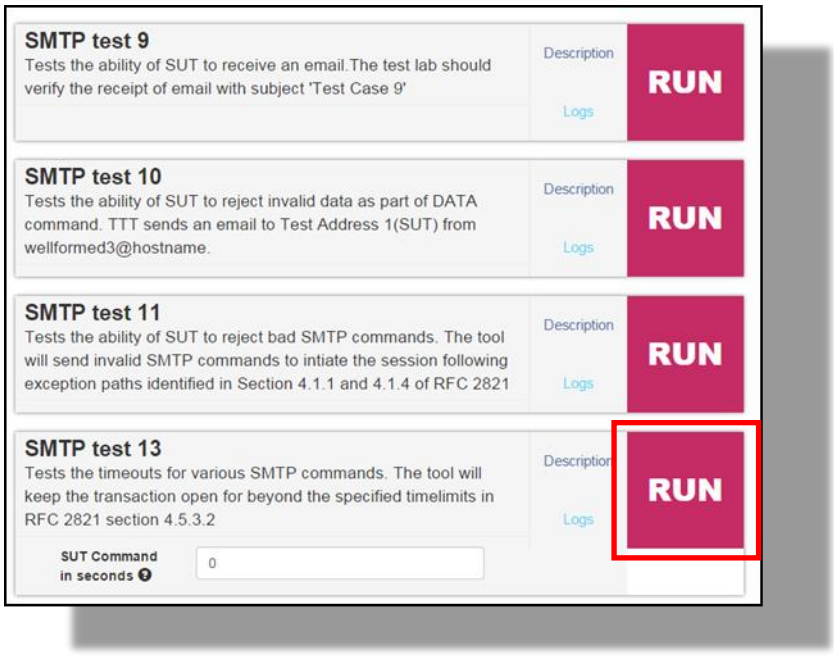
3. From the testing Profile, select '**Receiver**'.

4. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 5 within 2.3 Profile Creation.

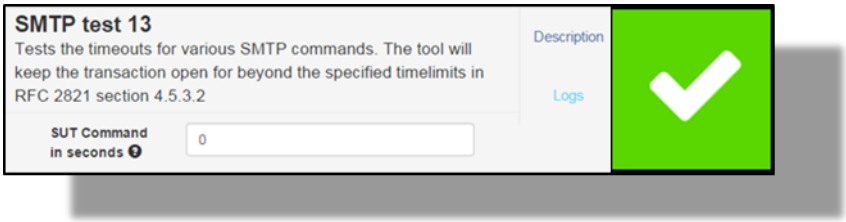
5. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, click the '**Description**' link for the Test Case.

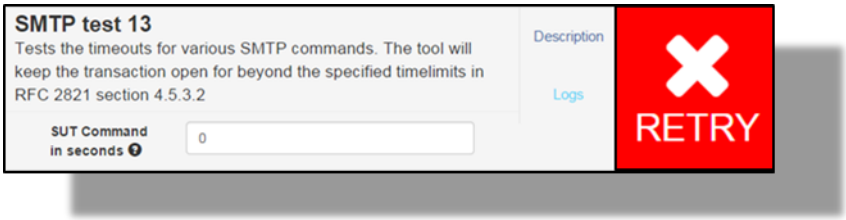


6. With the Profile saved and all fields accurately populated, select target Test Case (SMTP Test 13) from the available list and click '**Run**'.



7. The test will process and render one of two results: Success or Fail. If the test is Successful, a green box with a 'check' will appear. If the test is Failed, a red box with an 'X' will appear and prompt a Retry.



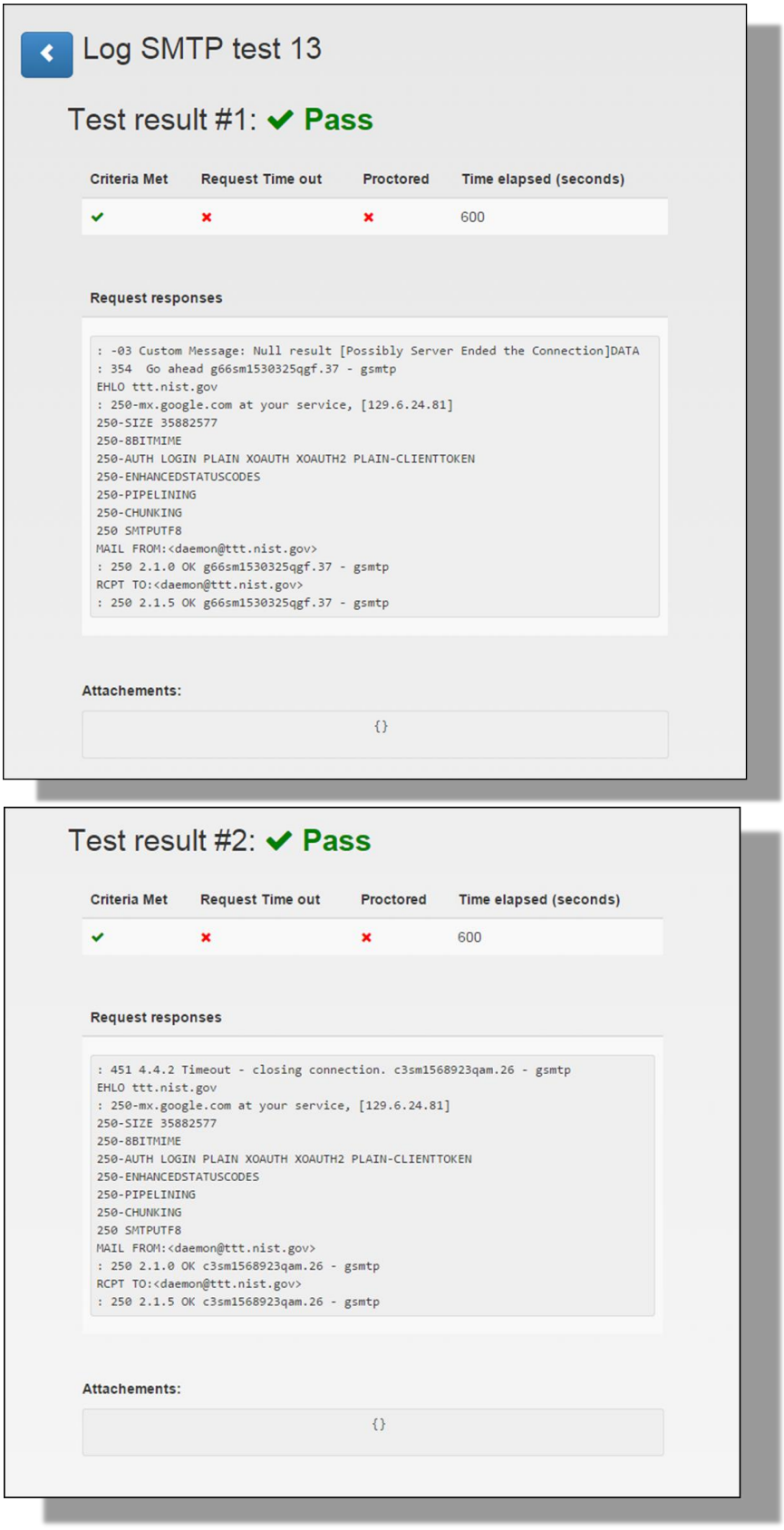


***Note**: For test Failures, Reference Section 2.0 Testing Configuration for Edge System and 2.3 Profile Creation of this ETT User Guide assure that the accurate configurations have been applied.*

8. Upon test Success, validate the test results conformed to the testing objective by navigating to the email client given for the SUT ('**SUT Email Address'**) in Step 3 of Section 2.3 Profile Creation within this ETT User Guide. If Successful, an email should be present with an attachment from the ETT sending endpoint 'wellformed@hit-testing2.nist.gov'. The attachment contains information concerning the test.

***Note**: If no email is present, please consult the 'Help' button located on tool's Navigation Bar.*

9. The Tester can gain additional information concerning the results and/or outcome of particular target Test Case by clicking the '**Log**' link. For SMTP Test Case 13, the testing outcomes can be reviewed by analyzing the '**Test Result**', '**Request Response**', and '**Attachments**'.



Log SMTP test 13

Test result #1: ✔ Pass

Criteria Met	Request Time out	Proctored	Time elapsed (seconds)
✔	✖	✖	600

Request responses

```
: -03 Custom Message: Null result [Possibly Server Ended the Connection]DATA
: 354  Go ahead g66sm1530325qgf.37 - gsmtp
EHLO ttt.nist.gov
: 250-mx.google.com at your service, [129.6.24.81]
250-SIZE 35882577
250-8BITMIME
250-AUTH LOGIN PLAIN XOAUTH XOAUTH2 PLAIN-CLIENTTOKEN
250-ENHANCEDSTATUSCODES
250-PIPELINING
250-CHUNKING
250 SMTPUTF8
MAIL FROM:<daemon@ttt.nist.gov>
: 250 2.1.0 OK g66sm1530325qgf.37 - gsmtp
RCPT TO:<daemon@ttt.nist.gov>
: 250 2.1.5 OK g66sm1530325qgf.37 - gsmtp
```

Attachements:

```
{}
```

Test result #2: ✔ Pass

Criteria Met	Request Time out	Proctored	Time elapsed (seconds)
✔	✖	✖	600

Request responses

```
: 451 4.4.2 Timeout - closing connection. c3sm1568923qam.26 - gsmtp
EHLO ttt.nist.gov
: 250-mx.google.com at your service, [129.6.24.81]
250-SIZE 35882577
250-8BITMIME
250-AUTH LOGIN PLAIN XOAUTH XOAUTH2 PLAIN-CLIENTTOKEN
250-ENHANCEDSTATUSCODES
250-PIPELINING
250-CHUNKING
250 SMTPUTF8
MAIL FROM:<daemon@ttt.nist.gov>
: 250 2.1.0 OK c3sm1568923qam.26 - gsmtp
RCPT TO:<daemon@ttt.nist.gov>
: 250 2.1.5 OK c3sm1568923qam.26 - gsmtp
```

Attachements:

```
{}
```

***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

5.0 XDR SENDING

Within the following Test Cases, tests are executed from the following actor perspective:

Test Actor	Testing Role
SUT	Sends test message in alignment with Testing Procedures and Conformance Test Details
ETT	Receives test message and validates alignment with Testing Procedures and Conformance Test Details

5.1 XDR Test Case 6

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender (client), can establish a mutual TLS connection with a HISP (e.g., ETT), acting as the receiver (server), and successfully authenticate.

The details for conformance testing flow are as follows: The SUT sends a request to the ETT to establish a TLS connection. The ETT receives the request and responds to the SUT by sending a valid and properly configured server certificate. The SUT receives the server certificate, validates the certificate, and proceeds to send the client certificate to the ETT. The ETT receives the client certificate, validates the certificate, and establishes a mutual TLS session with the SUT. The Tester (e.g., Vendor) verifies the existence, accurate configuration, and authentication success of a mutual TLS connection between a SUT and the ETT.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

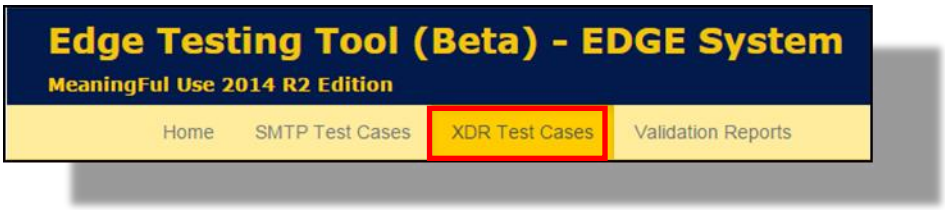
This test correlates to Test ID 6 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

5.1.1 TESTING STEPS

To execute XDR Test Case 6 and assess the SUT's ability to establish a mutual TLS session with the ETT before transmitting data, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

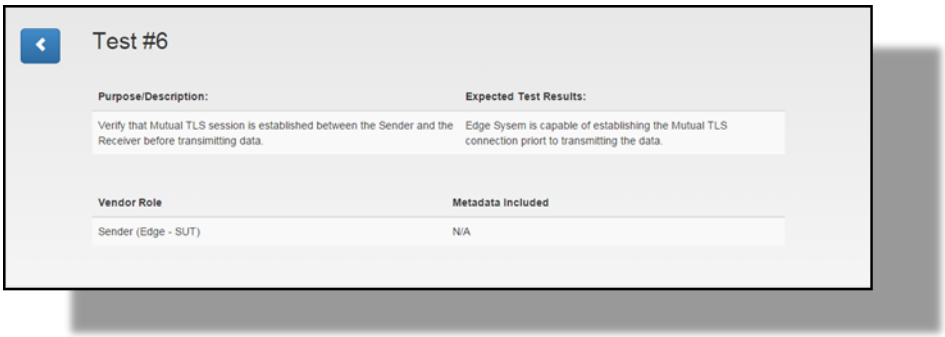
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



3. From the testing options available, select '**Sender**'. This will enable Test Case selection.

***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.



5. To initiate the target Test Case (XDR Test 6), click '**Run**'. This generates a '**TLS Endpoint**'.

1.

***Note**: Instructions are labeled in sequential order (e.g., '**Step 1**', '**Step 2**', '**Step 3**') in the content description of the Test Case. The '**TLS Endpoint'** is uniquely generated and specific to the target Test Case and Tester (e.g., Vendor) ETT testing session.*

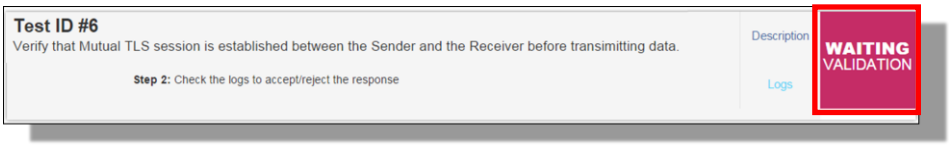
6. Once the '**TLS Endpoint**' has been successfully created, the Tester (e.g., Vendor) must then configure the SUT (their operated and managed Edge system) to execute XDR Sending Test Case 6. SUT configuration entails creating an XDR message and defining the '**TLS Endpoint**' as the message recipient, thus establishing a mutual TLS session between the SUT and ETT. Session connection must occur before any data is transmitted.

7. With SUT configuration complete and XDR message successfully sent to the ETT '**TLS Endpoint**', the Tester (e.g., Vendor) clicks the '**Pending Refresh**' button for the Test Case. This enables the ETT to check the '**TLS Endpoint**' for receipt of the XDR message.

2.

***Note**: For XDR Sending Test Cases, the ETT generates a unique '**TLS Endpoint**' and listens on the specific/configured port to detect the presence of a transmitted XDR message from the SUT.*

8. Upon refresh completion, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.



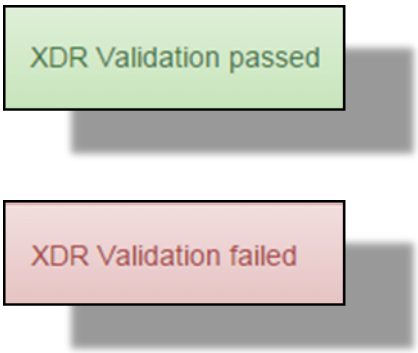
9. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented with '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information relevant to the test. The Tester (e.g., Vendor) reviews the '**Log**' data and validates that the message content and metadata conforms to the testing objectives.

10. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the '**Log**' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button is selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected.

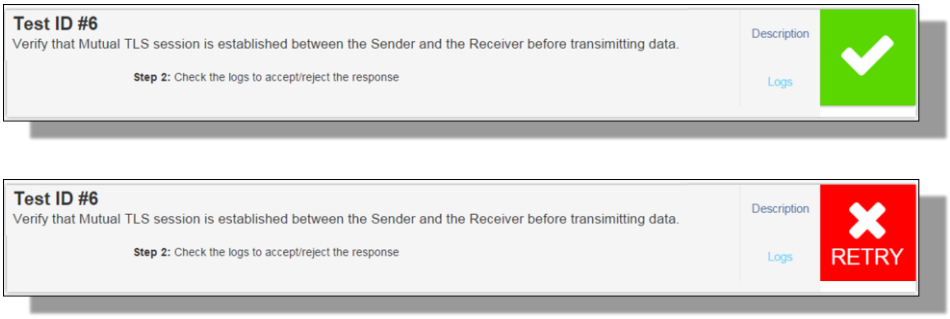
1.

***Note**: '**Accept XDR**' selections correlate with Test Case Success results (e.g., green check mark). Likewise, '**Reject XDR**' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).*

11. The Tester (e.g., Vendor) is given selection conformation by the ETT.



12. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

5.2 XDR Test Case 7

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender (client), can reject an invalid and/or misconfigured certificate during an attempt to establish a TLS session with a HISP (e.g., ETT), acting as the receiver (server).

The details for conformance testing flow are as follows: The SUT sends a request to the ETT to establish a TLS connection. The ETT receives the request and responds to the SUT by sending an invalid and/or misconfigured server certificate. The SUT receives the server certificate, validates that it is invalid and/or misconfigured, rejects the TLS connection attempt, and disconnects from the ETT. The Tester (e.g., Vendor) verifies the SUT properly rejected the

invalid and/or misconfigured server certificate, disconnected from the ETT, and did not allow a mutual TLS connection to proceed.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

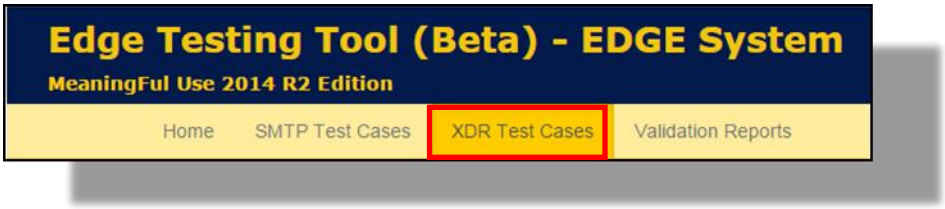
The test correlates to Test ID 7 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

5.2.1 TESTING STEPS

To execute XDR Test Case 7 and assess the SUT's ability to disconnect from the ETT when presented with an invalid certificate (e.g., server certificate), , the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

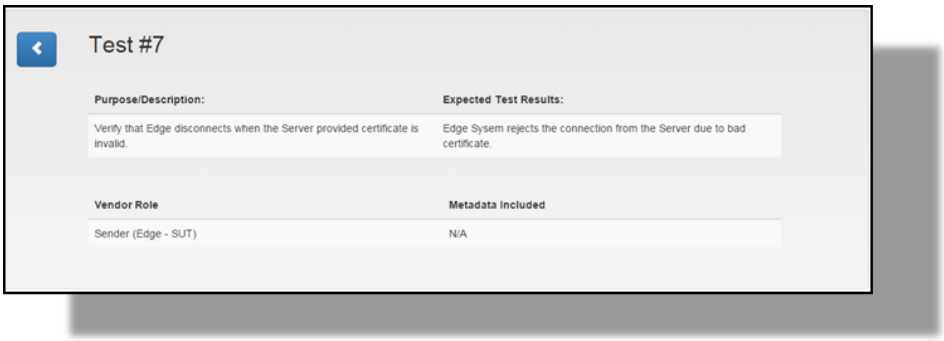
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



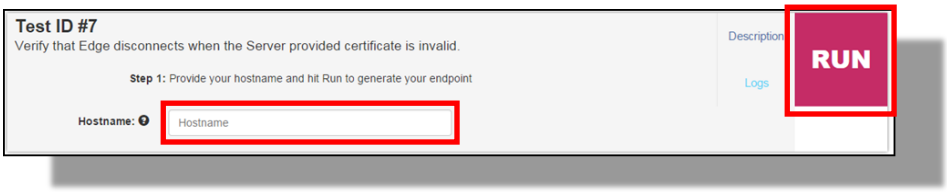
3. From the testing options available, select '**Sender**'. This will enable test case selection.

***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.



5. To initiate the target Test Case (XDR Test 7), insert the SUT host name of device the that the Test Case will be executed from. Once the '**Hostname**' has been inserted, click '**Run**'. This generates a '**TLS Endpoint**'.

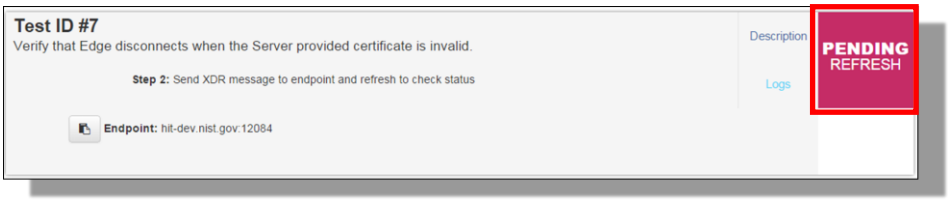


3.

***Note**: Instructions are labeled in sequential order(e.g., '**Step 1**', '**Step 2**', '**Step** ') in the content description of the Test Case The '**TLS Endpoint'** is uniquely generated and specific to the target Test Case and Tester (e.g., Vendor) ETT testing session.*

6. Once the '**TLS Endpoint**' has been successfully created, the Tester (e.g., Vendor) must then configure the SUT (their operated and managed Edge system) to execute XDR Sending Test Case 7. SUT configuration entails creating an XDR message and defining the '**TLS Endpoint'** as the message recipient, thus sending the message to the ETT.

7. With SUT configuration is complete and the XDR message has been successfully sent to the ETT '**TLS Endpoint**', the Tester (e.g., Vendor) clicks the '**Pending Refresh**' button on for the Test Case. This enables the ETT to check the '**TLS Endpoint**' for receipt of the XDR message.

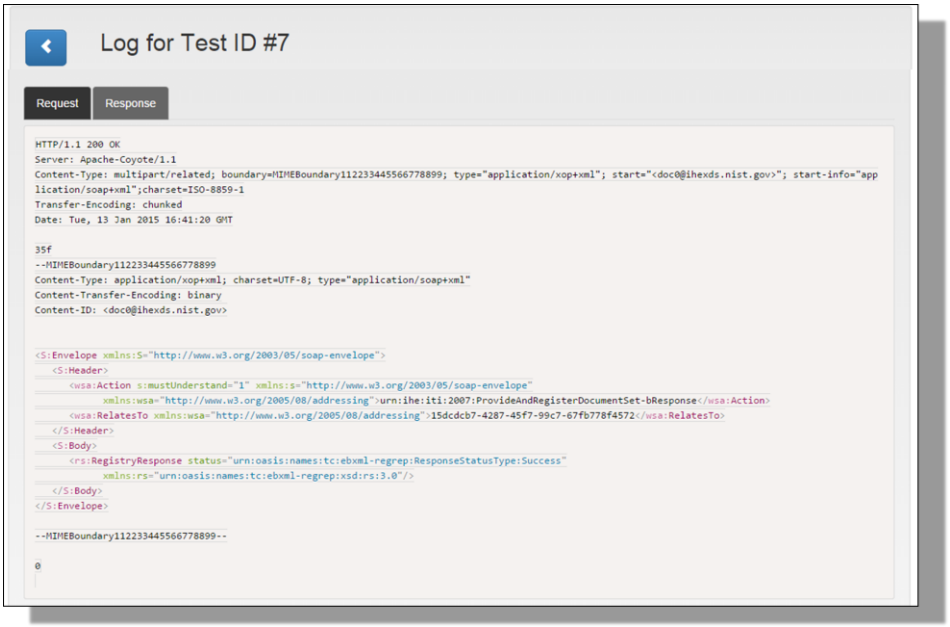


4.

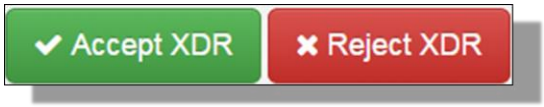
***Note**: For XDR Sending Test Cases, the ETT generates a unique '**TLS Endpoint**' and listens on the specific/configured port to detect the presence of a transmitted XDR message from the SUT.*

8. Upon refresh completion, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.

9. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.



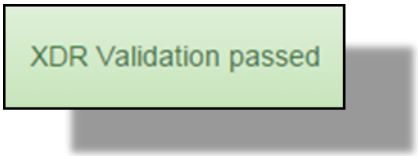
10. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.

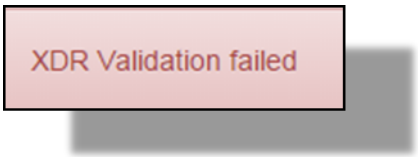


2.

***Note**: 'Accept XDR' selections correlate with Test Case Success results (e.g., green check mark). Likewise, 'Reject XDR' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).*

11. The Tester (e.g., Vendor) is given conformation on selection by the ETT.





12. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).

***Note**: In the test procedures, the 'Log' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The 'Log' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

5.3 XDR Test Case 1

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender, can create and transmit an XDR message per given conformance specifications to a HISP (e.g., ETT), acting as the receiver.

The details for conformance testing flow are as follows: The SUT will form an XDR message that includes limited metadata and a correctly formed Direct Address Block header. The SUT sends the correctly formed XDR message to the ETT. The ETT receives the XDR message, verifies alignment with Conformance Test Detail requirements for: XDR Message Checklist, XDS Metadata Checklist for Limited Metadata Document Source, and Direct Address Block. The Tester (e.g., Vendor) verifies that the SUT produces an XDR message that conforms to the targeted specifications.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

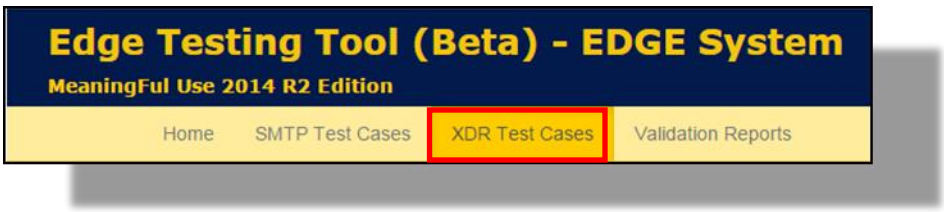
The test correlates to Test ID 1 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

5.3.1 TESTING STEPS

To execute XDR Test Case 1 and assess the SUT's ability create and XDR message per specifications given and send the message to the ETT, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

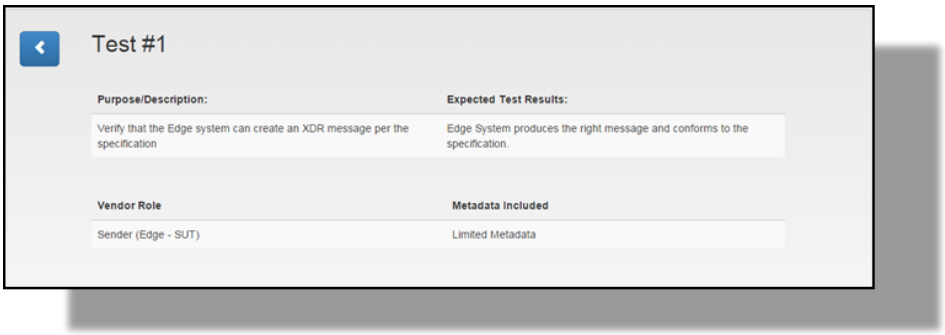
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



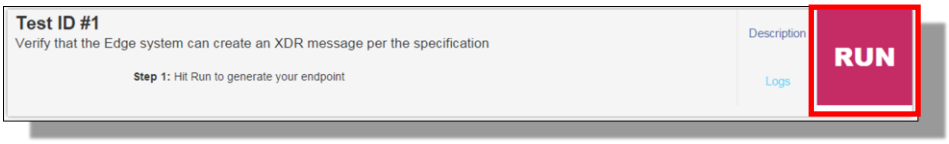
3. From the testing options available, select '**Sender**'. This will enable test case selection.

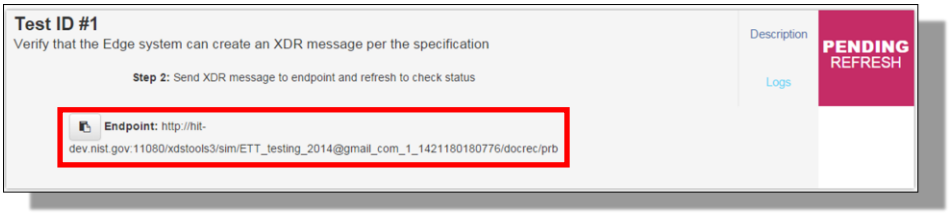
***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.



5. To initiate the target Test Case (XDR Test 1), click '**Run**'. This generates a "**TLS Endpoint**".



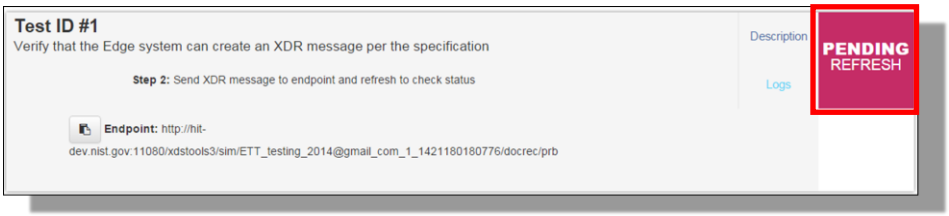


5.

***Note**: Instructions are labeled in sequential order(e.g., '**Step 1**', '**Step 2**', '**Step** ') in the content description of the Test Case The '**TLS Endpoint'** is uniquely generated and specific to the target Test Case and Tester (e.g., Vendor) ETT testing session.*

6. Once the '**TLS Endpoint**' has been successfully created, the Tester (e.g., Vendor) must then configure the SUT (their operated and managed Edge system) to execute XDR Sending Test Case 1. SUT configuration entails creating an XDR message and defining the '**TLS Endpoint'** as the message recipient, thus creating a path to establish a connection between the SUT and ETT.

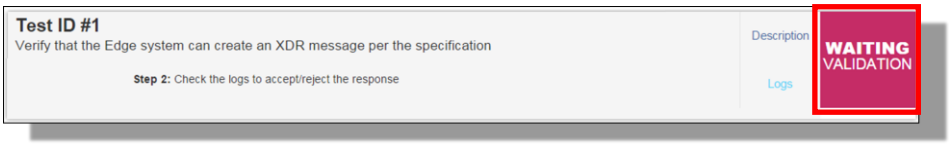
7. With SUT configuration is complete and the XDR message has been successfully sent to the ETT '**TLS Endpoint**', the Tester (e.g., Vendor) clicks the '**Pending Refresh**' button on for the Test Case. This enables the ETT to check the '**TLS Endpoint**' for receipt of the XDR message.



6.

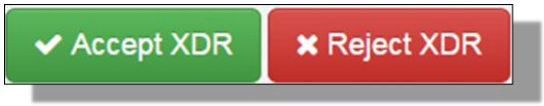
***Note**: For XDR Sending Test Cases, the ETT generates a unique '**TLS Endpoint**' and listens on the specific/configured port to detect the presence of a transmitted XDR message from the SUT.*

8. Upon refresh completion, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.



9. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.

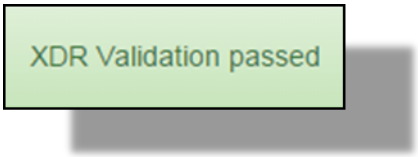
10. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.

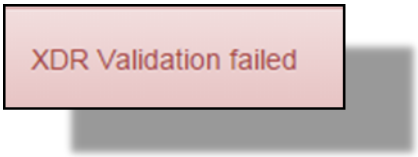


3.

***Note**: 'Accept XDR' selections correlate with Test Case Success results (e.g., green check mark). Likewise, 'Reject XDR' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).*

11. The Tester (e.g., Vendor) is given conformation on selection by the ETT.





12. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).

***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

5.4 XDR Test Case 2

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the sender, can create and transmit an XDR message per given conformance specifications to a HISP (e.g., ETT), acting as the receiver.

The details for conformance testing flow are as follows: The SUT will form an XDR message that includes full metadata and a correctly formed Direct Address Block header. The SUT sends the correctly formed XDR message to the ETT. The ETT receives the XDR message, verifies alignment with Conformance Test Detail requirements for: XDR Message Checklist, XDS Metadata Checklist for Full Metadata Document Source, and Direct Address Block. The Tester (e.g., Vendor) verifies that the SUT produces an XDR message that conforms to the targeted specifications.

This is a optional test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

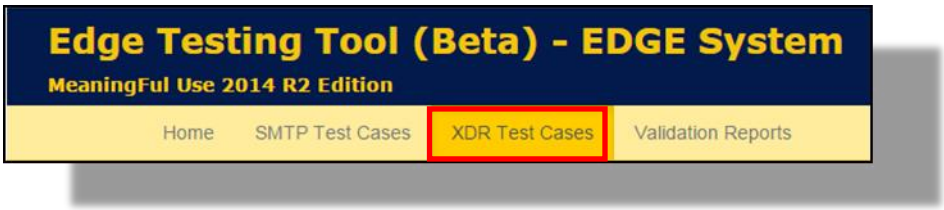
The test correlates to Test ID 2 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

5.4.1 TESTING STEPS

To execute XDR Test Case 2 and assess the SUT's ability create and XDR message per specifications given and send the message to the ETT, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

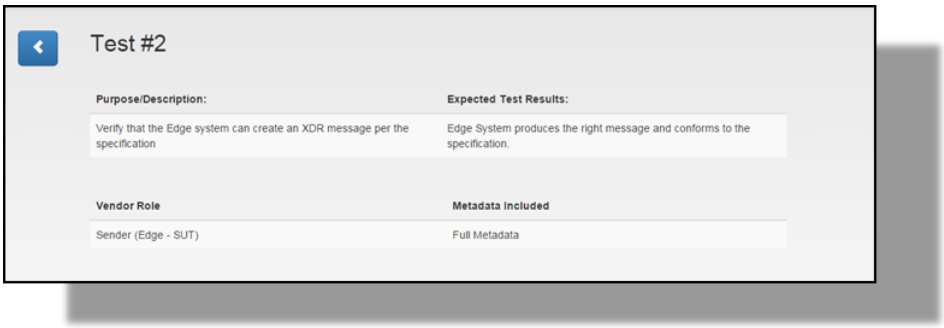
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



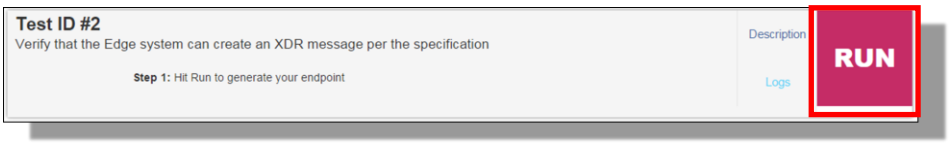
3. From the testing options available, select '**Sender**'. This will enable test case selection.

***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.



5. To initiate the target Test Case (XDR Test 2), click '**Run**'. This generates a "**TLS Endpoint**".

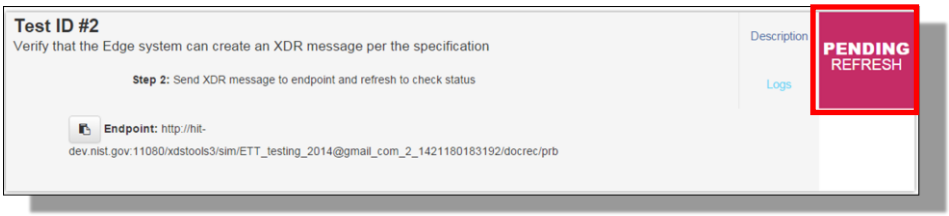


7.

***Note**: Instructions are labeled in sequential order(e.g., '**Step 1**', '**Step 2**', '**Step** ') in the content description of the Test Case The '**TLS Endpoint'** is uniquely generated and specific to the target Test Case and Tester (e.g., Vendor) ETT testing session.*

6. Once the '**TLS Endpoint**' has been successfully created, the Tester (e.g., Vendor) must then configure the SUT (their operated and managed Edge system) to execute XDR Sending Test Case 1. SUT configuration entails creating an XDR message and defining the '**TLS Endpoint'** as the message recipient, thus creating a path to establish a connection between the SUT and ETT.

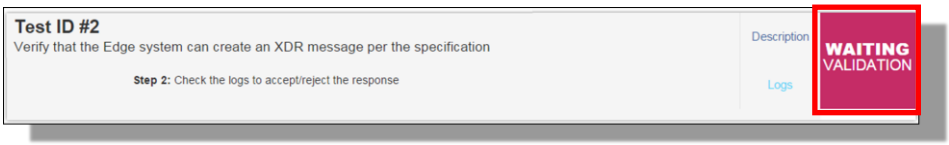
7. With SUT configuration is complete and the XDR message has been successfully sent to the ETT '**TLS Endpoint**', the Tester (e.g., Vendor) clicks the '**Pending Refresh**' button on for the Test Case. This enables the ETT to check the '**TLS Endpoint**' for receipt of the XDR message.



8.

***Note**: For XDR Sending Test Cases, the ETT generates a unique '**TLS Endpoint**' and listens on the specific/configured port to detect the presence of a transmitted XDR message from the SUT.*

8. Upon refresh completion, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.



9. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.

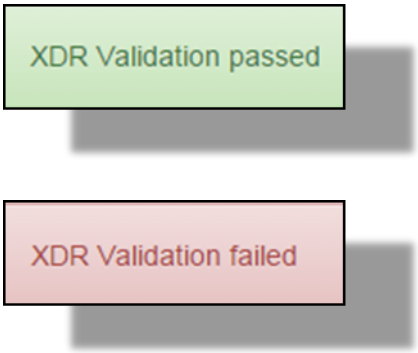
10. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.

4.

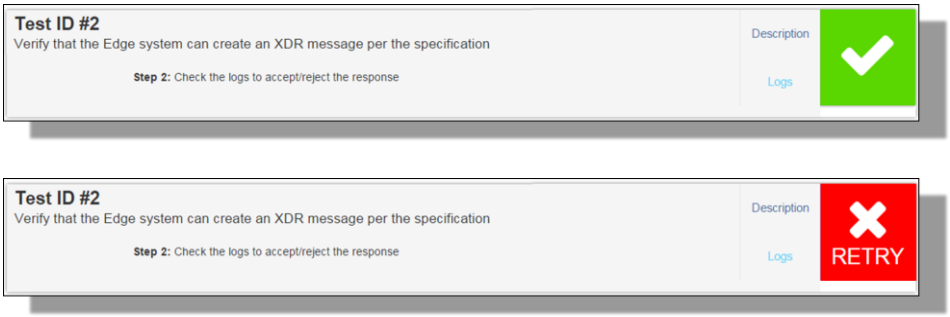
***Note**: '**Accept XDR**' selections correlate with Test Case Success results (e.g., green check mark). Likewise, '**Reject XDR**' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test*

Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).

11. The Tester (e.g., Vendor) is given conformation on selection by the ETT.



12. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

6.0 XDR RECEIVING

Within the following Test Cases, tests are executed from the following actor perspective:

Test Actor	Testing Role
SUT	Receives test message in alignment with Testing Procedures and Conformance Test Details
ETT	Sends test message and validates alignment with Testing Procedures and Conformance Test Details

6.1 XDR Test Case 8

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver (server), can establish a mutual TLS connection with a HISP (e.g., ETT), acting as the sender (client), and successfully authenticate.

The details for conformance testing flow are as follows: The ETT sends a request to the SUT to establish a TLS connection. The SUT receives the request and responds to the ETT by sending a valid and properly configured server certificate. The ETT receives the server certificate, validates the certificate, and proceeds to send the client certificate to the SUT. The SUT receives the client certificate, validates the certificate, and establishes a mutual TLS session with the ETT. The Tester (e.g., Vendor) verifies the existence, accurate configuration, and authentication success of a mutual TLS connection between a SUT and the ETT.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

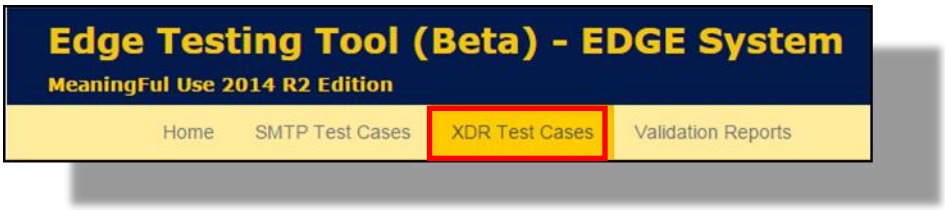
The test correlates to Test ID 8 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

6.1.1 TESTING STEPS

To execute XDR Test Case 8 and assess the SUT's ability to accept an authentication attempt from the ETT and successfully establish a mutual TLS connection, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

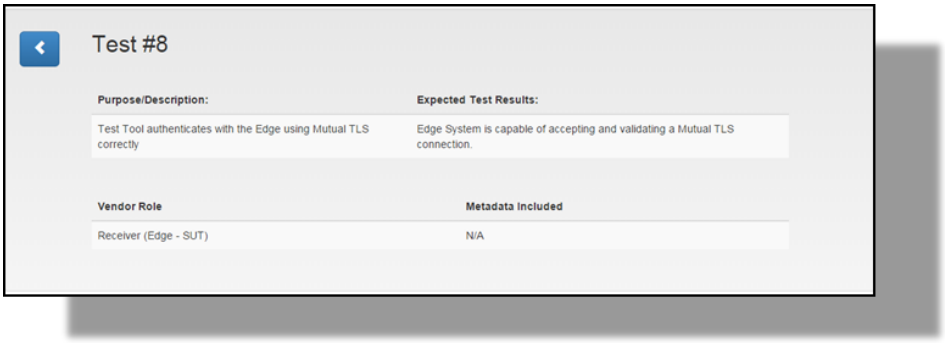
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



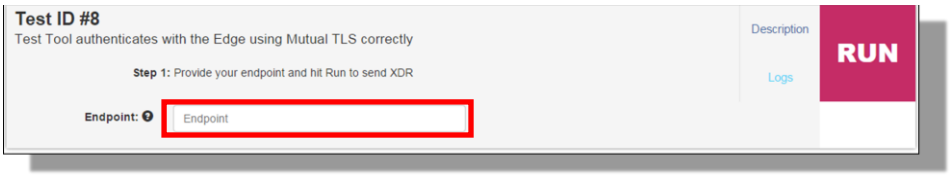
3. From the testing options available, select '**Receiver**'. This will enable test case selection.

***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

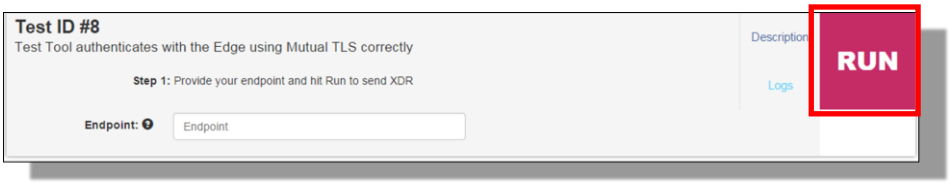
4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.



5. To initiate the target Test Case, the Tester (e.g., Vendor) must provide the SUT (their operated and managed Edge system) as a '**TLS Endpoint**' for the ETT to communicate with and send an XDR message to. The provided '**TLS Endpoint**' of the SUT is the message recipient for this Test Case.



6. Once the 'TLS Endpoint' has been inserted, '**Run**' to transmit the XDR message.

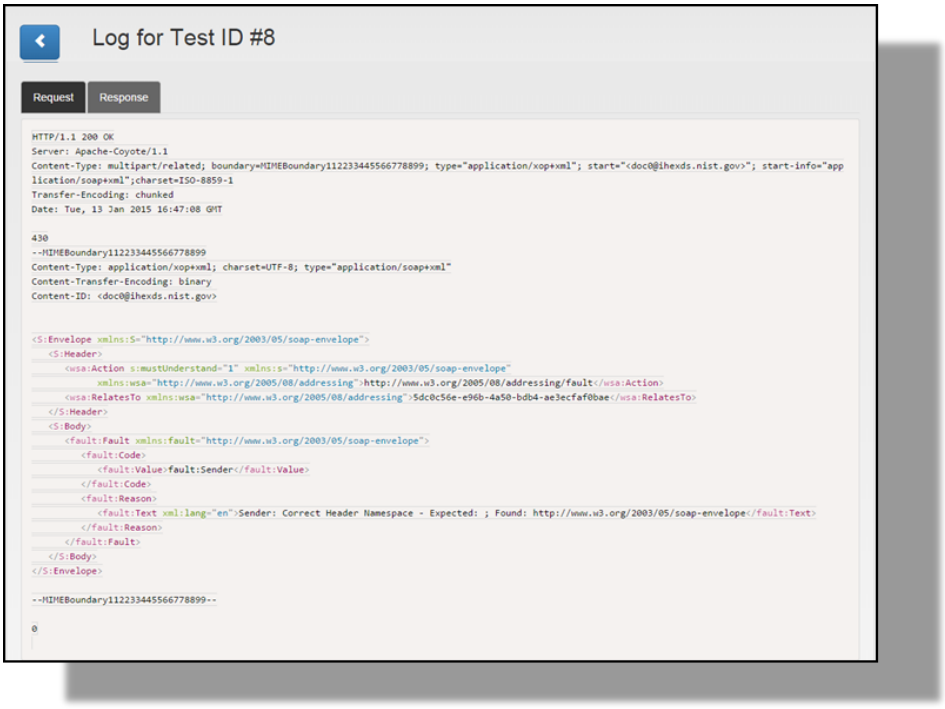


9.

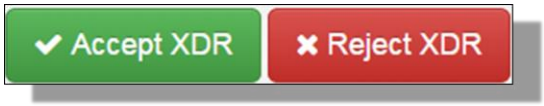
***Note**: Instructions are labeled in sequential order(e.g., '**Step 1**', '**Step 2**', '**Step 3**') in the content description of the Test Case. For this Test Case, the '**TLS Endpoint'** is provided by the Tester (e.g., Vendor).*

7. Once the XDR message has been sent, ETT will listen for the SUT's response/conformation of the sent message. Upon receipt of the message, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.

8. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.



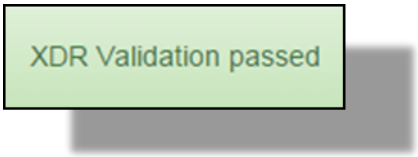
9. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.

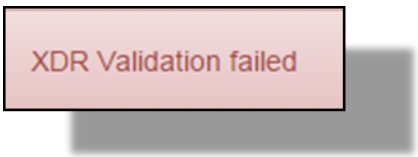


5.

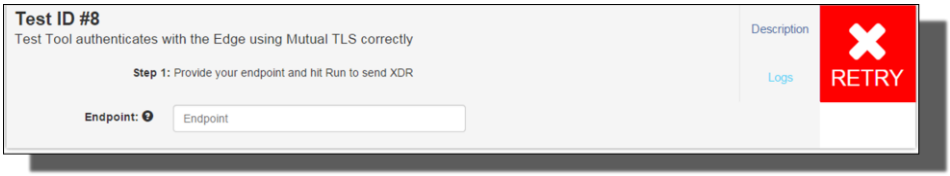
***Note**: '**Accept XDR**' selections correlate with Test Case Success results (e.g., green check mark). Likewise, '**Reject XDR**' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a '**Reject XDR**' selection correlate with a Test Success).*

10. The Tester (e.g., Vendor) is given conformation on selection by the ETT.





11. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. Rejection resets the Test Case back to '**Step 1**'. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

6.2 XDR Test Case 9

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver (server), can reject an invalid and/or misconfigured certificate during an attempt to establish a TLS session with a HISP (e.g., ETT), acting as the sender (client).

The details for conformance testing flow are as follows: The ETT sends a request to the SUT to establish a TLS connection. The SUT receives the request and responds to the ETT by sending a valid and properly configured server certificate. The ETT receives the server certificate, validates the certificate, and proceeds to send the SUT an invalid and/or misconfigured client certificate. The SUT receives the client certificate, validates that it is invalid and/or misconfigured, rejects the TLS connection attempt, and disconnects from the ETT. The Tester (e.g., Vendor) verifies the SUT properly rejected the invalid and/or misconfigured client certificate, disconnected from the ETT, and did not allow a mutual TLS connection to proceed.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

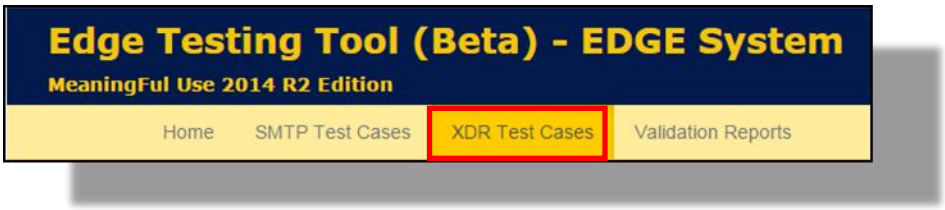
The test correlates to Test ID 9 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

6.2.1 Testing Steps

To execute XDR Test Case 9 and assess the SUT's ability to accept an authentication attempt by the ETT using an invalid certificate, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.

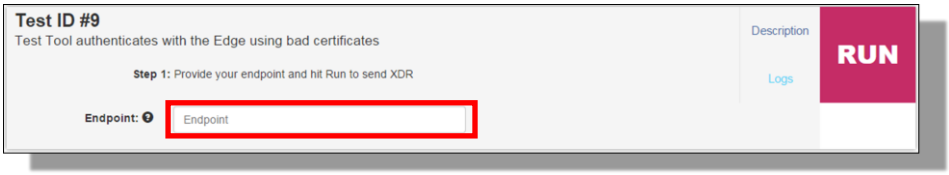


3. From the testing options available, select '**Receiver**'. This will enable test case selection.

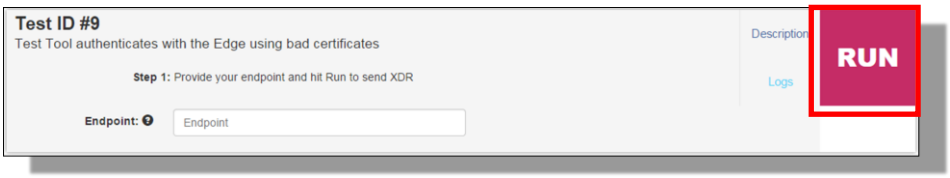
***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.

5. To initiate the target Test Case, the Tester (e.g., Vendor) must provide the SUT (their operated and managed Edge system) as a '**TLS Endpoint**' for the ETT to communicate with and send an XDR message to. The provided '**TLS Endpoint**' of the SUT is the message recipient for this Test Case.



6. Once the 'TLS Endpoint' has been inserted, '**Run**' to transmit the XDR message.



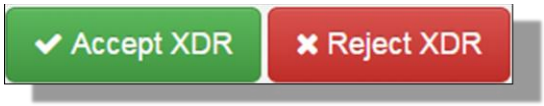
10.

***Note**: Instructions are labeled in sequential order (e.g., '**Step 1**', '**Step 2**', '**Step 3**') in the content description of the Test Case. For this Test Case, the '**TLS Endpoint**' is provided by the Tester (e.g., Vendor).*

7. Once the XDR message has been sent, ETT will listen for the SUT's response/conformation of the sent message. Upon receipt of the message, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.

8. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.

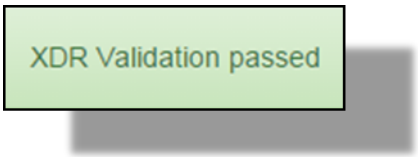
9. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.

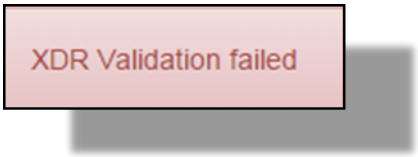


6.

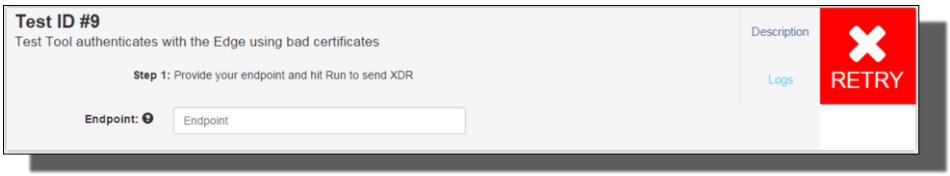
***Note**: 'Accept XDR' selections correlate with Test Case Success results (e.g., green check mark). Likewise, 'Reject XDR' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).*

10. The Tester (e.g., Vendor) is given conformation on selection by the ETT.





11. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. Rejection resets the Test Case back to '**Step 1**'. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).



***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

6.3 XDR Test Case 3

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, can receive an XDR message that has been created in alignment with given conformance specifications from a HISP (e.g., ETT), acting as the sender.

The details for conformance testing flow are as follows: The ETT will form an XDR message that includes limited metadata and a correctly formed Direct Address Block header. The ETT sends the correctly formed XDR message to the SUT. The SUT receives the XDR message, verifies alignment with Conformance Test Detail requirements for: XDR Message Checklist, XDS Metadata Checklist for Limited Metadata Document Source, and Direct Address Block. The Tester (e.g., Vendor) verifies that the SUT correctly receives an XDR message that has been created in alignment with given conformance specifications.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

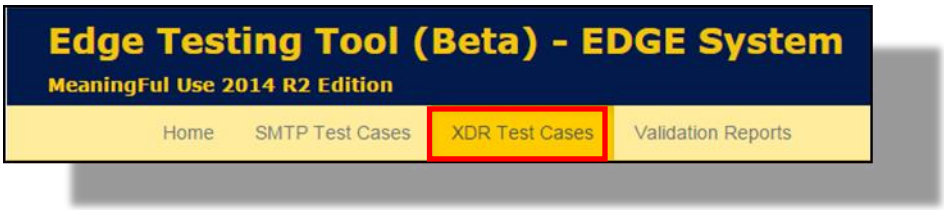
The test correlates to Test ID 3 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

6.3.1 TESTING STEPS

To execute XDR Test Case 3 and assess the SUT's ability receive a properly formatted XDR message from the ETT, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

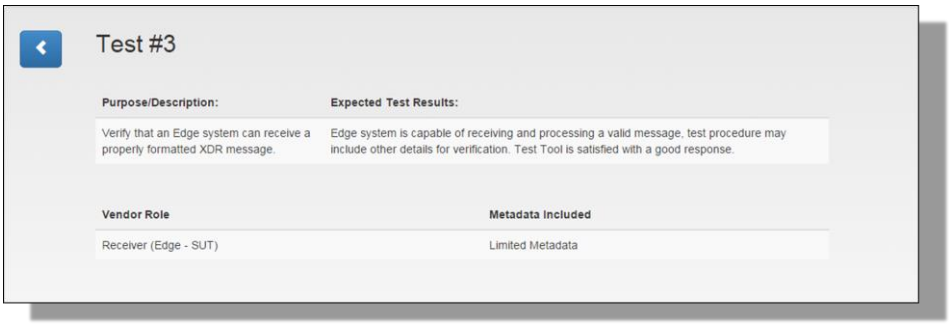
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



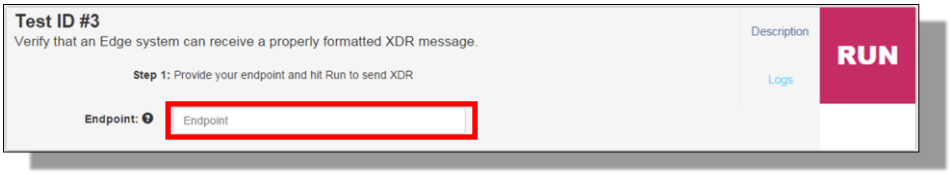
3. From the testing options available, select '**Receiver**'. This will enable test case selection.

***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

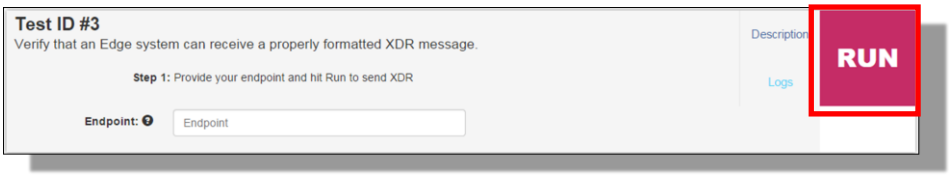
4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.



5. To initiate the target Test Case, the Tester (e.g., Vendor) must provide the SUT (their operated and managed Edge system) as a '**TLS Endpoint**' for the ETT to communicate with and send an XDR message to. The provided '**TLS Endpoint**' of the SUT is the message recipient for this Test Case.



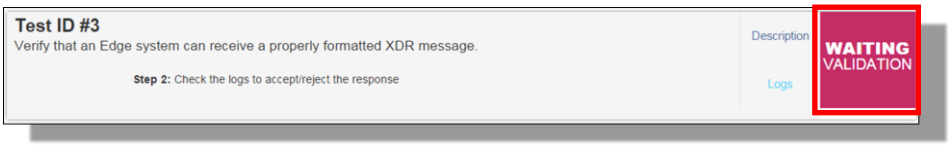
6. Once the '**TLS Endpoint**' has been inserted, '**Run**' to transmit the XDR message.



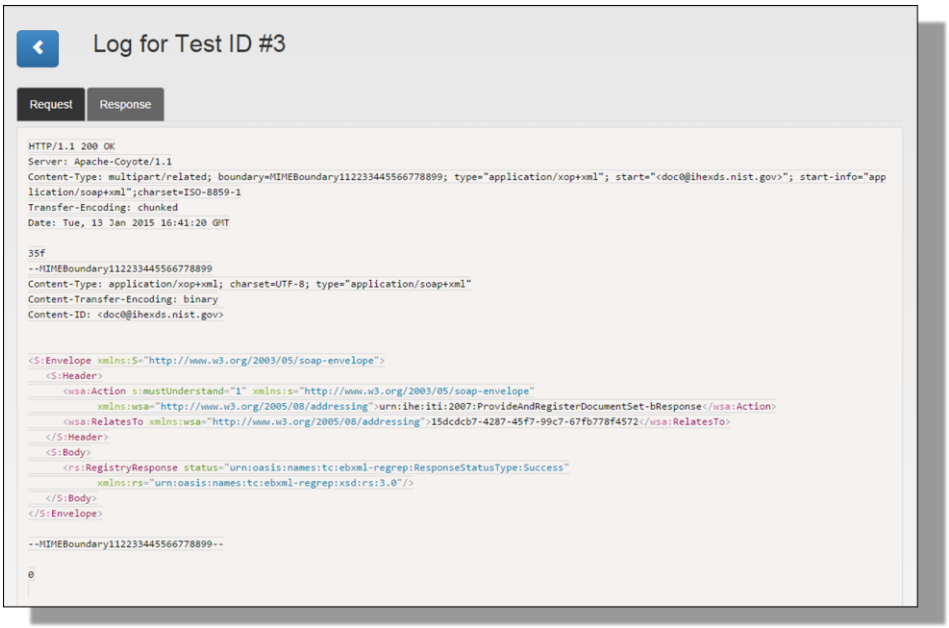
11.

***Note**: Instructions are labeled in sequential order (e.g., '**Step 1**', '**Step 2**', '**Step 3**') in the content description of the Test Case. For this Test Case, the '**TLS Endpoint**' is provided by the Tester (e.g., Vendor).*

7. Once the XDR message has been sent, ETT will listen for the SUT's response/conformation of the sent message. Upon receipt of the message, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.



8. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.

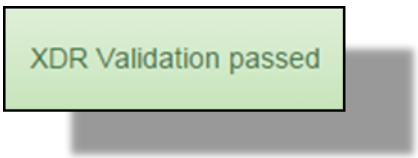


9. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.

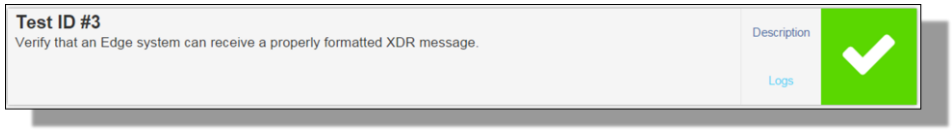
7.

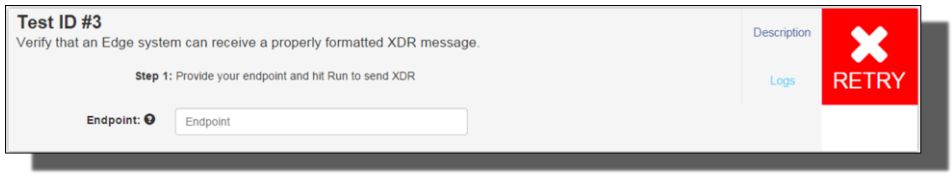
***Note**: 'Accept XDR' selections correlate with Test Case Success results (e.g., green check mark). Likewise, 'Reject XDR' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).*

10. The Tester (e.g., Vendor) is given conformation on selection by the ETT.



11. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. Rejection resets the Test Case back to '**Step 1**'. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).





***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

6.4 XDR Test Case 4

The objective of this test sequence is to determine if an Edge System (e.g., SUT), acting as the receiver, can receive an XDR message that has been created in alignment with given conformance specifications from a HISP (e.g., ETT), acting as the sender.

The details for conformance testing flow are as follows: The ETT will form an XDR message that includes full metadata and a correctly formed Direct Address Block header. The ETT sends the correctly formed XDR message to the SUT. The SUT receives the XDR message, verifies alignment with Conformance Test Detail requirements for: XDR Message Checklist, XDS Metadata Checklist for Full Metadata Document Source, and Direct Address Block. The Tester (e.g., Vendor) verifies that the SUT correctly receives an XDR message that has been created in alignment with given conformance specifications.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

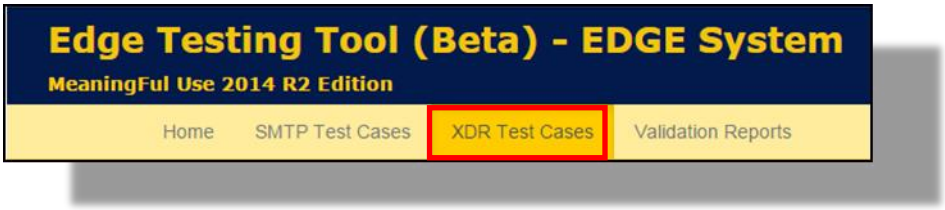
The test correlates to Test ID 4 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

6.4.1 TESTING STEPS

To execute XDR Test Case 4 and assess the SUT's ability produce an error notification when an incorrectly formatted XDR message is received from the ETT, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

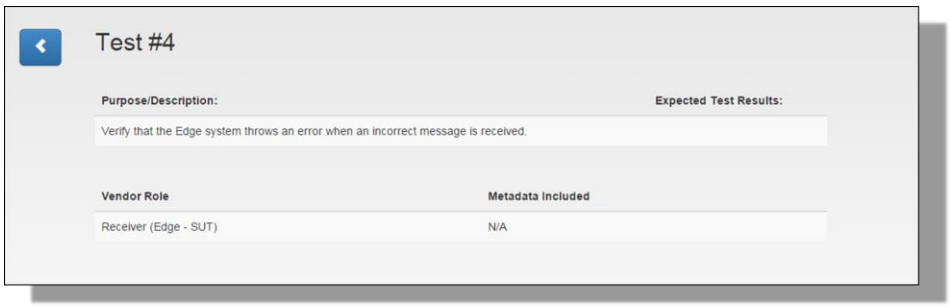
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



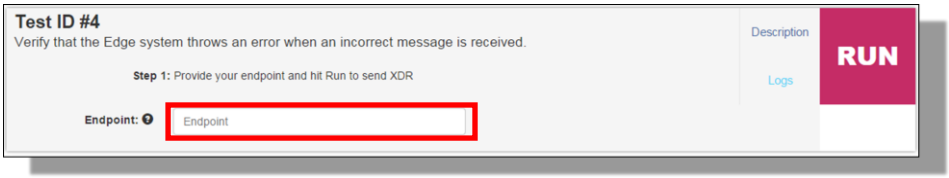
3. From the testing options available, select '**Receiver**'. This will enable test case selection.

***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

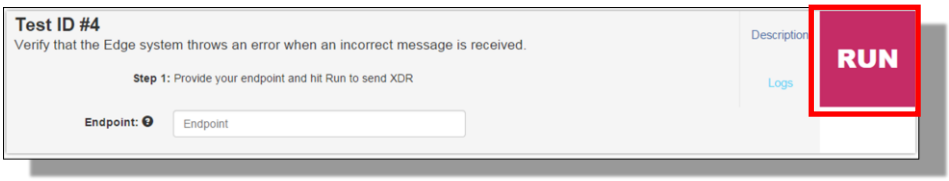
4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.



5. To initiate the target Test Case, the Tester (e.g., Vendor) must provide the SUT (their operated and managed Edge system) as a '**TLS Endpoint**' for the ETT to communicate with and send an XDR message to. The provided '**TLS Endpoint**' of the SUT is the message recipient for this Test Case.



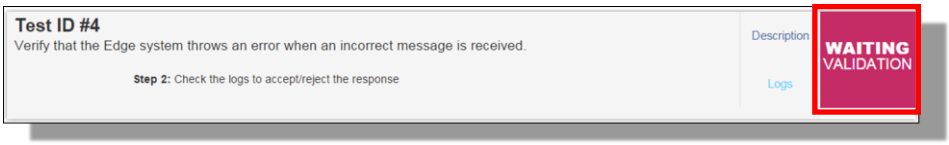
6. Once the '**TLS Endpoint**' has been inserted, '**Run**' to transmit the XDR message.



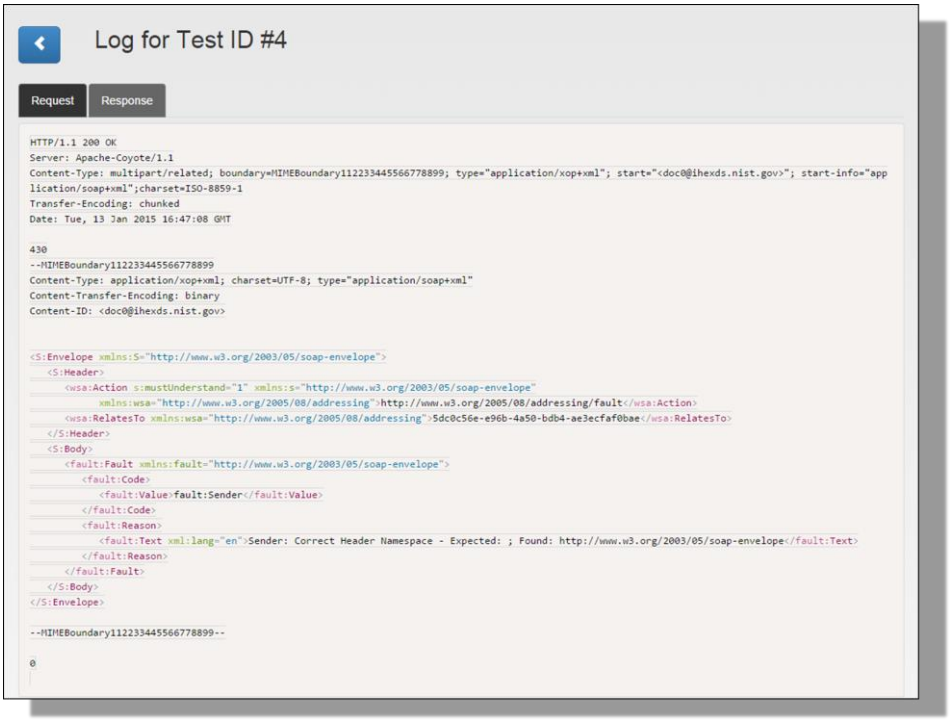
12.

***Note**: Instructions are labeled in sequential order (e.g., '**Step 1**', '**Step 2**', '**Step 3**') in the content description of the Test Case. For this Test Case, the '**TLS Endpoint**' is provided by the Tester (e.g., Vendor).*

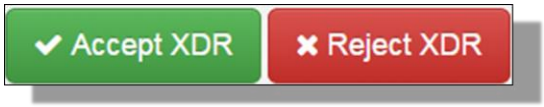
7. Once the XDR message has been sent, ETT will listen for the SUT's response/conformation of the sent message. Upon receipt of the message, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.



8. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.



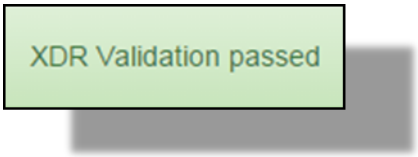
9. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.

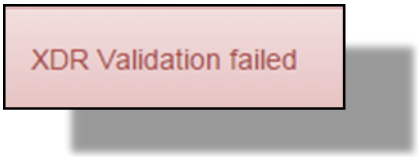


8.

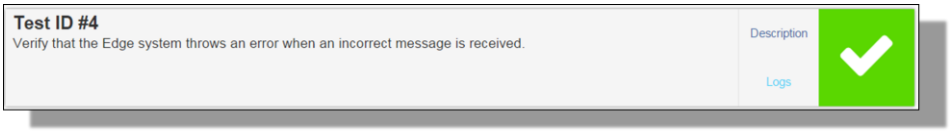
***Note**: 'Accept XDR' selections correlate with Test Case Success results (e.g., green check mark). Likewise, 'Reject XDR' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).*

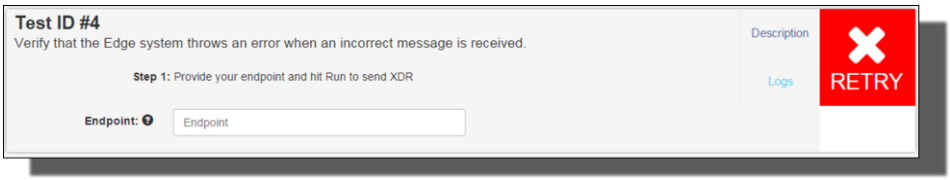
10. The Tester (e.g., Vendor) is given conformation on selection by the ETT.





11. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. Rejection resets the Test Case back to '**Step 1**'. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).





***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*

6.5 XDR Test Case 5

The objective of this test sequence is to determine if a HISP (e.g., ETT), acting as the sender, can create and transmit a properly formatted XDR message to the SUT (e.g, Edge system), acting as the receiver.

The details for conformance testing flow are as follows: The ETT will create a properly formatted XDR message that includes full metadata and a Direct Address Block header. The formed XDR message is then sent by the ETT and received by the SUT. Upon receipt, the ETT verifies that the message aligns with the Conformance Test Details requirements. The Tester verifies that the SUT can accurately receive and process the XDR message.

This is a required test and maintains compliance with the secure health data transport messaging formats, processing requirements, and communication standards for Direct Edge message exchanges. See Section 1.1 of the 'Implementation Guide for Direct Edge Protocols' document.

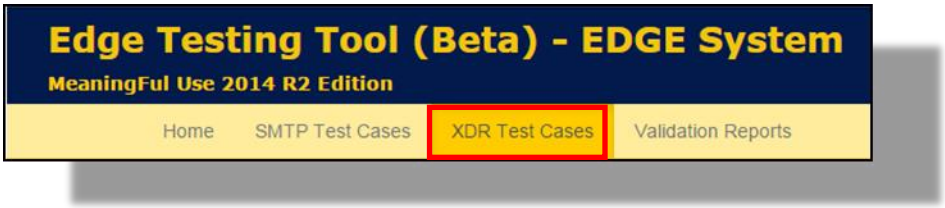
The test correlates to Test ID 5 of the XDR Test Cases (tab) within the 'DirectEdgeProtocols' spreadsheet.

6.5.1 TESTING STEPS

To execute XDR Test Case 5 and assess the SUT's ability to receive a properly formatted XDR message send from the ETT, the Tester (e.g., Vendor) must perform the following steps:

1. Reference Section 2.0 Testing Configuration for Edge System of this ETT User Guide and follow Steps 1 through 7 within 2.2 Registration.

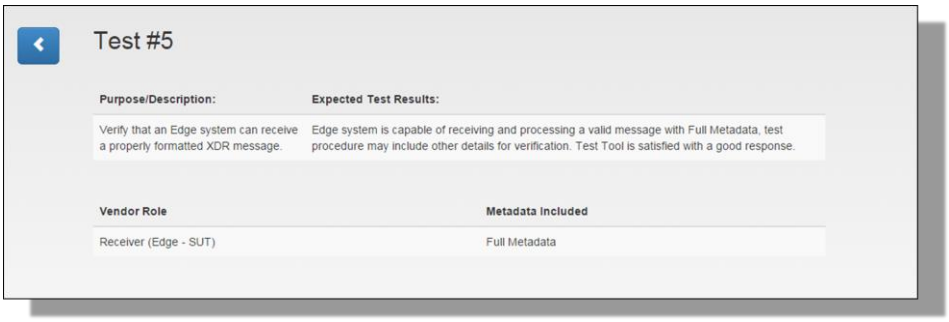
2. For this target XDR test, select '**XDR Test Cases'** from the Navigation Bar.



3. From the testing options available, select '**Receiver**'. This will enable test case selection.

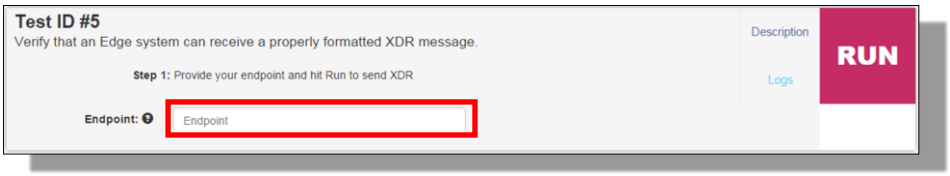
***Note**: XDR Test Cases do not implement the same testing Profile feature that the SMTP Test Cases do.*

4. To gain additional information concerning a target Test Case's intended focus, purpose/descriptions, conditional requirements, and expected test results, Tester (e.g., Vendor) role, and Metadata inclusion, click the '**Description**' link for the Test Case.

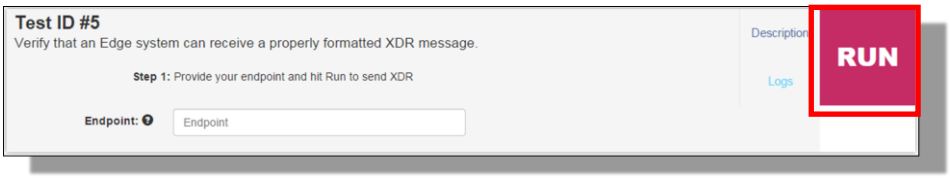


5. To initiate the target Test Case, the Tester (e.g., Vendor) must provide the SUT (their operated and managed Edge system) as a '**TLS Endpoint**' for the ETT to communicate

with and send an XDR message to. The provided '**TLS Endpoint**' of the SUT is the message recipient for this Test Case.



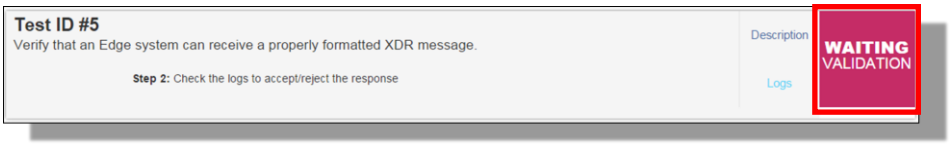
6. Once the '**TLS Endpoint**' has been inserted, '**Run**' to transmit the XDR message.



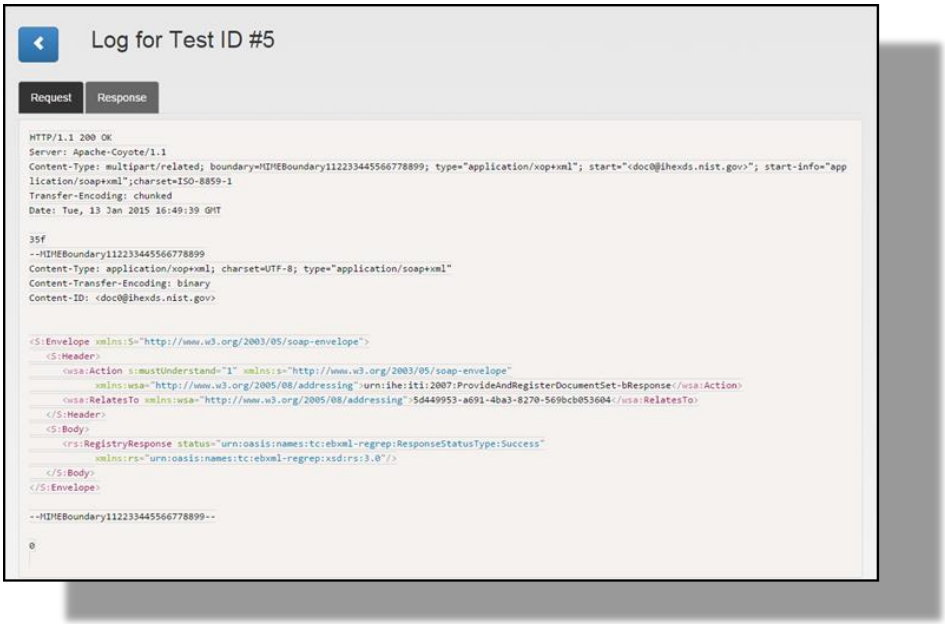
13.

***Note**: Instructions are labeled in sequential order (e.g., '**Step 1**', '**Step 2**', '**Step 3**') in the content description of the Test Case. For this Test Case, the '**TLS Endpoint**' is provided by the Tester (e.g., Vendor).*

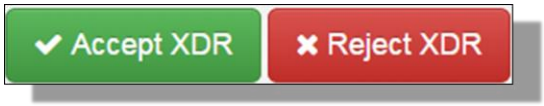
7. Once the XDR message has been sent, ETT will listen for the SUT's response/conformation of the sent message. Upon receipt of the message, the Tester (e.g., Vendor) is prompted to manually validate if the test results conformed to the testing objective. This is performed through clicking the '**Waiting Validation**' button.



8. This will bring up the '**Log**' screen for the Test Case. The Tester (e.g., Vendor) is presented '**Request**' and '**Response**' tabs. Based upon the specific testing objective for a Test Case, one of the two tabs will contain XDR message information. The Tester (e.g., Vendor) reviews the 'Log' data and validates that the message content and metadata conforms to the testing objectives.



9. If the Tester (e.g., Vendor) accepts the data and confirms that the XDR message content within the 'Log' conforms to the testing objectives for the Test Case, the '**Accept XDR**' button can be selected. However, if the XDR message content does not conform to the testing objectives for the Test Case, the '**Reject XDR**' button is selected. The Tester (e.g., Vendor) is given conformation on selection by the ETT.



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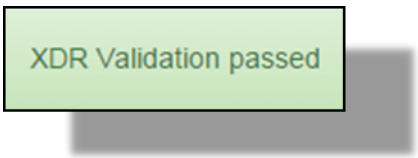
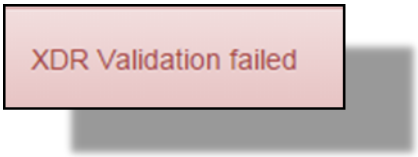
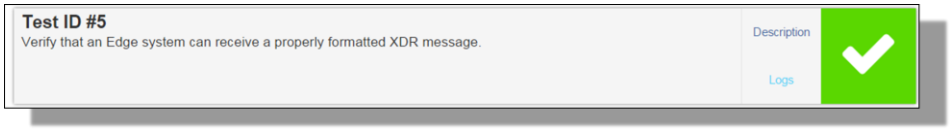
***Note**: 'Accept XDR' selections correlate with Test Case Success results (e.g., green check mark). Likewise, 'Reject XDR' selections correlate with Test Case Failures (e.g., red X). Only if the testing objective for a Test Case is in the negative (e.g., verify message rejection) will a 'Reject XDR' selection correlate with a Test Success).*

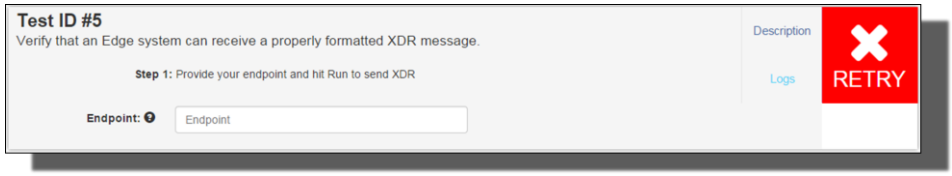
10. The Tester (e.g., Vendor) is given conformation on selection by the ETT.





11. Acceptance or rejection of the XDR message content results in overall Test Case testing Success of Failure. Rejection resets the Test Case back to '**Step 1**'. This testing data is then available through the '**Validation Report**' (reference Section 2.4 Reporting).





***Note**: In the test procedures, the '**Log**' directly references a single Test Case's generated result (either 'Success' or 'Fail'). The '**Log**' is geared to view individual test results details (e.g., factors for Success or Fail) and acts as a testing artifact. The 'Validation Report' represents the aggregation of all Test Cases executed and result outcomes. This enables the Tester (e.g., Vendor) to validate the acceptance of the message received by the SUT.*