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Seminole Software

Electronic Stamp Project

Software Testing Plan

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Preface

This document presents the Software Test Plan for the Electronic Stamp project by Seminole Software. The first section describes the testing requirements for the test plan. This includes a description on the test objectives as well as the testing approach taken. The test items are also listed and the finally the system pass / fail criteria are defined.

The Test Cases section goes into further detail about the Use Case tests and the Module Unit tests. For the Use Case tests, the requirements that are being tested are listed along with the test script for that use case. The Module Unit tests describe the tests that will be performed to verify the correctness of the API implemented in the classes of the Electronic Stamp software.

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1 Introduction

1.1 Purpose

The purpose of the Software Testing Plan for the Electronic Stamp project by Seminole Software is to describe the testing requirements for the Electronic Stamp software. It is important that this document describe the objectives of performing the tests on the software so it is clear as to why certain tests are being performed. This document will provide an answer to how the software will be tested. All of the tests that will be performed on the software are also listed in this document including the expected results for each test.

1.2 Scope

It is within the scope of the Software Testing Plan to describe the testing requirements of the Electronic Stamp project. This would include the Use Case testing and Module Unit testing to be performed on the Electronic Stamp software.

It is outside the scope of this document to describe electronic mail systems and technology or the general problem with unwanted electronic mail. It is also outside the scope of this document to describe in any detail at all how certain mentioned standards or technologies work and operate.

1.3 References

Table of References

References	Description
Software Design Specification	The Software Design Specification from the Electronic Stamp project was referenced.
Software Requirements Specification	The Software Requirements Specification from the Electronic Stamp project was referenced.

2 Testing Requirements

2.1 Test Objectives

Several objectives are to be met by completing the test cases identified in this document. First, by testing the software the requirements identified in the Software Requirements Specification can be verified that they are in fact included in the Electronic Stamp software as stated. Second, the behavior of the functionality of the system can be validated for correctness. Third, the performance of the system can be measured and improved if necessary. Last and most important, the system can be determined if acceptable for use by the customer in a production environment.

2.2 General Approach

The testing strategy taken to test the features of the Electronic Stamp software are to use both black box and white box testing techniques. To develop the black box test cases, the Use Cases identified in the Software Requirements Specification were analyzed. From this analysis several test cases with test scripts were identified that will adequately exercise all implemented features in the Electronic Stamp software. Section 3.1, Use Case Test Cases, goes into detail on all of the identified Use Case test cases.

The white box testing strategy consists of testing the implemented API exposed by the Electronic Stamp classes with executable unit tests. Sections 3.2, Module Test Cases, describe in detail these types of test cases.

For both the Use Case test cases and the Module Unit test cases, a test persistent storage is in place that represents the test data needed to perform some of the tests. If certain test data is needed for a test, it is specified in the test case.

2.3 Test Items

The test items that were used to focus the development of the test cases were generated from the Use Cases identified in the Software Requirements Specification and the design specified in the Software Design Specification.

The test items are Configuring an E-Stamp Vendor, Setting up the E-Stamp Manager, Purchasing an E-Stamp, Sending a email with or without an E-Stamp, and Receiving an email with or without an E-Stamp. The develop Use Case test cases and Module test cases test one or many of these test items.

2.4 Pass / Fail Criteria

For the Electronic Stamp software to be determined as acceptable several criteria have to be met. First, the identified requirements as stated in the Software Requirements Specification have to be implemented. Second, the features implemented in the software have to work correctly. Third, the performance of the system has to be adequate as specified by the customer. Forth, the system has to be usable by the customer and the customer has to agree that the system is usable.

By passing the test cases identified in this document, the requirements identified in the Software Requirements Specification will have been implemented and the features implemented in the software will function correctly. User acceptance testing will need to be performed with the customer to verify that the system performance is adequate and to determine that the customer agrees that the system is usable.

3 Test Cases

3.1 Use Case Test Cases

3.1.1 Send Email Test Case 1

3.1.1.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to send an e-mail using the compose function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, purchase a new stamp from vendor and attach it to the outgoing e-mail. In this test a valid Electronic stamp is available in the stamp book.

3.1.1.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #1: A sender not know to the recipient SHALL be able to send a “first class” email message to the recipient with the assurance that it will not be filtered out as Spam.
- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #13: The system SHALL allow the recipient to respond to the sender using the same stamp the sender purchased.
- Shall list ID #14: The system SHALL allow the sender and recipient to have an indeterminate exchange of emails related to an email originally sent from the sender using the original stamp.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.
- Shall list ID #23: The Sender SHALL be able to send an email with an electronic stamp to a Recipient.

3.1.1.3 Test Steps

Table of Test Steps for Send Email Test Case 1

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	

User Actions	System Actions
6) Select the "Buy a New Stamp and attach to outgoing E-Mail" Radio button option.	
7) Select the "Multi-Use" Radio button option.	
8) Left-click "OK" button.	
	9) Close the E-Stamp Manager Dialog.
10) Left-click Compose E-mail button.	
	11) Open the Compose E-mail window.
12) After composing E-Mail, Left-click the send email button.	
	13) Display a message box with the message "An E-stamp for this recipient is available. Sending e-mail with the available E-Stamp" for 3 seconds.
	14) Send the E-mail with attached stamp.

3.1.2 Send Email Test Case 2

3.1.2.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to send an e-mail using the compose function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, purchase a new stamp from vendor and attach it to the outgoing e-mail. In this test a valid Electronic stamp is NOT available in the stamp book.

3.1.2.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #1: A sender not know to the recipient SHALL be able to send a "first class" email message to the recipient with the assurance that it will not be filtered out as Spam.
- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #16: The system SHALL automate the purchasing and affixing of an electronic stamp to an email.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.
- Shall list ID #19: The Sender SHALL be able to purchase an electronic stamp from a vendor.
- Shall list ID #20: The Vendor SHALL be able to create an electronic stamp using a public-private key pair with the information sent in the request.
- Shall list ID #23: The Sender SHALL be able to send an email with an electronic stamp to a Recipient.

- Shall list ID #24: The Sender SHALL be able to “log” the stamp as valid for return use if the Sender would like to allow the Recipient to respond using the same electronic stamp.

3.1.2.3 Test Steps

Table of Test Steps for Send Email Test Case 2

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	
6) Select the “Buy a New Stamp and attach to outgoing E-Mail” Radio button option.	
7) Select the “Multi-Use” Radio button option.	
8) Left-click “OK” button.	
	9) Close the E-Stamp Manager Dialog.
10) Left-click Compose button	
	11) Open the Compose E-mail window.
12) After composing E-Mail, Left-click the send email button.	
	13) Display a message box with the message “An E-stamp for this recipient is NOT available. Purchasing E-Stamp from the vendor” until a stamp has been purchased.
	14) Display a message box with the message “An E-Stamp has been purchased. Sending e-mail with the purchased E-Stamp”
	15) Send the E-mail with attached stamp.

3.1.3 Send Email Test Case 3

3.1.3.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to send an e-mail using the reply function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, purchase a new stamp from vendor and attach it to the outgoing e-mail. In this test a valid Electronic stamp is available in the stamp book.

3.1.3.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #1: A sender not know to the recipient SHALL be able to send a “first class” email message to the recipient with the assurance that it will not be filtered out as Spam.
- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.

- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #13: The system SHALL allow the recipient to respond to the sender using the same stamp the sender purchased.
- Shall list ID #14: The system SHALL allow the sender and recipient to have an indeterminate exchange of emails related to an email originally sent from the sender using the original stamp.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.
- Shall list ID #23: The Sender SHALL be able to send an email with an electronic stamp to a Recipient.

3.1.3.3 Test Steps

Table of Test Steps for Send Email Test Case 3

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	
6) Select the "Buy a New Stamp and attach to outgoing E-Mail" Radio button option.	
7) Select the "Multi-Use" Radio button option.	
8) Left-click "OK" button.	
	9) Close the E-Stamp Manager Dialog.
10) Left-click a message in the inbox.	
	11) Display contents of the message.
12) Left-click Reply button.	
	13) Open the Compose E-mail window.
14) After composing E-Mail, Left-click the send email button.	
	15) Display a message box with the message "An E-stamp for this recipient is available. Sending e-mail with the available E-Stamp" for 3 seconds.
	16) Send the E-mail with attached stamp.

3.1.4 Send Email Test Case 4

3.1.4.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to send an e-mail using the reply function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, purchase a new stamp from vendor and attach it to the outgoing e-mail. In this test a valid Electronic stamp is NOT available in the stamp book.

3.1.4.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #1: A sender not know to the recipient SHALL be able to send a “first class” email message to the recipient with the assurance that it will not be filtered out as Spam.
- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #16: The system SHALL automate the purchasing and affixing of an electronic stamp to an email.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.
- Shall list ID #19: The Sender SHALL be able to purchase an electronic stamp from a vendor.
- Shall list ID #20: The Vendor SHALL be able to create an electronic stamp using a public-private key pair with the information sent in the request.
- Shall list ID #23: The Sender SHALL be able to send an email with an electronic stamp to a Recipient.
- Shall list ID #24: The Sender SHALL be able to “log” the stamp as valid for return use if the Sender would like to allow the Recipient to respond using the same electronic stamp.

3.1.4.3 Test Steps

Table of Test Steps for Send Email Test Case 4

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	
6) Select the “Buy a New Stamp and attach to outgoing E-Mail” Radio button option.	
7) Select the “Multi-Use” Radio button option.	
8) Left-click “OK” button.	
	9) Close the E-Stamp Manager Dialog.
10) Left-click a message in the inbox.	
	11) Display contents of the message.
12) Left-click Reply button	
	13) Open the Compose E-mail window.
14) After composing E-Mail, Left-click the send email button.	
	15) Display a message box with the message “An E-stamp for this recipient is NOT available. Purchasing E-Stamp from the vendor” until a stamp has been purchased.

User Actions	System Actions
	16) Display a message box with the message "An E-Stamp has been purchased. Sending e-mail with the purchased E-Stamp"
	17) Send the E-mail with attached stamp.

3.1.5 Send Email Test Case 5

3.1.5.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to send an e-mail using the compose function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, attach NO STAMP with the outgoing e-mail. In this test a valid Electronic stamp is available in the stamp book.

3.1.5.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #1: A sender not know to the recipient SHALL be able to send a "first class" email message to the recipient with the assurance that it will not be filtered out as Spam.
- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #13: The system SHALL allow the recipient to respond to the sender using the same stamp the sender purchased.
- Shall list ID #14: The system SHALL allow the sender and recipient to have an indeterminate exchange of emails related to an email originally sent from the sender using the original stamp.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.
- Shall list ID #23: The Sender SHALL be able to send an email with an electronic stamp to a Recipient.

3.1.5.3 Test Steps

Table of Test Steps for Send Email Test Case 5

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	

User Actions	System Actions
6) Select the "Do Not buy a New Stamp to attach to outgoing E-Mail" Radio button option.	
7) Left-click "OK" button.	
	8) Close the E-Stamp Manager Dialog.
9) Left-click Compose E-mail button.	
	10) Open the Compose E-mail window.
11) After composing E-Mail, Left-click the send email button.	
	12) Display a message box with the message "An E-stamp for this recipient is available. Sending e-mail with the available E-Stamp" for 3 seconds.
	13) Send the E-mail with attached stamp.

3.1.6 Send Email Test Case 6

3.1.6.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to be used to send an e-mail using the compose function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, attach NO STAMP with the outgoing e-mail. In this test a valid Electronic stamp is NOT available in the stamp book.

3.1.6.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #1: A sender not know to the recipient SHALL be able to send a "first class" email message to the recipient with the assurance that it will not be filtered out as Spam.
- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #16: The system SHALL automate the purchasing and affixing of an electronic stamp to an email.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.
- Shall list ID #19: The Sender SHALL be able to purchase an electronic stamp from a vendor.
- Shall list ID #20: The Vendor SHALL be able to create an electronic stamp using a public-private key pair with the information sent in the request.
- Shall list ID #23: The Sender SHALL be able to send an email with an electronic stamp to a Recipient.
- Shall list ID #24: The Sender SHALL be able to "log" the stamp as valid for return use if the Sender would like to allow the Recipient to respond using the same electronic stamp.

3.1.6.3 Test Steps

Table of Test Steps for Send Email Test Case 6

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	
6) Select the "Do Not buy a New Stamp to attach to outgoing E-Mail" Radio button option.	
7) Left-click "OK" button.	
	8) Close the E-Stamp Manager Dialog.
9) Left-click Compose button	
	10) Open the Compose E-mail window.
11) After composing E-Mail, Left-click the send email button.	
	12) Display a message box with the message "An E-stamp for this recipient is NOT available. Sending E-Mail with NO STAMP".
	13) Send the E-mail with no stamp.

3.1.7 Send Email Test Case 7

3.1.7.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to send an e-mail using the reply function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, attach NO STAMP with outgoing e-mail. In this test a valid Electronic stamp is available in the stamp book.

3.1.7.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #1: A sender not know to the recipient SHALL be able to send a "first class" email message to the recipient with the assurance that it will not be filtered out as Spam.
- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #13: The system SHALL allow the recipient to respond to the sender using the same stamp the sender purchased.

- Shall list ID #14: The system SHALL allow the sender and recipient to have an indeterminate exchange of emails related to an email originally sent from the sender using the original stamp.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.
- Shall list ID #23: The Sender SHALL be able to send an email with an electronic stamp to a Recipient.

3.1.7.3 Test Steps

Table of Test Steps for Send Email Test Case 7

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	
6) Select the "Do Not buy a New Stamp to attach to outgoing E-Mail" Radio button option.	
7) Left-click "OK" button.	
	8) Close the E-Stamp Manager Dialog.
9) Left-click a message in the inbox.	
	10) Display contents of the message.
11) Left-click Reply button.	
	12) Open the Compose E-mail window.
13) After composing E-Mail, Left-click the send email button.	
	14) Display a message box with the message "An E-stamp for this recipient is available. Sending e-mail with the available E-Stamp" for 3 seconds.
	15) Send the E-mail with attached stamp.

3.1.8 Send Email Test Case 8

3.1.8.1 Purpose

The purpose of this use case test is to test the ability of the E-mail Client software to be used to send an e-mail using the reply function after the E-mail Stamp Manager has been configured to send e-mail with either available stamps or if a stamp is not available, attach NO STAMP with outgoing e-mail. In this test a valid Electronic stamp is NOT available in the stamp book.

3.1.8.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.

3.1.8.3 Test Steps

Table of Test Steps for Send Email Test Case 8

User Actions	System Actions
1) Left-click E-Stamp Menu option.	
	2) Open E-Stamp Menu.
3) Left-click E-Stamp Manager option.	
	4) Open E-Stamp Manager Dialog Box.
5) Left-click on Sending Config Tab.	
6) Select the "Do Not buy a New Stamp to attach to outgoing E-Mail" Radio button option.	
7) Left-click "OK" button.	
	9) Close the E-Stamp Manager Dialog.
10) Left-click a message in the inbox.	
	11) Display contents of the message.
12) Left-click Reply button	
	13) Open the Compose E-mail window.
14) After composing E-Mail, Left-click the send email button.	
	15) Display a message box with the message "An E-stamp for this recipient is NOT available. Sending E-Mail with NO STAMP.
	16) Send the E-mail with NO stamp.

3.1.9 Send Email Test Case 9

3.1.9.1 Purpose

The purpose of this use case test is to test the ability of the E-Mail Client software to allow the user to send a self addressed E-mail. This e-mail should be present in the user's inbox along with other Stamped mail. This e-mail must not contain a stamp irrespective of the options selected in the E-Stamp manager.

3.1.9.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #6: The system SHALL use the existing Internet SMTP mail transport protocol.
- Shall list ID #8: The email messages SHALL not be encrypted.
- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #10: The system SHALL not restrict the content of the email message.
- Shall list ID #18: The system SHALL not provide email security. This means that the system will not hide the content of the message or certify that a message has not been forged.

3.1.9.3 Test Steps

Table of Test Steps for Send Email Test Case 9

User Actions	System Actions
1) Left-click Compose button	
	2) Open the Compose E-mail window
3) After composing E-Mail, Left-click the send email button.	
	4) Display a message box with the message "Sending E-mail to own self. Sending E-Mail with NO STAMP.
	5) Send the E-mail with NO stamp.
6) Left-click "download new messages" button.	
	7) View Contents of Inbox and own message.

3.1.10 Receive Email Test Case 1

3.1.10.1 Purpose

The purpose of this use case test is to test the ability of the software to receive E-mail with a valid E-Stamp.

3.1.10.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #11: The system SHALL allow a user to discard all unstamped mail -or- Reply to unstamped mail with a "challenge" message on how to obtain a stamp and send a stamped message. -or- Selectively filter unstamped mail.
- Shall list ID # 12: The system SHALL allow the recipient to receive email from "blacklisted" domains if the email has a stamp.
- Shall list ID # 17: The system SHALL protect against stamp forgery using public-key encryption
- Shall list ID # 21: The Electronic Stamp SHALL contain a unique ID.

- Shall list ID # 26: The Recipients email client software SHALL be able to identify email that have an electronic stamp and SHALL be able to decrypt the electronic stamp using the public key of the vendor from whom the stamp was purchased
- Shall list ID # 27: The Recipients email client software SHALL reject electronic stamps that do not have a valid Recipient email address.
- Shall list ID # 28: The Recipient SHALL be able to “log” an electronic stamp as valid for multiple use. This would be to allow the Sender to respond to the Recipient’s responses.

3.1.10.3 Test Steps

Table of Test Steps for Receive Email Test Case 1

User Actions	System Actions
1) Left-click a message in the inbox marked by the letter 'E', implying stamped email.	
	2) Display contents of the e-mail.
3) Click on the Reject stamp button.	
	4) Button changes to display the message, undo Reject??
5) Click back to inbox button.	

3.1.11 Receive Email Test Case 2

3.1.11.1 Purpose

The purpose of this test is to verify that e-mail with a revoked e-stamp is not placed in the inbox along with stamped e-mail but is instead placed in a separate folder.

3.1.11.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #9: The system SHALL not rely on the honesty of the origin address in the email header.
- Shall list ID #11: The system SHALL allow a user to discard all unstamped mail -or- Reply to unstamped mail with a “challenge” message on how to obtain a stamp and send a stamped message. -or- Selectively filter unstamped mail.
- Shall list ID # 12: The system SHALL allow the recipient to receive email from “blacklisted” domains if the email has a stamp.
- Shall list ID # 17: The system SHALL protect against stamp forgery using public-key encryption
- Shall list ID # 21: The Electronic Stamp SHALL contain a unique ID.
- Shall list ID # 26: The Recipients email client software SHALL be able to identify email that have an electronic stamp and SHALL be able to decrypt the electronic stamp using the public key of the vendor from whom the stamp was purchased
- Shall list ID # 27: The Recipients email client software SHALL reject electronic stamps that do not have a valid Recipient email address.

- Shall list ID # 28: The Recipient SHALL be able to “log” an electronic stamp as valid for multiple use. This would be to allow the Sender to respond to the Recipient’s responses.

3.1.11.3 Test Steps

This test assumes that a sender has sent e-mail to the recipient with an E-Stamp that has been revoked. This test uses visual verification that e-mail with revoked stamp was not placed in the Inbox.

Table of Test Steps for Receive Email Test Case 2

User Actions	System Actions
1) View contents of the inbox to verify that emails with revoked stamps are not placed in the inbox.	
2) Click on folders.	
3) Click on Unstamped mail folder.	
	4) Display contents of the folder.
5) Verify that e-mail with revoked stamp is placed in this folder.	

3.1.12 Receive Email Test Case 3

3.1.12.1 Purpose

The purpose of this test is to verify that e-mail without an e-stamp is not placed in the inbox along with stamped e-mail but is instead placed in a separate folder.

3.1.12.2 Requirements Verified

The following requirements identified in the Software Requirements Specification are verified by this test case.

- Shall list ID #7: The system SHALL be backward compatible with previous email systems. It should not inhibit someone from getting an email if their email system does not support the use of electronic stamps.
- Shall list ID #11: The system SHALL allow a user to discard all unstamped mail -or- Reply to unstamped mail with a “challenge” message on how to obtain a stamp and send a stamped message. -or- Selectively filter unstamped mail.

3.1.12.3 Test Steps

Table of Test Steps for Receive Email Test Case 3

User Actions	System Actions
1) View contents of the inbox to verify that emails with no stamps are not placed in the inbox.	

User Actions	System Actions
2) Click on folders.	
3) Click on Unstamped mail folder.	
	4) Display contents of the folder.
5) Verify that e-mail with no stamp is placed in this folder.	

3.2 Module Test Cases

3.2.1 E-Stamp Provider Test Case

3.2.1.1 Purpose

The module unit test for the EStampProvider class will verify that the containment relationship is valid for the VendorConfiguration singleton, the EStampManager singleton, and the EStampAuthenticator singleton. Also, this unit test will verify that the EStampProvider does return the default EStampVendor when the method getAvailableVendor() is called.

3.2.1.2 Test Description

Table of E-Stamp Provider Unit Tests

Test	Pre-Conditions	Post-Conditions
VendorConfiguration Relationship Test	<p>An EStampProvider object is instantiated that does not have a VendorConfiguation object set on it.</p> <p>A VendorConfiguration object is instantiated.</p>	<p>Null should be returned from the call to getStampConfiguration() on the Pre-Condition EStampProvider.</p> <p>Set the Pre-Condition VendorConfiguration object on the Pre-Condition EStampProvider by calling setStampConfiguration().</p> <p>The Pre-Condition VendorConfiguration object should be returned from the call to getStampConfiguration() on the Pre-Condition EStampProvider</p>
EStampManager Relationship Test	<p>An EStampProvider object is instantiated that does not have a EStampManager object set on it.</p> <p>A EStampManager object is instantiated.</p>	<p>Null should be returned from the call to getStampManager() on the Pre-Condition EStampProvider.</p> <p>Set the Pre-Condition EStampManager object on the Pre-Condition EStampProvider by calling setStampManager().</p> <p>The Pre-Condition EStampManager object should be returned from the call to getStampManager() on the Pre-Condition EStampProvider</p>

Test	Pre-Conditions	Post-Conditions
EStampAuthenticator Relationship Test	An EStampProvider object is instantiated that does not have a EStampAuthenticator object set on it. A EStampManager object is instantiated.	Null should be returned from the call to getStampAuthenticator() on the Pre-Condition EStampProvider. Set the Pre-Condition EStampAuthenticator object on the Pre-Condition EStampProvider by calling setStampAuthenticator(). The Pre-Condition EStampAuthenticator object should be returned from the call to getStampAuthenticator() on the Pre-Condition EStampProvider
Default Vendor Test	An EStampProvider object is instantiated. The persistent storage has a EStampVendor persisted in it that has been marked as the default vendor.	The default EStampVendor object as defined in the persisted storage should be returned from the call to getAvailableVendor() on the Pre-Condition EStampVendor object.

3.2.2 E-Stamp Manager Test Case

3.2.2.1 Purpose

The module unit test for the EStampManager class will verify that the methods on this class that manipulate an EStamp object in some way do so as expected. The following methods manipulate an EStamp object and need to be verified for correctness; logAsUsed(), logAsMultiUse(), logAsReplyUse(), and logAsRejected(). Also, the methods ifRejected(), ifUsedBefore(), and isStampAvailable() need to be verified that they check the state of an EStamp correctly.

3.2.2.2 Test Description

Table of E-Stamp Manager Unit Tests

Test	Pre-Conditions	Post-Conditions
EStamp Logged As Used Test	An EStampManager object is instantiated. An EStamp object has been instantiated that has not been logged as used.	The Pre-Condition EStamp will be passed into the logAsUsed() call on the Pre-Condition EStampManager object. The persisted storage is examined to verify that this EStamp it is in fact logged as used.

Test	Pre-Conditions	Post-Conditions
EStamp Logged As Multi Use Test	<p>An EStampManager object is instantiated.</p> <p>An EStamp object has been instantiated that has not been logged as multi use.</p>	<p>The Pre-Condition EStamp will be passed into the logAsMultiUse() call on the Pre-Condition EStampManager object.</p> <p>The persisted storage is examined to verify that this EStamp it is in fact logged as multi use.</p>
EStamp Logged As Reply Use Test	<p>An EStampManager object is instantiated.</p> <p>An EStamp object has been instantiated that has not been logged as reply use.</p>	<p>The Pre-Condition EStamp will be passed into the logAsReplyUse() call on the Pre-Condition EStampManager object.</p> <p>The persisted storage is examined to verify that this EStamp it is in fact logged as reply use.</p>
EStamp Logged As Rejected Test	<p>An EStampManager object is instantiated.</p> <p>An EStamp object has been instantiated that has not been logged as rejected.</p>	<p>The Pre-Condition EStamp will be passed into the logAsRejected() call on the Pre-Condition EStampManager object.</p> <p>The persisted storage is examined to verify that this EStamp it is in fact logged as reply use.</p>
EStamp Rejected Check Test	<p>An EStamp object has been instantiated that has been logged as rejected by calling logAsRejected().</p> <p>Another EStamp object has been instantiated that has not been logged as rejected.</p>	<p>The Pre-Condition EStamp that has been logged as rejected will be passed into the ifRejected() method and true should be returned.</p> <p>The Pre-Condition EStamp that has not been logged as rejected will be passed into the ifRejected() method and false should be returned.</p>
EStamp Used Before Check Test	<p>An EStamp object has been instantiated that has been used before.</p> <p>Another EStamp object has been instantiated that has not been used before.</p>	<p>The Pre-Condition EStamp that has been used before will be passed into the ifUsedBefore() method and true should be returned.</p> <p>The Pre-Condition EStamp that has not been used before will be passed into the ifUsedBefore() method and false should be returned.</p>
EStamp Available Test	<p>The persistent storage has an EStamp persisted in it that has been properly setup.</p>	<p>True should be returned from isStampAvailable().</p>

3.2.3 E-Stamp Vendor Test Case

3.2.3.1 Purpose

The module unit test for the EStampVendor class will verify that this class correctly purchases a stamp for the values set for Vendor Name, Vendor URL, Vendor Password, and Sender Credit Card.

3.2.3.2 Test Description

Table of E-Stamp Vendor Unit Tests

Test	Pre-Conditions	Post-Conditions
EStamp Purchase Test	An EStampVendor has been instantiated with a valid Vendor's Name, URL, and Password. The EStamp also has the Sender's Credit Card and Email Address set.	A valid EStamp from the Vendor set in the Pre-Condition EStampVendor should be returned when purchase() is called.

3.2.4 E-Stamp Authenticator Test Case

3.2.4.1 Purpose

The module unit test for the EStampAuthenticator class will verify that an EStamp can be correctly verified. This test would include testing for the conditions where an EStamp is a valid stamp and is not a valid stamp.

3.2.4.2 Test Description

Table of E-Stamp Authenticator Unit Tests

Test	Pre-Conditions	Post-Conditions
EStamp Authentication Test	<p>An EStamp has been instantiated that has valid authentication information set. This would include a valid public key from the vendor set on the EStamp.</p> <p>Another EStamp has been instantiated that has invalid authentication information set. This would include an invalid public key form the vendor set on the EStamp or an invalid receiver email address.</p>	True is returned from the call to authenticate() on EStampAuthenticator for the valid Pre-Condition EStamp and False is returned from the call to authenticate() for the invalid EStamp.

3.2.5 Vendor Configuration Test Case

3.2.5.1 Purpose

The module unit test for the VendorConfiguration class will verify that the EStampVendor objects are being managed correctly. The default vendor should be returned that is specified by the user as the default vendor. A vendor should be able to be retrieved by vendor name. All of the vendors should be returned when getAllVendors() is called. Lastly, a vendor should be able to be successfully added and persisted.

3.2.5.2 Test Description

Table of Vendor Configuration Unit Tests

Test	Pre-Conditions	Post-Conditions
Get Default Vendor Test	<p>The persistent storage has a vendor persisted in it that has been marked as the default vendor.</p> <p>A VendorConfiguration object has been instantiated.</p>	The default EStampVendor object should be returned from the call to getDefaultVendor() on the Pre-Condition VendorConfiguration object.
Get Vendor By Name Test	<p>The persistent storage has a vendor persisted in it that has been properly setup with vendor name.</p> <p>A VendorConfiguration object has been instantiated.</p>	The EStampVendor object with the correct name should be returned from the call to getVendorByName() on the Pre-Condition VendorConfiguration object.
Get All Vendors Test	<p>The persistent storage has multiple vendors persisted in it that have been properly setup.</p> <p>A VendorConfiguration object has been instantiated.</p>	A collection of EStampVendor objects should be returned from the call to getAllVendors() on the Pre-Condition VendorConfiguration object.
Add Vendor Test	<p>An EStampVendor object has been instantiated and the Vendor Name, URL, and Password as well as the Sender Email and Credit Card have been set.</p> <p>A VendorConfiguration object has been instantiated.</p>	The persistent storage is examined to verify that the Pre-Condition EStampVendor has been added when addVendor() is called on the Pre-Condition VendorConfiguration object.