

City of Houston

Acceptance Test Criteria

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**3-26-07
5:30 CST**

Introduction

EarthLink uses a standardized architecture and design for the EarthLink Wi-Fi Broadband Network. This design is customized and deployed appropriately for each city in which EarthLink implements/maintains a network.

Robust testing is performed on each city network throughout its lifecycle to ensure that it operates as designed/expected. Any learnings discovered are leveraged and applied across all cities, ensuring that all city networks are optimized.

Each city has its own unique characteristics and environment, not to mention its own stakeholders who are deeply interested in the progress and performance of the network.

Accordingly, while EarthLink tests every portion of the network as it is designed and deployed; extra attention is paid to the initial deployment in each city (which is typically defined as the first tower).

Due to the unique nature of products to be deployed in each city, the test scenarios included in this document are specifically geared towards testing the Wi-Fi network. Each product has its own individual test plan, which will be provided to the city as part of the Onboarding process for that product. Acceptance of the individual product tests will not impact testing or continued rollout of the network.

This document outlines, at a high level, the testing that is performed for that initial city launch and is intended to provide a framework for launch acceptance testing criteria.

Testing Approach - Overview

The EarthLink Quality Engineering team, with City review, will use a standard suite of scenarios described below that represent the various ways that the end users will experience the network. The testing will be performed locally by the testing team throughout the deployment area. The City and EarthLink will form a joint technical testing team. The City will employ personnel who will observe and review the testing results as members of the testing team. The City may also perform these same tests on its own, either directly or through independent experts.

Each test case is prioritized as High, Medium, or Low and then scheduled accordingly.

Testing Approach – Additional Detail

To test Outdoor and Indoor Performance, the technical testing team will use a combination of test tools. The technical testing team may agree on other scenarios as appropriate.

- a. Outdoor Test
- b. Outdoor testing will cover each zone of the build out. In each zone, the technical testing team will perform tests in 15 geographically dispersed areas.
 - i. Licensee will share a coverage map to show signal propagation in the zone. An outdoor zone is accepted if signal is available in 95% of the zone except for Excluded Areas.
 - ii. Performance for an outdoor location is considered accepted if the test area conforms to acceptable limits within the SLA and the test scenarios herein.
- c. Indoor Test
- d. Indoor testing will cover each zone of the build out. In each zone, the technical testing team will perform tests in 5 geographically dispersed areas.
 - i. An indoor location is considered accepted if a majority of the test area conforms to acceptable limits within the SLA and the test scenarios herein.

Defect Management

When a location is tested and the scenario results deviate from the test scenarios herein, the testing team will log the site as “Failed.”

The testing team will work in conjunction with the Operations resources, applications developers, engineers and project managers to assign a “defect severity.” The defect severities include:

- Severity 1 – Any defect identified that prohibits the network from performing within acceptable limits of the SLA and the test scenarios herein.
- Severity 2 – Any defect identified that does not prevent the network from performing within acceptable limits of the SLA and the test scenarios herein but causes unexpected or undesirable results that require an explicit action or workaround by the end user.

- Severity 3 – Any defect identified that does not prevent the network from performing within acceptable limits of the SLA and the test scenarios herein but causes an unexpected or undesirable results but does not require an explicit action or workaround by the end user.
- Severity 4 – Any defect that has a minimal unexpected result, but the result is still an acceptable customer experience. Things like typos or minor aesthetic issues are examples of Severity 4 defects.

All defects are logged in an EarthLink-customized version of Remedy and managed until the defect is resolved or otherwise closed.

Additionally, a test location shall fail if any scenario operation is found to adversely affect basic functionality or cause failure of the hardware and/or software. All failures will be reported as defects.

Network Acceptance Criteria

The network will be considered tested and accepted once:

- All scenarios at all locations are tested and logged
- There are no unresolved “Severity 1” or “Severity 2” defects
- If there are outstanding “Severity 3” defects, the workarounds are documented by EarthLink and submitted to the Director.
- All outstanding “Severity 3” or “Severity 4” defects have a documented target correction date.

Any location with a defect must be retested and accepted.

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Appendix

This Appendix is comprised of the following test scenarios (listed chronologically):

- Indoor Performance
- Outdoor Performance
- Miscellaneous

Indoor Performance

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass/ Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|------------------|-----|---|--|---------------|----------------------|-----------------------|----------------------------------|------------------------|
| Connectivity | 1.1 | An EarthLink customer connects to the Feather Secure SSID using an EarthLink branded CPE. | Upon successfully associating to the Feather Secure SSID, the customer will receive a Success page and then will have open access to the Internet. | | | | | |
| Connectivity | 1.2 | A Wholesale customer connects to the Feather Secure SSID using the Generic branded CPE. | Upon successfully associating to the Feather Secure SSID, the customer will receive a Success page and then will have open access to the Internet. | | | | | |
| Email | 1.3 | A customer sends an email while connected to the Feather Secure SSID using a CPE. | The customer is able to successfully send email while connected to the Feather Secure SSID using a CPE. | | | | | |
| Email | 1.4 | A customer receives an email while connected to the Feather Secure SSID using a CPE. | The customer is able to successfully receive email while connected to the Feather Secure SSID using a CPE. | | | | | |
| Throughput | 1.5 | A customer performs a speed test to the edge router using an industry standard test tool. | The customer is able to perform a speed test. The network throughput is 1.0 Mbps up and down on average | | | | | |
| Latency | 1.6 | A customer performs a latency test to the edge router. | The latency between the end user device and EarthLink's edge router is <= 100ms. | | | | | |
| Security | 1.7 | An EarthLink retail customer performs a secure login | Customer can successfully perform secure login using EarthLink's connection manager | | | | | |

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|------------------|-----|--|--|---------------|----------------------|-----------------------|----------------------------------|------------------------|
| | | | and security software | | | | | |
| Security | 1.8 | A wholesale customer performs a secure login | Customer can successfully perform a secure login to their retail service provider using a proxy RADIUS request | | | | | |
| Security | 1.9 | A customer can establish a VPN tunnel over the network | Customer can perform a successful VPN tunnel connection | | | | | |

Outdoor Performance

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass / Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|-----------------------------------|-----|--|--|-------------|-------------------|--------------------|----------------------------|------------------|
| Connectivity to Open Access SSIDs | 2.1 | An EarthLink customer connects to the Feather By EarthLink SSID and authenticates to the network using the Feather Portal. | Upon successfully authenticating using the Feather Portal, the customer will receive a Success page and then will have open access to the internet. | | | | | |
| Connectivity to Open Access SSIDs | 2.2 | A Wholesale customer connects to the Feather By EarthLink SSID and authenticates to the network using the Feather Portal. | Upon successfully authenticating using the Feather Portal, the customer will receive a Success page and then will have open access to the internet. | | | | | |
| Connectivity to Open Access SSIDs | 2.3 | An Occasional Use Feather customer with time remaining in their session connects to the Feather By EarthLink SSID and authenticates to the network using the Feather Portal. | Upon successfully authenticating using the Feather Portal, the customer will be redirected to the City specific Welcome Page and then will have open access to the internet. | | | | | |
| Connectivity to Open Access SSIDs | 2.4 | An Occasional Use Feather customer whose session time has expired connects to the Feather By EarthLink SSID and authenticates to the network using the Feather Portal. | The customer will be redirected to the Feather Refill page, where they will have the option to purchase additional time. | | | | | |

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass / Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|------------------------------|------|---|--|-------------|-------------------|--------------------|----------------------------|------------------|
| Connectivity to Secure SSIDs | 2.5 | An EarthLink customer connects to the Feather Secure SSID using the Feather Wi-Fi client. | After a browser window is opened, the customer has open access to the internet. | | | | | |
| Connectivity to Secure SSIDs | 2.6 | A Wholesale customer connects to the Feather Secure SSID using the Feather Wi-Fi client. | After a browser window is opened, the customer has open access to the internet. | | | | | |
| Connectivity to Secure SSIDs | 2.7 | An Occasional Use Feather customer with time remaining in their session connects to the Feather Secure SSID using the Feather Wi-Fi client. | After a browser window is opened, the customer has open access to the internet for the duration of their session. | | | | | |
| Connectivity to Secure SSIDs | 2.8 | An Occasional Use Feather customer whose session time has expired connects to the Feather Secure SSID using the Feather Wi-Fi client. | After a browser window is opened, the customer will be redirected to the Feather Refill page, where they will have the option to purchase additional time. | | | | | |
| Throughput | 2.9 | A customer performs a speed test to the edge router using an industry standard test tool | The customer is able to perform a speed test. The network throughput is average 1.0 Mbps up and down. | | | | | |
| Latency | 2.10 | A customer performs a latency test to the edge router. | The latency test between the end user device and EarthLink's edge router is less than <= 100ms. | | | | | |
| Security | 2.11 | An EarthLink retail customer performs a | Customer can successfully perform secure login using | | | | | |

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass / Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|------------------|------|--|--|-------------|-------------------|--------------------|----------------------------|------------------|
| | | secure login | EarthLink's connection manager and security software | | | | | |
| Security | 2.12 | A wholesale customer performs a secure login | Customer can successfully perform a secure login to their retail service provider using a proxy RADIUS request | | | | | |
| Security | 2.13 | A customer can establish a VPN tunnel over the network | Customer can perform a successful VPN tunnel connection to a VPN concentrator | | | | | |

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass / Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|----------------------------------|------|--|---|-------------|-------------------|--------------------|----------------------------|------------------|
| Occasional User Product Purchase | 2.14 | A customer purchases the 1-Hour Product. | The customer is able to surf the internet for 60 continuous minutes. The customer receives an email confirmation with their invoice upon purchase of the session. After 60 minutes, if a browser window is open the customer will be redirected to the Refill page on the Feather Portal. | | | | | |
| Occasional User Product Purchase | 2.15 | A customer purchases the 1-Day Product. | The customer is able to surf the internet for 24 continuous hours. The customer receives an email confirmation with their invoice upon purchase of the session. After 24 hours, if a browser window is open the customer will be redirected to the Refill page on the Feather Portal. | | | | | |

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass / Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|----------------------------------|------|---|--|-------------|-------------------|--------------------|----------------------------|------------------|
| Occasional User Product Purchase | 2.16 | A customer purchases the 3-Day Product. | The customer is able to surf the internet for 72 continuous hours. The customer receives an email confirmation with their invoice upon purchase of the session. After 72 hours, if a browser window is open the customer will be redirected to the Refill page on the Feather Portal. | | | | | |
| Refilling Time | 2.17 | A customer refills their account after their session expires. | The customer is able to successfully refill their time after their session expires. The customer is able to continue to surf the internet. The customer receives an email confirmation with their invoice upon refill. After their new session expires the customer will be redirected to the Refill page. | | | | | |

Miscellaneous

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass / Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|--------------------------------|-----|---|--|-------------|-------------------|--------------------|----------------------------|------------------|
| Login/ Password Recovery | 3.1 | An existing customer needs to recover a lost password. | The existing customer is able to successfully reset their password. | | | | | |
| Login/ Password Recovery | 3.2 | An existing customer needs to recover their username. | The existing customer is able to successfully recover their username. | | | | | |
| My Account | 3.3 | A customer updates their Account Information. | The customer is able to successfully update their account information. | | | | | |
| My Account | 3.4 | A customer updates their Billing Information. | The customer is able to successfully update their billing information. | | | | | |
| Local Portal Content | 3.5 | A customer clicks on a City specific link on the Portal Landing page. | A new browser window opens for the City specific link. | | | | | |
| Local Portal Content | 3.6 | After authentication a Feather customer is presented with the city customized Welcome page. | The City customized Welcome page contains city specific links, local news, local search, traffic, and local directory. | | | | | |
| Monthly Plans | 3.7 | A customer clicks on the "Learn About Monthly Plans" link within the Feather portal. | The customer is redirected to the Monthly plans page where they are presented with companies that offer monthly plans in their city. | | | | | |

| Scenario Summary | # | Scenario Description | Scenario Expected Result | Pass / Fail | If Fail, Severity | Distance from Node | Specialist Performing Test | Latest Test Date |
|----------------------------|-----|--|--|-------------|-------------------|--------------------|----------------------------|------------------|
| Multilingual Functionality | 3.8 | A customer clicks on the "Español" link within the Feather Portal. | After clicking on the link, the Feather Portal's (landing page, sign-up, refill) language will change from English to Spanish. | | | | | |
| Multilingual Functionality | 3.9 | A customer clicks on the "English" link within the Feather Portal. | After clicking on the link, the Feather Portal's (landing page, sign-up, refill) language will change from Spanish to English. | | | | | |