

Structured Contact Tracing Protocol, V. 2.0 (1.5)

Test Goal

The goal of this test is to collect Bluetooth RSSI data between two iPhones at different distances, orientations, and carrying positions relative to each other under different environmental conditions.

One tester, the **Beacon**, will stay stationary at one end of the test space with a phone in a particular position for the duration of each distance test. The other tester, the **Receiver**, will run the Contact Tracing app to collect data at different distances and rotation angles relative to the **Beacon** position. Each tester will choose a position to place their phone, and should keep that position throughout each distance-test. After each distance is complete, the **Receiver** will send data to the Contact Tracing team for evaluation. The **Receiver** will then move to a new distance further away and repeat the process with the **Beacon** still maintaining in the exact same position. The test is completed when data from all distances is sent back to the Contact Tracing team for evaluation.

Important Note: The Testers must be currently cohabitating to conduct this test, and must strictly obey social distancing guidelines if the test is conducted outside, in common areas or other publically accessible locations. Please visit the following CDC website for more social distancing guidelines and information:

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html>

Site Set-Up and Materials

Estimated time: 5 min

Materials: Tape measure; Small objects or Post-it Notes to mark ground/floor positions

1. Locate a suitable space to conduct the test. The site should be level, at least 20 feet long with no barrier in between (i.e. walls, book cases, desks) and with enough room for the testers to stand so people can walk freely by.

Note: Please try to limit the number of people and phones around the space to just the two testers.

2. Mark one end of the space by placing an object or Post-it Note on the floor or ground. This is **Station 0** where the **Beacon** will stand for all tests.
3. Using the tape measure, mark distance stations at 3, 4, 5, 6, 8, 10, 12, and 15 ft. from **Station 0** in a straight line (Figure 1). These are distance stations that the **Receiver** will stand on.

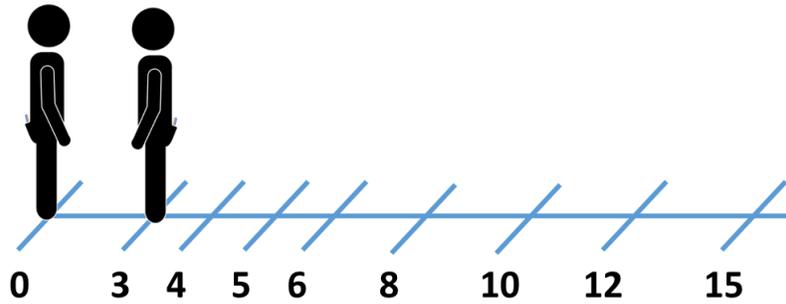


Figure 1

Test Instructions

Phone Setup

Important: The **Receiver** and **Beacon** must both use an iPhone for testing.

1. Make sure the current version of the iPhone Contract Tracing app is on both iPhones. Instructions for app download:
 - Download “TestFlight” from the App Store
 - Send the email address associated with your phone to Stacy (stacy.zeder@ll.mit.edu) to receive an invite to download the app
 - Follow the link in the email to TestFlight and download “BlueProximity”
2. Configuration for both the **Receiver** and **Beacon**:
 - Ensure the phone has either a good cell or WiFi connection
 - Ensure that Bluetooth is enabled while using the app (Figure 2).
 - If the phone is in a case with an external battery, please remove it from the case
 - Ensure that power-save mode is not on; the screen should stay on throughout the data collect
 - From the iOS home screen, open the **Settings** app.
 - Tap **Display & Brightness**, then scroll down and tap **Auto-Lock**.
 - Change auto-lock timeout to **Never**. For laboratory phones, the maximum auto-lock time is 5 minutes; select 5 min.

Note: For security, remember to change this back to its previous setting when you’re done collecting data

 - Return to the home screen
 - Ensure the phone has sufficient battery life to run the test (~ 25 minutes)
 - Ensure that the volume is ON and is loud enough to be heard when the phone is stored
 - Be sure to know the iPhone model of the **Beacon** before starting the test
3. Both testers open the app, and press “Select a test scenario”.

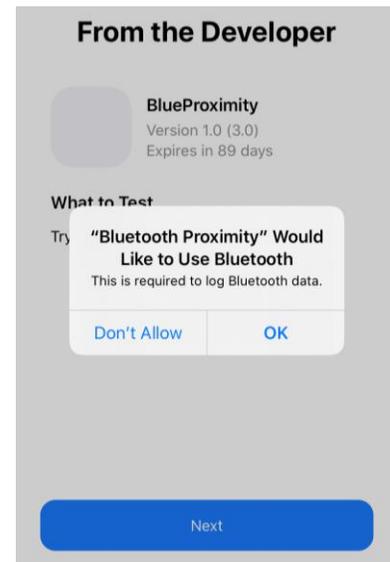


Figure 2

4. Then press “Test Type” and select Structured; press “Test Scenario” and select Test Protocol Full. Then move to the next page.
5. The **Receiver** then selects “Receiver Tester” while the **Beacon** selects “Beacon Tester”, then Next.
6. The **Beacon** phone will then be ready for use throughout the data collection (Figure 3).
7. The **Receiver** will next input the follow information about the **Beacon** phone:
 - (Ignore “User ID” for now)
 - **Beacon** iPhone model
 - **Beacon** phone location on the body (Figure 5)
 - **Beacon** position: whether sitting or standing
 - Note: the **Beacon’s** phone location and body position should remain consistent throughout the data collect.
8. The **Receiver** selects “Next” to move to enter the dropdowns about environment, phone location on body (Figure 4), and body position (sitting or standing) (Figure 5). The phone location on body and position should remain consistent throughout the data collect.
9. Lastly, the **Receiver** selects where they would like to send the data: selects “MIT LL e-mail”.



Figure 3

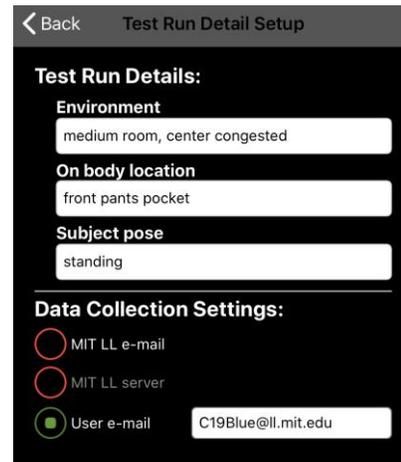
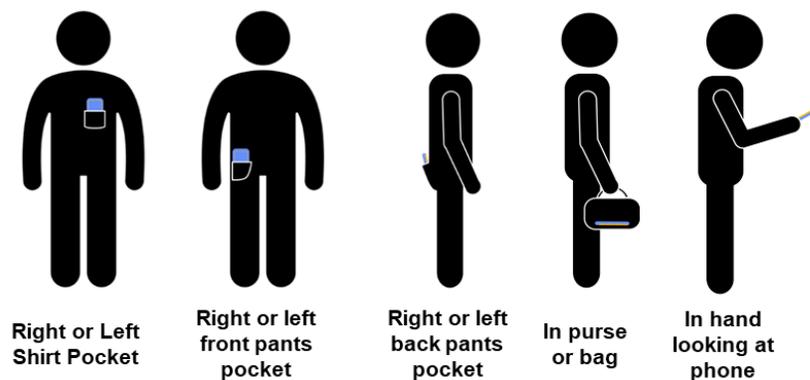


Figure 4



Note: Phone screen faces body in all positions

Figure 5

Running the Test

Estimated time: 20 min

- To begin the test, the **Beacon** stands on **Station 0** and the **Receiver** stands at the 3ft Station (Figure 5). Both testers are facing each other.
- The **Beacon** stores their phone in the location selected during set-up. They will hold this position with their phone in the same location for every angle and distance tested, and will only move their phone to tap the screen (refresh) between each distance data-collection.
- The **Receiver**, at the 3ft distance and facing the **Beacon**, pushes the “Start” button. They will see a green indicator flashing to show that the app is collecting data (Figure 6).
- The **Receiver** quickly stores their iPhone in the location they selected in the drop down during phone setup, and data collection will start after 5 seconds.
- The **Receiver** will hold their angle-position until they hear a “whistle” (after 15-seconds). When they hear the whistle, they will rotate clockwise by 45 degrees, and hold still again until they hear the next whistle. Note: there is a short delay between data capture at angles to allow the tester to transition to the correct angle.
- They will continue to rotate at each “whistle” until they have collected data at all 8 angles, and will hear a “beep-tone”.
- Then the **Receiver** will remove their phone from its position and press “Send Data.”
- At the same time between distances, the **Beacon** will also remove their phone and touch the screen, simply to ensure that it remains active.
- Then the **Receiver** will move to the next distance station, 4ft. facing the beacon again, they will press “Start” and the data collection will commence again. Repeat the process of **both** users storing the phone, rotating at each “whistle”, and then sending the data.
- Continue the data collection for all distances: 3, 4, 5, 6, 8, 10, 12, 15 ft. After each distance have been completed, be sure to press “Send Data”.
- Once all distances are complete, the “train whistle” will sound. Once the **Receiver** has sent the final data, **both** testers can close the app.

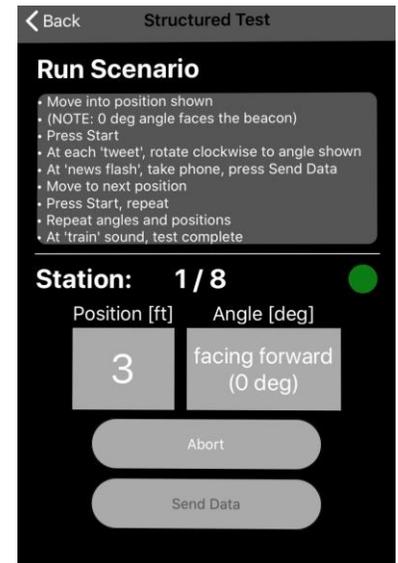


Figure 6

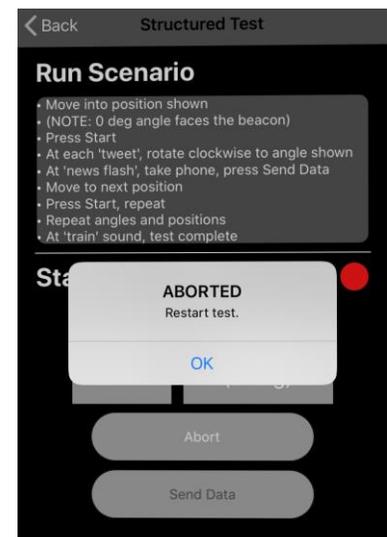


Figure 7

If a Mistake is made during data collect:

If the test is aborted because “No beacon found”, go to settings -> Bluetooth on both phones and pause until both testers see the other phone listed under *other devices*; then return to the testing app and try to re-start the test.

If an error is made at one of the distances during data collect, simply select “abort” (Figure7). Then the Receiver will be able to restart the test at that distance by pressing “Start”. Please do not close the app during a data collection event.

If there is a problem with the app, any questions about the data collect protocol, contact bluetooth-proximity-admin@mit.edu or submit your comment via github (<https://github.com/mit-ll/BluetoothProximity>)

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