### **Test Report - Smart Safe Project**

## **1. Functional Tests**

### **Test 1: Keypad Entry Test**

* **Objective:** Verify that the keypad allows entry with the correct PIN and denies access for incorrect PINs.
* **Test Steps:**
  1. Enter the correct PIN.
  2. Observe whether the servo motor unlocks
  3. Enter an incorrect PIN
  4. Observe if the system remains locked.
* **Expected Result:** Correct PIN unlocks the safe; incorrect PIN denies access.
* **Actual Result:** Pass

### **Test 2: Servo Lock Mechanism**

* **Objective:** Confirm that the servo motor properly locks and unlocks the safe.
* **Test Steps:**
  1. Send an unlock command via the keypad.
  2. Observe if the servo motor rotates to unlock.
  3. Send a lock command.
  4. Observe if the servo motor rotates to lock.
* **Expected Result:** Servo motor locks/unlocks the safe as expected.
* **Actual Result:** Pass

### **Test 3: LCD display**

* **Objective:** Confirm that the display is clear and readable.
* **Test Steps:**
  1. Wired the display and connected it to the Arduino using I2C.
  2. Ran a test code from the Arduino to the display and checked if the display displayed the code.
  3. Rotate the I2C potentiometer clockwise or counterclockwise to find the optimal contrast level for the display.
* **Expected Result:** pass
* **Actual Result:** Pass

### **Test 4: RFID card reader**

* **Objective:** Confirm that the RFID can read tags..
* **Test Steps:**
  1. Wired the RFID and connected it to the Arduino
  2. Assign an RFID tag and program the Arduino to turn on the LED if it reads the correct tag if otherwise, no.
* **Expected Result**: pass
* **Actual Result:** Pass

## **- Performance Tests**

### **Test 5: Response Time Test**

* **Objective:** Measure how long it takes for the safe to unlock after authentication.
* **Test Steps:**
  1. Authenticate using a correct PIN.
  2. Record the time taken for the safe to unlock.
* **Expected Result:** The unlock process is completed within 1 second.
* **Actual Result:** Less than a second

### **Test 6: Power Test**

* **Objective:** Check if the safe’s battery can charge when the power boost is connected to a power source.
* **Test Steps:**
  1. Connecting the power boost to a power source using USB-C.
  2. Check if the power boost is charging the battery by the LED indicators.
  3. Check how long the battery will last before it needs to be recharged.
* **Expected Result:** The Power boost can charge the battery, and it lasts for a week.
* **Actual Result:** 
  1. The battery takes 60 minutes to fully charge.
  2. It takes 10 days to discharge with normal daily use.