# Acceptance Tests

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## Ease of Use

**Test Name**: EU\_T1  
**Requirements Tested**: EU1

**Outline**: Ensure that the device boots up under 2 minutes

**Pre-requisites**: Make sure the device is turned off and healthy

**Method:**

|  |  |  |
| --- | --- | --- |
| *STEP* | *Action* | *Expected Observation* |
| 1. | Power on the device | Observe booting process |
| 2. | Run a timer to record the time it took boot up | Device fully booted |

**Test Name**: EU\_T2  
**Requirements Tested**: EU2, EU3, EU4  
**Outline**: Ensure that the device does not need to be charged very often  
**Pre-requisites**: Device is fully charged

**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Connect the device to a power source and make sure the battery is charging | Battery should be charging |
| 2. | Stop charging the battery at 100% | Battery percentage should be 100% |
| 3. | Run a timer until the device turns off itself and then take the reading from the timer | Device should be turned off and you should have a reading that tells you how long the device can run on battery |

**Test Name**: EU\_T3

**Requirements Tested**: EU3, EU9, EU10

**Outline**: Ensure that the device can be powered by USB

**Pre-requisites**: Device can be turned off or turned on

**Method:**

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Connect the device to power source via a USB connection | Device is connected to the power source |
| 2. | Ensure that the battery is being charged | LEDs on the device should indicate that the power is being transmitted from the power source to the device |
| 3. | Check the battery percentage | Battery percentage should be going up |

**Test Name**: EU\_T4

**Requirements Tested**: EU5, S1, S2, S3, S4

**Outline**: Ensure that the results can be viewed on the screen

**Pre-requisites**: Device is turned on and healthy

**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Navigate to where the results are being displayed | You are on the expected menu section |
| 2. | Check the screen | Results are being displayed |

**Test Name:** EU\_T5  
**Requirements Tested**: EU6, EU8  
**Outline:** Ensure that users can adjust the screen brightness  
**Pre-requisites**: Device is turned on and healthy

**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Navigate to where the screen brightness settings are | See the brightness setting options |
| 2. | Select the brightness options and click on the button to **decrease** the brightness | Screen brightness is dimming down |
| 3. | Select the brightness options and click on the button to **increase** the brightness | Screen brightness is increasing |

**Test Name**: EU\_T6  
**Requirements Tested**: EU7, EU8  
**Outline**: Ensure that text size is adjustable  
**Pre-requisites**: Device is turned on and healthy  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Navigate to where the screen font settings are | See the font settings options |
| 2. | Select the font options and click on the button to **decrease** the size of font | Font size is decreasing |
| 3. | Select the font options and click on the button to **increase** the size of font | Font size is increasing |

## Interfacing Between Devices

**Test Name:** IBD\_T1

**Requirements Tested:** I1, D3, DB5

**Outline:**  A PC can read files from the ECG

**Prerequisites:** The PC and ECG are powered and healthy, the ECG is connected to the PC via USB.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | View USB devices on the PC. | The PC should list the ECG as a device. |
| 2 | Mount the ECG to the OS. | The ECG should successfully mount to the OS. |
| 3 | Navigate to the ESG and list files. | The ECG should successfully mount to the OS. |

**Test Name:** IBD\_T2

**Requirements Tested:** I2, P9, M1, D3, DB5, S5

**Outline:** The ECG can send files via Bluetooth to a PC.

**Prerequisites:** The PC and ECG are powered on and healthy, Bluetooth is turned on and discoverable on the PC and ECG.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | Search for Bluetooth devices on the PC. | The PC can find the ECG as a Bluetooth device. |
| 2 | Connect the ECG on via the PC. | The ECG should receive a prompt to connect to the PC.  The ECG should accept the request, and the PC should show a healthy connection status to the ECG. |
| 3 | On the ECG, navigate the menu to find files. Use the buttons to send via Bluetooth. | The PC should get a notification of an incoming file from the ECG. |

**Test Name:** IBD\_T3

**Requirements Tested:** I3, I4, P8, D3, DB5,

**Outline:** View files on the ECG from a PC.

**Prerequisites:** The PC and ECG are powered on and healthy, is connected to the network via Wi-Fi or ethernet, the ECG and PC are on the same network, ECG credentials are known.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | List connected device on the router. | The ECG should be visible and should have an IP address. |
| 2 | Using the PC, SSH into the ECG using its IP. | SSH connection should be successful. |
| 3 | Using the correct terminal commands; navigate to the folder containing ECG save files, and list. | A list of files in the current directory should be listed. |

**Test Name:** IBD\_T4

**Requirements Tested:** I6, P8, M1, D3, S4, S5

**Outline:** Send data from ECG to a server.

**Prerequisites:** The ECG is powered on and healthy, is connected to a network via ethernet or Wi-Fi and the PC is connected to the network via ethernet or Wi-Fi, The server is connected to the same network as the ECG.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | Check ECG has a successful connection with the server. | ECG is connected to the server. |
| 2 | Navigate menu to find the list of records on the ECG and select the option to upload a singular file to the server. | A prompt should appear on ESG to confirm server upload. |
| 3 | Confirm upload from prompt. | An uploading prompt appears.  An upload complete prompt proceeds. |
| 4 | Check the file has successfully been uploaded to server. | An uploading prompt appears.  An upload complete prompt proceeds. |

**Test Name:** IBD\_T5

**Requirements Tested:** I7, E5, M1, D3, DB5, S5

**Outline:** View previous results from database.

**Prerequisites:** The ECG is powered on and healthy, results have already been saved to the local database.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | Navigate menu to results page. | Results are shown in chronological order (latest first) |

**Test Name:** IBD\_T6

**Requirements Tested:** I5, E5, M1, D1, D3, H7, S3, S5, E1, E3, E6

**Outline:** Results are sent via SMS to client.

**Prerequisites:** The ECG is powered on and healthy.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | Navigate menu and select record new readings. | Recording screen is shown. |
| 2 | After the results have been recorded, select option to send results via SMS. | A prompt should appear to enter a phone number. |
| 3 | Confirm phone number and press send. | The results are received in plain text to the specified phone number. |

## Menu

**Test Name**: MENU\_T1  
**Requirements Tested**: M1, M2, M3, M4, M5, M6, S2, S5, H1, H5  
**Outline**: Ensure that the Menu can navigate between Sub-Menus and return to the Main Menu  
**Pre-requisites**: System turned on, display functional   
**Method**:

|  |  |  |
| --- | --- | --- |
| STEP | Action | Expected Observation |
| **1** | Use device input such as buttons/sliders to cycle through possible menu options | Display shows cycling of possible menu options through a possible “hover over” state |
| **2** | Use button to select menu option, for example “Start ECG Reading” or “Settings” | Device correctly navigates to the chosen sub menu and the display reflects this |
| **3** | Use button to return to the main menu | Device returns correctly to the main menu and display reflects this |

**Test Name**: MENU\_T2  
**Requirements Tested**: M2, M3, M4, H5, ECG(All), S2, S5, DB1, DB5, H6  
**Outline**: Ensure the user can prompt the start of an ECG reading via Menu navigation on the device  
**Pre-requisites**: Device is on, Menu navigation working correctly, ECG sensors connected  
**Method**:

|  |  |  |
| --- | --- | --- |
| STEP | Action | Expected Observation |
| **1** | Use buttons to navigate to “Start Reading” | Device and display correctly reflect the selection |
| **2** | After the reading is complete, use buttons to navigate menu to view results of reading | Displays the correct reading on the screen |
| **3** | Select “View previous readings”, pull from database | Displays correctly |
| **4** | Return to menu using buttons | Display and device reach main menu |

**Test Name**: MENU\_T3  
**Requirements Tested**: M1, M2, M7, H1, S5, P6  
**Outline**: Ensure the board can be rebooted as prompted by the user  
**Pre-requisites**: Device is on, Menu navigation working correctly, I/O functional  
**Method**:

|  |  |  |
| --- | --- | --- |
| STEP | Action | Expected Observation |
| **1** | Use buttons to cycle to reboot option | Display reflects this |
| **2** | Use button to select reboot option | Device shuts down safely, then reboots automatically, fully functional and ready to go |

## Data Handling

**Test Name**: DH\_T1  
**Requirements Tested**: D3  
**Outline**: Ensure that the device can store ECG readings on the device/database  
**Pre-requisites**: Device is on and functional, sensors connected and working correctly  
**Method**:

|  |  |  |
| --- | --- | --- |
| STEP | Action | Expected Observation |
| **1** | Begin an ECG reading on the device | Device starts reading, following the reading, option for saving data results appears |
| **2** | Select option to save data to device | successfully saves |
| **3** | Load results data from device | Data loads and displays on the screen |

**Test Name**: DH\_T2  
**Requirements Tested**: D1, D2  
**Outline**: Ensure that the data can be saved as a file that can be readable by a computer  
**Pre-requisites**: Device is on, reading has taken place **Method**:

|  |  |  |
| --- | --- | --- |
| STEP | Action | Expected Observation |
| **1** | Following ECG reading, select “save as file” | ding |
| **2** | Connect ECG to PC | PC can detect and view data results file |
| **3** | Open file in a text editor | Data file is human readable and formatted |

## Database

**Test Name:** DB\_T1

**Requirements Tested:** DB1, DB4, DB5, EU5, M1, M2

**Outline:** Data is being loaded from the database.

**Prerequisites:** The ESG is powered and healthy.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | Navigate menu to find the list of past readings. | A list of previous readings should be listed. |

**Test Name:** DB\_T2

**Requirements Tested:** DB2, DB3, DB4, I7, M1, M2, M5, M8, H7

**Outline:** Edit user data.

**Prerequisites:** The ESG is powered and healthy.

**Method:**

|  |  |  |
| --- | --- | --- |
| **Step** | Action | Expected Observance |
| 1 | Navigate menu to find the user profile information. | The user information fields (age, gender etc.) should appear either blank or prefilled. |
| 2 | Edit the information. | Fields should be editable. |
| 3 | Save changes. | * A save success prompt should appear. * Information fields should appear again, but with the alterations. |

## Human Interface

**Test Name**: HI\_T1  
**Requirements Tested**: H1. H2, H3, H4  
**Outline**: Ensure that a single button click is registered as only a click  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Click the button for an option | No other type of button press is registered |

**Test Name**: HI\_T2  
**Requirements Tested**: H1. H2, H3, H4  
**Outline**: Ensure that a double button click is registered as only a double click  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Double click an option | No other type of button press is registered |

**Test Name**: HI\_T3  
**Requirements Tested**: H1. H2, H3, H4  
**Outline**: Ensure that a single long press is registered as only a long a press  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Hold button down to select an option | No other type of button press is registered |

**Test Name**: HI\_T4  
**Requirements Tested**: H1. H2, H3, H4  
**Outline**: Ensure that pressing multiple buttons at once is registered as nothing else  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Push multiple buttons | No other type of button press is registered |

**Test Name**: HI\_T5  
**Requirements Tested**: H5  
**Outline**: Use the slider to change an option  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Adjust the slider such that an option is changed | The slider input is correctly handled |

**Test Name**: HI\_T6  
**Requirements Tested**: H6  
**Outline**: View feedback on the screen  
**Pre-requisites**: System is turned on, healthy, and ready to send output  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Make changes to the system such that what is displayed to the user will change | Any changes or actions carried out by the user are communicated to them |

**Test Name**: HI\_T7  
**Requirements Tested**: H7  
**Outline**: Enter information on a user  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Goto user profiles |  |
| 2 | Create or edit a new user |  |
| 3 | Enter user information using various combinations of the button presses | The data being entered can be entered by the user using the buttons |

**Test Name**: HI\_T8  
**Requirements Tested**: H8  
**Outline**: Use the slider to change the ECG scale  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Navigate to ECG screen |  |
| 2 | Use the slider to zoom in/out | The readings are enlarged |

**Test Name**: HI\_T9  
**Requirements Tested**: H9  
**Outline**: Change the scale of the UI using the slider  
**Pre-requisites**: System is turned on, healthy, and ready to receive input  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | While on any screen use the slider to change the scale of the text and other things | The text is enlarged/shrank |

## Screen

**Test Name**: S\_T1  
**Requirements Tested**: S1, S3, E1, E6  
**Outline**: Ensure that the screen displays the heart rate  
**Pre-requisites**: Device is turned on and healthy

**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Connect the sensors | Sensors are connected |
| 2. | Look at the screen | See the heart rate |
| 3. | Take off the sensors | See the heart rate value either disappear or display 0 |

**Test Name**: S\_T2  
**Requirements Tested:** S2, DB1, DB4  
**Outline**: Ensure that the screen displays all the available / useful data  
**Pre-requisites:** Device is turned on and healthy

**Method:**

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Connect all the sensors and peripherals that can be connected | All sensors and peripherals are fully connected |
| 2. | Make sure that all the data is formatted perfectly on the screen so that every useful and available data can displayed on one screen | View all the available / useful data in one screen without any data missing or protruding out of the screen |

**Test Name:** S\_T3  
**Requirements Tested:** S1, S3, E1, E6  
**Outline:** Ensure that the screen displays heart rate in real time  
**Pre-requisites:** Device is turned on, healthy and sensors are connected  
**Method:**

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Attach sensors to a person | Sensors are connected to a person |
| 2. | Look at the heart rate reading on the screen | See the heart rate reading on the screen that should be changing according to persons physical activity |
| 3. | Attach the sensors to a different person | Sensors are connected to another person |
| 4. | Look at the heart rate reading on the screen | See that the heart rate reading on the screen is potentially different and still changing which proves that the readings are done in real time |

**Test Name**: S\_T4  
**Requirements Tested**: S4, DB1, DB3, DB4, DB5  
**Outline**: Ensure that the screen can show multiple ECG readings at once  
**Pre-requisites**: Device is turned on and healthy  
**Method:**

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Navigate to where the user profiles are on the menu | See a list of users |
| 2. | Select a user from the list | See a list of previous readings on one screen |

**Test Name**: S\_T5  
**Requirements Tested**: S5, P2, H6, M1, M2, M3, M4, M5, M6  
**Outline**: Ensure that the screen can display a menu **Pre-requisites**: Device is turned on and healthy

**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Look at the screen | See a list of options available to pick for different tasks |

## ECG

**Test Name**: EL\_T1  
**Requirements Tested**: EL1, EL2, EL3, EL5, EL6  
**Outline**: Take the measurements for a user’s heart rate  
**Pre-requisites**: System is on, healthy, ready to receive electrode input, ready to display heart rate  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Navigate to ECG reading screen |  |
| 2 | Attach electrodes to user |  |
| 3 | View Screen | The user’s heart rate is displayed with very little erroneous or odd readings and is shown to be operating in real time |

**Test Name**: EL\_T2  
**Requirements Tested**: EL1, EL2, EL3, EL4, EL5, EL6  
**Outline**: The sensitivity of the device needs to be changed based on a user’s age  
**Pre-requisites**: System is on, healthy, ready to receive electrode input, ready to display heart rate  
**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1 | Navigate to ECG Screen |  |
| 2 | Attach electrodes to user |  |
| 3 | View Screen and record readings |  |
| 4 | Attach electrodes to a different, older user |  |
| 5 | Adjust sensitivity | The readings on the screen should show similar/as clean results as compared to the first readings |

## Sphygmomanometer (Blood Pressure)

**Test Name**: B\_T1  
**Requirements Tested**: B1, B2, B3, B6  
**Outline**: Ensure that the device can measure user’s blood pressure  
**Pre-requisites**: Make sure the device is turned on, healthy and sensors connected

**Method:**

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Attach the sensors to a person | Sensors are properly attached to a person |
| 2. | Once the reading is completed, look at the blood pressure reading on the display | See a reasonable blood pressure reading |
| 3. | Repeat the above ***STEP***s again to check if readings are consistent | See same or very similar blood pressure readings |

**Test Name**: B\_T2  
**Requirements Tested**: B4  
**Outline**: Ensure that the device can take the average blood pressure  
**Pre-requisites**: Make sure the device is turned on, healthy and sensors connected

**Method**:

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Attach the sensors to a person | Sensors are properly attached to a person |
| 2. | Get three different readings from the machine in one sitting | End up with three very similar readings |
| 3. | Once the readings are completed, select the “average” option from the menu | Observe the “average” option returning the average result of the last three readings |

**Test Name**: B\_T3

**Requirements Tested**: B1, B2, B3, B4, B5, B6

**Outline**: Ensure that the device can filter out erroneous readings and data

**Pre-requisites**: Make sure the device is turned on, healthy and sensors connected  
**Method:**

|  |  |  |
| --- | --- | --- |
| **STEP** | Action | Expected Observation |
| 1. | Attach the sensors to a person | Sensors are properly attached to a person |
| 2. | Get different readings from the machine | See the readings on the screen |
| 3. | If some readings are unusually high or low due to – person: not resting 3-5 minutes, talking, has fluctuating body temperature, smoking cigarette less than 30 mins prior to reading or other reasons, identify these readings and delete them. | See a realistic and accurate readings |