Traceability Matrix

ID	Requirement	Related Use Case	Fulfilled By	Test	Description
1	The user interface has many buttons (like power and select), a display like the Oasis Pro, etc.	N/A	MainWindow.ui	Running the application in Qt shows the user interface.	We used Qt's user interface editor to replicate the buttons and display.
2	The power button will turn the device on/off.	UC1	MainWindow	Pressing the power button once the application starts turns the device on. Pressing it twice will turn it off.	To turn on the device, we press the power button. Once the device is on, we have to press the power button twice to turn it off.

3	Simulate the ear clips connection	UC1	MainWindow	If the ear clips connection is not both connected, it will pause the session.	If the ear clips connection is either left, right, or not connected, the session is paused. Once the ear clips connection is both connected, the session resumes. The updateSession() function will pause the session until this is fixed.
4	Select a session frequency	UC1	MainWindow	Power on the device, press the power button again, then select one of the time options by pressing the up/down button and clicking the select button. Afterwards, the session frequency can be selected with the up/down button again by clicking the select button.	The MainWindow will control the session frequency. The frequency has four options, of which the user selects one.

5	Select a session intensity	UC1	MainWindow	Turn the device on and start a session. Once the session has started, the intensity can be changed by pressing the up and down arrow and clicking the select button.	The updateIntensity() function changes the intensity while the program is running. The intensity is set at a default value until the session has started. Once it has started, the intensity can be changed to what the user wants.
6	Simulate the reconnection function of the device	UC2	MainWindow	While the session is running, if the ear clips are disconnected, the session will pause until they are reconnected.	The session is updated to pause once the ear clips disconnect until they are reconnected to both ears.
7	End a session	UC3	MainWindow	Pressing the power button will end the session.	To end the current session, pressing the power button ceases it. The session details will be saved to the side and the session can be restarted from there.

8	Shutdown	UC4	MainWindow	Pressing the power button shuts the device down.	To end the current session, pressing the power button ceases it.
9	Display no connection	UC2	MainWindow	When there is no connection from input/output or ear clips connection, the no connection is displayed by the red button.	To display no connection, the changeEcc, changeCl, changeCS functions display the red button and stop the session.
10	Power lights	UC1	MainWindow	Above the power button, there is an indicator to show whether the power is on or not. It is white when the device is off and green when on.	The powerBtn() and shutDown() function will show the power lights as on and off respectively by changing the color.

11	Stimulate metal jewelry on user's ears	UC1	MainWindow	When there is no metal jewelry, the ear clips are not fully connected. When fully connected, there is an assumption of no metal jewelry.	The changeEcc() function checks if there is any metal jewelry by checking if it is fully connected.
12	Simulate the battery level	UC1 & UC4	MainWindow, Battery	The battery level is simulated as a value in the lower left. The intensity impacts the battery level.	The battery is controlled by the Battery class. The updateBty() function is linked to the timer and updates the battery as it gets lower.
13	Device auto pause the session when lost the connection	UC2	MainWindow	When the session is in progress and the connection is lost, the session is paused.	The updateSession() function auto-pauses the session when the connection is lost.
14	History	N/A	MainWindow, Record	This shows the whole history of the sessions.	The shutdown() function saves the session to the history when the session is ended or the device is shut down.

15	Save session	N/A	MainWindow, Record	This saves any session the user selects from the history.	The save() function saves the current session and all the information corresponding to it.
16	Start a saved session	UC1	MainWindow, Record	Once the start session button is clicked, the clicked saved session will start.	The startRecord() function will start the saved session selected by the user.
17	Change battery level	N/A	MainWindow, Battery	The change battery button will change the battery to the number written by the user for debugging purposes. Since the battery is around ~30 hours, this lets us debug the low battery.	The changeLevel() function will change the battery level to the user specified number for debugging purposes.
18	Replace battery	UC4	MainWindow, Battery	The user can replace the battery when it runs low by pressing the “change battery” button.	The changeBty() function will replace the button with a fully charged one when it is initialized.