

Traceability Matrix

ID	Requirement	Use Case #	Design Elements	Test	Design Description
1	ON Switch	1	MainWindow, Device	Make sure the device is off. Press the Power Button and the device is enabled.	When the PowerButton is pressed, a signal is sent in MainWindow and makes the Device to turn on
2	Battery charge indicator: device issues a warning at 10% and turns off at 0%	2, 10	MainWindow, Device	Make sure the device is turned on and the battery bar is decreasing. When the battery level reaches 10% then send a warning message. If the battery level reaches 0% then shut down the device.	The device starts with a full battery, so the battery bar is set to 100. A QTimer for the battery is connected to the slot decreaseBattery in MainWindow. If the device is on, the battery will decrease every 5 seconds. Once the battery is decreased, the battery bar level will change. The messageBox will display a warning if the battery level reaches 10%. If there is no power left, then the device will automatically turn off.
3	OFF Switch	3, 12	MainWindow, Device	Make sure the device is on. Pressing the power button to let the device turn off.	Once the power button is pressed, a signal is sent in MainWindow and forces the Device to shut down. So the rest of the device is disable.
4	20, 45mins, or custom time	4	MainWindow, Device	Before pressing the start button, choose a treatment time. Choosing the default time or "+" button to enter a custom countdown cycle.	The 20, 25 or "+" released signals are connected to the MainWindow's slots. Once the buttons are pressed, the device sets the time cycle of treatment.

5	4 waveforms Alpha, Beta, Gamma, Theta	5	MainWindow, Device	Before the treatment starts, choose wave form by clicking 1 of 4 options in the interface.	A signal will be sent to MainWindow when a waveform is picked. The Device will then set the treatment waveform based on the option picked.
6	Set intensity from level 1 to 8	6	MainWindow, Device	Set the intensity before the treatment starts by pressing Up or Down button	The upButton and downButton released signals are connected to the MainWindow's upButtonPressed() and downButtonPressed() slots. When a button is pressed, the Device sets the chosen intensity level of treatment.
7	Choosing to record the treatment data to replay on the next treatments	7	MainWindow, Device, Treatment	Once the device is turned on and set up timer, waveform, intensity, the user can choose if they want to do recording. After finishing the treatment, the user can click the history button to see recorded treatments. To do replay, the user can click to one treatment, then click the History button. So the treatment will appear in the interface and ready to start.	When the recordCheckBox is checked, MainWindow will send a signal to recorButtonPressed letting the Device to start recording. The isRecording variable is used to check if the Device is recording. If it is true, the treatment will be saved to QList and added to the treatment ListWidget. When the History Button is pressed, a signal is sent to the historyPressed() slot in MainWindow enabling the treatmentListWidget. Indexing is used to do replay, which assign unique value to each treatment in treamentListWidget.

8	Continuous check if the electrodes contact with patient's skin, sending message to circuit symbol to make the device ON or OFF	8	MainWindow, Device	Change the "Attach to Skin" to false and see if the Start Button is inactivated. Once the "Attach to Skin" is switched to True then the start button is activated	A signal will be sent in MainWindow and change the status of Start Button when "Attach to Skin" is toggled.
9	The device automatically turn off after 30 minutes if not in use	8	MainWindow, Treatment, Device	Make sure the power button was pressed, and the treatment was not started. Leave the device for 30 mins and observes it turns off	If the treatment did not start, a QTimer, skin30Timer's timeout() signal is connected to the MainWindow's slots. The QTimer will call a slot every second to track time. If it reaches 30 then the device is shutted down.
10	If the earclips fall of the user, then the device send warning to user	8	MainWindow, Device	Change the "Attach to Skin" to false and see if the Start Button is inactivated. A warning message letting user to set up ear clips again	A signal will be sent in MainWindow and change the status of Start Button and send a warning message when "Attach to Skin" is changed to False.