Traceability Matrix

ID	Requirement	Related Use Case	Fulfilled By	Test	Description
1	The application interface contains buttons, progress bars, drop-down menus and an input box.	N/A	MainWindow.ui	Run the simulator in Qt to observe the ui.	The CES device simulator was created using Qt's built in user interface. On startup of the program, only the "ON" button is enabled. After the device turns on, all buttons, drop-down menus and input box are clickable with the mouse. Beside the device is the admin panel that allows for more precise control of each element of the simulator system.
2	The application battery depends on time and on when a treatment is running.	N/A	MainWindow	Start a treatment by setting Apply to Skin to TRUE: battery progress bar will lower as time goes by.	The battery drainage is triggered by a QTimer attribute, as time progresses, the battery drains. It drains at a faster rate when a treatment is running.
3	Screen displays the total duration of treatment. Device supports 20, 40 or 60 minute countdown cycles.	Changing Treatment Time On Device (UC3)	MainWindow, Clock	Total time is indicated under "Timer total". Toggle the total time by clicking the "Change total time" button.	The treatment total duration is decided by the user with the "Change total time" button or manually in the admin panel with the drop down menu beside "Timer Total". This information will then be used to update the Clock class attribute before the treatment starts counting down time.
4	Total time of treatment counts down only when applied to skin.	Applying Nodes to User's Skin (UC12)	MainWindow, Clock	When "Apply to Skin" is set to FALSE the timer will not count down. Set "Apply to Skin" to TRUE	Changing the "Apply to Skin" drop-down menu value triggers the boolean to change and when the boolean is true the treatment starts, meaning the remaining time starts

				and watch the timer start to count down.	to count down and the battery drains faster. The time related information is stored with the Clock class.
5	Treatment stops and time restarts if skin contact is lost during treatment for more than 5 seconds.	Applying Nodes to User's Skin (UC12)	MainWindow	Set "Apply to Skin" to TRUE, watch the treatment start, set "Apply to Skin" to FALSE, wait 5 seconds, the treatment will stop and the timer will restart.	A variable stores the amount of seconds gone by after the "Apply to Skin" is set to FALSE before the end of a treatment. If that variable reaches 5, the timer stops, the Clock is updated, the treatment stops running and the displayed time resets.
6	Device supports three different frequencies: 0.5Hz, 77Hz and 100Hz.	Changing Frequency On Device (UC4)	MainWindow	Choose the frequency in the admin panel.	The admin panel has a drop down menu with the 3 frequencies, this information is used when a treatment is recorded.
7	Device supports three wave form options: Alpha, Betta and Gamma.	Changing Waveform s On Device (UC5)	MainWindow	Choose the wave form in the admin panel.	The admin panel has a drop down menu with the 3 wave form, this information is used when a treatment is recorded.
8	Device supports a current with the range [0, 500] microampere current control in 100 microampere increments.	Decreasing Intensity on Device (UC6), Increasing Intensity On Device (UC7)	MainWindow	Choose the current in the admin panel or with the buttons "Less intensity" and "More intensity".	The admin panel has a drop down menu with all the currency options, this information is used when a treatment is recorded. The progress bar under "Intensity" is updated accordingly.
9	30 minute auto-off when device not in use.	N/A	MainWindow, Clock	Leave the program running for 30 mins.	The program adds to a counter for every minute that a treatment is not running, which resets once a treatment starts. Once this counter reaches 30 the device is turned off.
10	Device issues a	N/A	MainWindow	Set the battery	Every time the battery

	warning at 5% charge and shuts down at 2% after issuing another warning.			level to 5% in the admin panel and see the message display in the terminal, wait until the battery drains completely to see the device shut down.	level changes, there is a check to see if it is at 5%, in which case a warning is displayed, and another check for 2%, when the device shuts off..
11	The user can choose to record a therapy and add to a history of treatment.	Viewing Treatment History On Device (UC8), Returning to Main Menu from Treatment History Page On Device (UC9), Record Treatment On Device (UC11)	MainWindow, Record	Start a treatment, click the “Record” button, click “View history” button for treatment details to display to the screen, click “back” button to go back to main screen.	Clicking the “Record” button creates a new Record and saves it in a QVector of Records. A record stores all the information about a treatment. Adding several recordings to the treatment history is done by populating a QStringList with each recording. The “View history” button accesses this QStringList and displays it to the screen.
12	Device will automatically and permanently disable itself should a single fault develop within the device causing the current to exceed 700 µA.	N/A	MainWindow	In the admin panel beside current, select 700 µA +.	When 700 µA + is selected, everything gets disabled, a message prints to the terminal and the device’s display and admin panel get hidden.
13	Device turns on and off.	Turning Device On (UC1), Turning Device Off (UC2)	MainWindow	Click the ON button and click the OFF button.	The ON button enables buttons, shows the device screen and admin panel. The OFF button disables the buttons and hides the device screen and admin panel.