

AED Traceability Matrix

ID	Requirement	Related Use Case	Fulfilled By	Test	Description
1	Design the software for a graphical user interface (GUI) that resembles the AED Plus's display.	N/A	MainWindow.ui	Run the simulation in Qt and check that ui matches with the AED Plus's display.	Using Qt designer we created a Qt based user interface which looks like that of the real world AED Plus's display/User interface.
2	Develop visual elements to display essential information, including: Real time CPR feedback, Cardiac arrhythmia diagnosis results, Device status indicators (e.g., battery, electrode placement), Simulated user interaction controls (e.g., buttons for electrode placement), Include a display panel to show the simulated ECG waveform and device status.	Emergency Use of AED Plus Unit (UC1)	MainWindow, QCustomPlot.	Run through the test list ensuring that it correctly displays shocks, and instructions for all users under all patient conditions.	Mainwindow.ui consists of two sections one which allows us to see all AED display features such as Real time CPR feedback, Cardiac arrhythmia diagnosis results, ECG waveform which is done in QCustomPlot and then Device status indicators. The other one displays simulated user interaction controls such as pad placements, power off/on, etc.
3	Develop a module to simulate the AED's capability to diagnose cardiac arrhythmias, specifically ventricular fibrillation and ventricular tachycardia. This includes: Simulate the analysis process where the AED Plus detects the heart rhythm, If a shockable rhythm is detected, display a message on the screen and provide textual instructions on how to prepare and deliver a shock, and if a non-shockable rhythm is detected, provide appropriate textual guidance for CPR.	Emergency Use of AED Plus Unit (UC1)	MainWindow, AED, Patient.	Run through the test list ensuring that it correctly diagnoses, shocks, and instructs users for all patient conditions.	MainWindow handles the display of the entire AED thus handles the display of textual guidance to users for shockable non shockable, and for CPR. The patient represents the cardiac arrhythmias which is used by both AED and mainwindow to perform analysis of the patients conditions.
4	Create a system that emulates the real-time CPR feedback feature of the AED Plus.	Emergency Use of AED Plus Unit (UC1)	MainWindow, AED	Run through the test list with ECG's enabled ensuring that	MainWindow handles the real-time feedback of the CPR feature, along with an AED class that performs

				all tests ECG's match the current patient's condition correctly.	the analysis to determine if CPR is enough or not.
5	Simulate the measurement and assessment of chest compressions, delivering visual and textual feedback to guide the user.	N/A	MainWindow, AED	Run through the test list ensuring that all tests match the expected text feed backs and visual guidance on the AED display.	MainWindow handles the real-time feedback of the CPR feature while also having the user select if they are not using enough force or good enough. The AED class performs the analysis to determine if CPR is enough or not.
6	Specify scenarios of a simulated cardiac emergency with visual prompts and their timing to guide the user through a rescue situation.	Emergency Use of AED Plus Unit (UC1)	MainWindow, AED, Patient	Run through test list ensuring that all tests match the expected visual prompts.	MainWindow as always will handle the visual prompts and user interactions used to specify scenarios of simulated cardiac emergency to the simulation, then AED will represent the AEDs current conditions along with handling the analysis working with mainwindow to guide the user through said simulated rescue situation.
7	Implement an interactive system that allows users to perform actions mimicking real-world AED operation.	Emergency Use of AED Plus Unit (UC1), Turn On AED (UC2), Turn Off AED (UC3).	MainWindow	Run through test list ensuring that all tests match the real-world AED operations.	This is handled by mainwindow handling and working with the other classes to output correct updates to the user interface representing what would actually happen to an AED display if we were to input these actions and use the AED in real life. For example mainwindow will take the scenario given to it by sim user then call the other classes to

					generate the corresponding AED display outputs.
8	Provide input mechanisms for electrode placement, shock delivery, and CPR initiation.	N/A	MainWindow	Run the simulation, power on AED do this for each scenario, then select patients with shockable and non-shockable conditions. Then test toggling through all DEFIB and CPR testing buttons options	Mainwindow.ui contains there sub sections as a part of the simulation controls called DEFIB PAD testing, CPR Testing, ECG testing, and Power on testing. Each of these subsections support all the buttons needed to select every possible condition of its respective type for example ECG just has a toggle to test off and on, while DEFIB pad testing contains 4 buttons though exclusive between adult and child pad used button, then exclusive between correctly and incorrectly placed button.
9	Develop scenarios with varying patient conditions, user responses, and outcomes to test your software.	N/A	Test List	N/A	Is a List of test we will conduct that ensures we can handle all of the supported scenarios aka Sinus, Asystole, Ventricular fibrillation, and Ventricular tachycardia for both adults and children, along with ECG or not, along with correct or wrong pads, correctly or incorrectly placed pads, Power on and off, CPR on/off, CPR to light, good enough, then when various self test cases fail or not.