Requirement Traceability Matrix

ID	Requirement	Related Use Case	Implemented By	Test	Description
1	Display home screen with battery, insulin, IOB info	Use Case 1, 2	MainWindow UI, SafetyController	Observe the screen after powering on	The main UI displays battery level, insulin levels, and IOB when the pump powers on
2	Navigate between screens through the different buttons	Use Case 1, 2	MainWindow:: on_pushButton_*	Observe the screen after clicking different screen buttons	Allows for smooth navigation across home, bolus, CGM, and options screens
3	Display charging progress and handle low battery warning	Use Case 2, 7	SafetyController, batteryLevelUpdated()	Allow for low battery and observe UI and warnings. Observe and connect charger	Alerts will show if battery is low in charge and show visible charging progress
4	Allow user to create personal profile	Use Case 3	on_pushButton_createAccount_clicked()	Create a profile by putting in the required fields	User can create a profile with their name, basal rate, ICR, correction factor, and target glucose
5	Allow user to update existing profiles	Use Case 3	on_pushButton_updateAccount_clicked()	Select a saved profile, update values, and check saved result	Allows the user to edit profile values such as ICR, CF, and target BG
6	Allow user to delete existing profiles	Use Case 3	on_pushButton_deleteAccount_clicked()	Delete profile and confirm it no longer appears	Removes saved profile from the system
7	Calculate bolus with IOB correction	Use Case 4	BolusManager::calculateBolus()	Enter carb and BG values and check output	Calculates bolus level using ICR, correction factor and BG
8	Confirm bolus before delivery	Use Case 4	on_pushButton_ConfirmBolus_clicked()	Click confirm and ensure confirmation page shows all values	Let's the user review bolus info (carbs, BG, units) before finalizing delivery
9	Display insulin breakdown and confirm delivery	Use Case 4	on_pushButton_FinalDeliver_clicked()	Confirm a bolus request and view summary breakdown	Displays carb/correction dose, extended vs immediate units, and allows user to approve or cancel
10	Start, stop, or resume insulin delivery	Use Case 5	SafetyController, stop/resume buttons	Use delivery buttons and observe delivery progress/logs	Allows insulin delivery to be paused and resumed and inlcudes automatic suspension based on glucose data

11	View delivery logs and IOB updates	Use Case 6	updateCGMDisplay() and CGM logs	View logs in CGM window and check IOB value	Tracks insulin activity and bolus logs with timestamps
12	Handle errors (low battery/CGM disconnection)	Use Case 2, 7	SafetyController, CGM alerts	Disconnect CGM or let battery die and observe alerts	Displays alerts and prompts the user to solve the errors
13	Simulate CGM data and glucose levels	Use case 4, 5, 6	CGMManager, MainWindow::updateCGM Display()	Start CGM and observe chart updates every 5 seconds	Generates glucose readings with trends and simulates future glucose behavior
14	Display CGM chart with prediction line	Use case 6	setupGlucoseChart(), updatePredictions()	Start CGM and observe the chart with a dashed prediction line	Shows predicted glucose levels over time, including insulin and carb trends