Traceability Matrix

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| **ID** | **Requirement** | **Related Use Case** | **Fulfilled By** | **Test** | **Description** |
| 1 | Wave analysis and simulation must occur, resulting in a dominant frequency | N/A | analysisWave.cpp, WaveSimulator.cpp | Observe the output of getBaseline() | The AnalysisWave class, through getBaseline(), simulates the process of analyzing a wave, ultimately providing a dominant frequency. This simulation includes generating a wave and assigning a random frequency within a specified band, which imitates real-world EEG signal processing. |
| 2 | Frequency bands for the simulation must be defined and utilized across all sessions | N/A | frequencyBands.h, session.cpp | Review frequency band usage in session instantiation | FrequencyBand definitions are declared in frequencyBands.h, which the Session class utilizes to randomly select a frequency band for the session, ensuring consistency across the simulation of 21 electrodes. This is critical for the authenticity of the treatment simulation. |
| 3 | Application's main control flow is correctly initialized | N/A | main.cpp | Run the application | The primary execution flow is defined in main.cpp, where the QApplication is initiated, and the MainWindow is instantiated and displayed. This file orchestrates the application's lifeline from ignition to termination. |
| 4 | The treatment delivery simulation must respect frequency parameters | Deliver Treatment Use Case | site.cpp, session.cpp | Observe the debug output for treatment frequency | Site::deliverTreatment in site.cpp takes in a treatment frequency and logs it, representing the application of a treatment at a certain frequency. This is a core part of simulating therapy sessions where different frequencies might be used. |

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| 5 | Simulation must generate wave frequencies within a random but constrained range | N/A | waveSimulator.cpp | Run the simulator and monitor frequency generation | WaveSimulator::generateRandomFrequency() in waveSimulator.cpp is responsible for producing a random frequency within the band range defined for a session. This randomness introduces variability, simulating real-world scenarios within controlled parameters. |
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