# Testing Documentation

| Functional Requirements | Test Cases | Oracle | Accuracy |
|---|---|---|---|
| Communication with the nanovoltmeter & current source | Verifying connection by getting info from nanovoltmeter | Info of nanovoltmeter | 100 |
| | Verifying connection by getting info from nanovoltmeter via current source | Info of current source | 100 |
| | On sending command to Current Source | Should perform the command | 100 |
| | On sending command to get present resistance of sample | Should get the present resistance of the sample | 100 |
| Communication & changing temperatures with CTC | Verifying connection by getting information of CTC | Info of CTC | 100 |
| | On sending command to CTC | Should perform the command | 100 |
| | On commanding get the present temperature of sample | Should return the current temperature | 100 |
| Calculation of variation of resistance at a given temperature range | Input known voltage and current values; verify that the software calculates resistance correctly | Gets the average resistance value | 100 |
| | Test extreme values (e.g., near zero current) and ensure resistance calculation handles these cases gracefully | Should give correct values | 100 |
| Real-time plotting of data | Add points to the graph | Points should be added to the graph in real time | 100 |
| | On command update graph | Graph should be updated | 100 |
| | Changes temperature in combobox | Graph should be updated to selected temperature | 100 |

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| Auto-saving collected & calculated data from time to time | On sending command save the graphs into directory | Graphs should be saved to the chosen directory | 100 |
| | On commanding write data to CSV | Should write the data to CSV | 100 |
| Calculation of variation of resistance in a given time interval at specific temperature | Getting resistances list measured at a particular temperature by the hardware | | 100 |

| **Non-Functional Requirements** | **Test Cases** | **Oracle** | **Accuracy** |
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| Performance | Measure response time for critical operations (e.g., data plotting, resistance calculation); ensure it meets acceptable performance thresholds | Response time is as per acceptable performance thresholds<br>If it crosses the threshold then warnings should be displayed | 70 |
| Reliability | Conduct long-duration testing to check for memory leaks or stability issues | Real time plotting and storage of data occurs with no data loss | 80 |
| | Simulate hardware failures (e.g., disconnection of instruments) and confirm the software gracefully handles such situations | Various kinds of warnings will be displayed for the debug it | |
| Availability | Evaluate the software's ability to recover from system failures (e.g., power outage) without data loss | There is no data loss even after abrupt abort or power loss | 50 |
| Maintainability | Assess the ease of updating or modifying the software (e.g., adding new device integrations) | Software can be modified/updated without any hassle | 100 |
| | Review code readability and documentation to ensure clarity for future maintenance | Code is perfectly readable and documentation clarifies how to use the software | |
| Interoperability | Test compatibility with different versions of nano voltmeters and current sources | Compatible with all versions of nano voltmeters and current sources | 80 |
| | Ensure the software can interact seamlessly with various CTC models | Flawless interaction of software with various CTC models | |