Validation Certificate

Sample Size Estimator Application

Test Execution Information

Test Date:	2026-02-18 14:34:25
Tester:	hapi - Automated Test System
Operating System:	Windows 11
Python Version:	3.13.5

URS Requirement Test Results

URS ID	Test Name	Status
URS-FUNC_A	test_known_value_95_90	PASS
URS-FUNC_A	test_known_value_90_95	PASS
URS-FUNC_A	test_high_confidence_high_reliability	PASS
URS-FUNC_A	test_low_confidence_low_reliability	PASS
URS-FUNC_A	test_result_is_integer	PASS
URS-FUNC_A	test_result_is_positive	PASS
URS-FUNC_A	test_increasing_confidence_increases_sample_size	PASS
URS-FUNC_A	test_increasing_reliability_increases_sample_size	PASS
URS-FUNC_A	test_property_success_run_theorem_correctness	PASS
URS-FUNC_A	test_known_value_c1	PASS
URS-FUNC_A	test_known_value_c2	PASS
URS-FUNC_A	test_result_is_integer	PASS
URS-FUNC_A	test_result_is_positive	PASS
URS-FUNC_A	test_increasing_failures_increases_sample_size	PASS
URS-FUNC_A	test_increasing_confidence_increases_sample_size	PASS
URS-FUNC_A	test_increasing_reliability_increases_sample_size	PASS
URS-FUNC_A	test_edge_case_very_high_confidence	PASS
URS-FUNC_A	test_edge_case_very_high_reliability	PASS
URS-FUNC_A	test_property_binomial_sample_size_correctness	PASS

URS-FUNC_A	test_property_binomial_sample_size_minimality	PASS
URS-FUNC_A	test_returns_four_results	PASS
URS-FUNC_A	test_correct_c_values	PASS
URS-FUNC_A	test_known_values	PASS
URS-FUNC_A	test_increasing_sample_sizes	PASS
URS-FUNC_A	test_correct_methods	PASS
URS-FUNC_A	test_property_sensitivity_analysis_completeness	PASS
URS-FUNC_A	test_with_c_none_returns_sensitivity	PASS
URS-FUNC_A	test_with_c_zero_returns_single_result	PASS
URS-FUNC_A	test_with_c_positive_returns_single_result	PASS
URS-FUNC_A	test_known_value_c95_r90	PASS
URS-FUNC_A	test_edge_case_very_high_confidence	PASS
URS-FUNC_A	test_edge_case_very_low_confidence	PASS
URS-CFG	test_app_settings_defaults	PASS
URS-CFG	test_get_settings_singleton	PASS
URS-CFG	test_app_settings_custom_values	PASS
URS-GEN	test_check_python_version	PASS
URS-GEN	test_check_dependency_installed	PASS
URS-GEN	test_check_dependency_not_installed	PASS
URS-GEN	test_get_system_info	PASS
URS-GEN	test_check_core_dependencies	PASS
URS-GEN	test_check_dev_dependencies	PASS
URS-GEN	test_attribute_zero_failures_complete_workflow	PASS
URS-GEN	test_attribute_with_failures_complete_workflow	PASS
URS-GEN	test_attribute_sensitivity_analysis_workflow	PASS
URS-GEN	test_variables_complete_workflow_with_spec_limits	PASS
URS-GEN	test_variables_one_sided_workflow	PASS
URS-GEN	test_variables_fail_scenario	PASS
URS-GEN	test_complete_normality_assessment_workflow	PASS
URS-GEN	test_transformation_workflow	PASS
URS-GEN	test_boxcox_transformation_workflow	PASS
URS-GEN	test_wilks_nonparametric_workflow	PASS
URS-GEN	test_zero_failure_demonstration_workflow	PASS
URS-GEN	test_acceleration_factor_workflow	PASS
URS-GEN	test_temperature_validation_workflow	PASS

URS-GEN	test_attribute_calculation_report_generation	PASS
URS-GEN	test_variables_calculation_report_generation	PASS
URS-GEN	test_validation_state_workflow	PASS
URS-GEN	test_validation_state_in_report	PASS
URS-GEN	test_complete_application_workflow	PASS
URS-GEN	test_error_handling_across_modules	PASS
URS-LOG	test_property_calculation_logging_completeness	PASS
URS-LOG	test_property_validation_logging_completeness	PASS
URS-LOG	test_json_formatter_basic	PASS
URS-LOG	test_json_formatter_with_calculation_data	PASS
URS-LOG	test_setup_logger_creates_file	PASS
URS-LOG	test_setup_logger_text_format	PASS
URS-LOG	test_setup_logger_prevents_duplicate_handlers	PASS
URS-LOG	test_log_calculation_writes_to_file	PASS
URS-LOG	test_log_validation_check_writes_to_file	PASS
URS-GEN	test_valid_inputs	PASS
URS-GEN	test_valid_inputs_without_failures	PASS
URS-GEN	test_confidence_zero_rejected	PASS
URS-GEN	test_confidence_hundred_rejected	PASS
URS-GEN	test_confidence_negative_rejected	PASS
URS-GEN	test_confidence_over_hundred_rejected	PASS
URS-GEN	test_reliability_zero_rejected	PASS
URS-GEN	test_reliability_hundred_rejected	PASS
URS-GEN	test_negative_failures_rejected	PASS
URS-GEN	test_edge_case_very_low_confidence	PASS
URS-GEN	test_edge_case_very_high_confidence	PASS
URS-GEN	test_valid_inputs_two_sided	PASS
URS-GEN	test_valid_inputs_one_sided	PASS
URS-GEN	test_confidence_zero_rejected	PASS
URS-GEN	test_sample_size_one_rejected	PASS
URS-GEN	test_sample_size_zero_rejected	PASS
URS-GEN	test_negative_sample_size_rejected	PASS
URS-GEN	test_zero_std_rejected	PASS
URS-GEN	test_negative_std_rejected	PASS
URS-GEN	test_lsl_equal_usl_rejected	PASS

URS-GEN	test_lsl_greater_than_usl_rejected	PASS
URS-GEN	test_only_lsl_provided	PASS
URS-GEN	test_only_usl_provided	PASS
URS-GEN	test_negative_spec_limits_allowed	PASS
URS-GEN	test_valid_inputs_without_acceleration	PASS
URS-GEN	test_valid_inputs_with_acceleration	PASS
URS-GEN	test_confidence_zero_rejected	PASS
URS-GEN	test_negative_failures_rejected	PASS
URS-GEN	test_zero_activation_energy_rejected	PASS
URS-GEN	test_negative_activation_energy_rejected	PASS
URS-GEN	test_zero_use_temperature_rejected	PASS
URS-GEN	test_test_temp_equal_use_temp_rejected	PASS
URS-GEN	test_test_temp_less_than_use_temp_rejected	PASS
URS-GEN	test_partial_acceleration_params_allowed	PASS
URS-GEN	test_positive_failures_allowed	PASS
URS-FUNC_N	test_no_outliers_in_normal_data	PASS
URS-FUNC_N	test_detects_obvious_outliers	PASS
URS-FUNC_N	test_returns_correct_indices	PASS
URS-FUNC_N	test_empty_outliers_for_uniform_data	PASS
URS-FUNC_N	test_single_outlier_high	PASS
URS-FUNC_N	test_single_outlier_low	PASS
URS-FUNC_N	test_property_outlier_detection_correctness	PASS
URS-FUNC_N	test_property_outlier_count_consistency	PASS
URS-FUNC_N	test_normal_data_passes	PASS
URS-FUNC_N	test_uniform_data_fails	PASS
URS-FUNC_N	test_interpretation_present	PASS
URS-FUNC_N	test_bimodal_data_fails	PASS
URS-FUNC_N	test_property_normality_test_execution	PASS
URS-FUNC_N	test_property_normality_rejection_logic	PASS
URS-FUNC_N	test_qq_plot_generation	PASS
URS-FUNC_N	test_qq_plot_with_non_normal_data	PASS
URS-FUNC_N	test_log_transform_positive_data	PASS
URS-FUNC_N	test_log_transform_rejects_negative	PASS
URS-FUNC_N	test_log_transform_rejects_zero	PASS
URS-FUNC_N	test_boxcox_transform_positive_data	PASS

URS-FUNC_N	test_boxcox_transform_rejects_negative	PASS
URS-FUNC_N	test_sqrt_transform_non_negative_data	PASS
URS-FUNC_N	test_sqrt_transform_rejects_negative	PASS
URS-FUNC_N	test_property_log_transformation_round_trip	PASS
URS-FUNC_N	test_property_boxcox_transformation_round_trip	PASS
URS-FUNC_N	test_property_sqrt_transformation_round_trip	PASS
URS-FUNC_N	test_apply_log_transformation	PASS
URS-FUNC_N	test_apply_boxcox_transformation	PASS
URS-FUNC_N	test_apply_sqrt_transformation	PASS
URS-FUNC_N	test_property_post_transformation_normality_testing	PASS
URS-FUNC_N	test_wilks_limits_basic	PASS
URS-FUNC_N	test_wilks_limits_with_outliers	PASS
URS-FUNC_N	test_property_wilks_limits_correctness	PASS
URS-FUNC_R	test_zero_failure_duration_basic	PASS
URS-FUNC_R	test_zero_failure_duration_different_confidence_levels	PASS
URS-FUNC_R	test_zero_failure_duration_with_failures	PASS
URS-FUNC_R	test_property_zero_failure_duration_correctness	PASS
URS-FUNC_R	test_zero_failure_duration_edge_cases	PASS
URS-FUNC_R	test_celsius_to_kelvin_basic	PASS
URS-FUNC_R	test_celsius_to_kelvin_negative	PASS
URS-FUNC_R	test_property_celsius_to_kelvin_formula	PASS
URS-FUNC_R	test_acceleration_factor_basic	PASS
URS-FUNC_R	test_acceleration_factor_higher_test_temp_increases_af	PASS
URS-FUNC_R	test_acceleration_factor_temperature_validation	PASS
URS-FUNC_R	test_acceleration_factor_equal_temperatures	PASS
URS-FUNC_R	test_property_arrhenius_formula_correctness	PASS
URS-FUNC_R	test_property_temperature_validation	PASS
URS-FUNC_R	test_acceleration_factor_known_values	PASS
URS-FUNC_R	test_calculate_reliability_without_acceleration	PASS
URS-FUNC_R	test_calculate_reliability_with_acceleration	PASS
URS-FUNC_R	test_calculate_reliability_partial_acceleration_params	PASS
URS-FUNC_R	test_calculate_reliability_with_failures	PASS
URS-FUNC_R	test_calculate_reliability_validates_temperatures	PASS
URS-FUNC_R	test_calculate_reliability_result_structure	PASS
URS-FUNC_R	test_property_calculate_reliability_integration	PASS

URS-REP	test_generate_calculation_report_basic	PASS
URS-REP	test_generate_calculation_report_with_validation_state	PASS
URS-REP	test_generate_calculation_report_creates_directory	PASS
URS-REP	test_generate_validation_certificate_basic	PASS
URS-REP	test_generate_validation_certificate_with_failures	PASS
URS-REP	test_generate_validation_certificate_creates_directory	PASS
URS-REP	test_generate_validation_certificate_empty_results	PASS
URS-VAL	test_property_hash_determinism	PASS
URS-VAL	test_property_hash_comparison_logic	PASS
URS-VAL	test_property_none_validated_hash	PASS
URS-VAL	test_calculate_file_hash_with_known_content	PASS
URS-VAL	test_calculate_file_hash_empty_file	PASS
URS-VAL	test_calculate_file_hash_nonexistent_file	PASS
URS-VAL	test_verify_validation_state_match	PASS
URS-VAL	test_verify_validation_state_mismatch	PASS
URS-VAL	test_verify_validation_state_none	PASS
URS-VAL	test_get_engine_validation_info_valid_file	PASS
URS-VAL	test_get_engine_validation_info_nonexistent_file	PASS
URS-FUNC_V	test_basic_calculation	PASS
URS-FUNC_V	test_known_value	PASS
URS-FUNC_V	test_increasing_sample_size_decreases_factor	PASS
URS-FUNC_V	test_increasing_confidence_increases_factor	PASS
URS-FUNC_V	test_increasing_reliability_increases_factor	PASS
URS-FUNC_V	test_invalid_sample_size	PASS
URS-FUNC_V	test_edge_case_high_values	PASS
URS-FUNC_V	test_basic_calculation	PASS
URS-FUNC_V	test_known_value	PASS
URS-FUNC_V	test_two_sided_larger_than_one_sided	PASS
URS-FUNC_V	test_increasing_sample_size_decreases_factor	PASS
URS-FUNC_V	test_increasing_confidence_increases_factor	PASS
URS-FUNC_V	test_increasing_reliability_increases_factor	PASS
URS-FUNC_V	test_invalid_sample_size	PASS
URS-FUNC_V	test_edge_case_high_values	PASS
URS-FUNC_V	test_formula_components	PASS
URS-FUNC_V	test_consistent_behavior_across_sample_sizes	PASS

URS-FUNC_V	test_property_one_sided_tolerance_factor_correctness	PASS
URS-FUNC_V	test_property_two_sided_tolerance_factor_correctness	PASS
URS-FUNC_V	test_two_sided_limits	PASS
URS-FUNC_V	test_one_sided_limits	PASS
URS-FUNC_V	test_negative_mean	PASS
URS-FUNC_V	test_large_tolerance_factor	PASS
URS-FUNC_V	test_small_std	PASS
URS-FUNC_V	test_invalid_std_zero	PASS
URS-FUNC_V	test_invalid_std_negative	PASS
URS-FUNC_V	test_invalid_sided_parameter	PASS
URS-FUNC_V	test_property_tolerance_limit_calculation_correctness	PASS
URS-FUNC_V	test_two_sided_ppk	PASS
URS-FUNC_V	test_ppk_upper_limiting	PASS
URS-FUNC_V	test_ppk_lower_limiting	PASS
URS-FUNC_V	test_ppk_only_usl	PASS
URS-FUNC_V	test_ppk_only_lsl	PASS
URS-FUNC_V	test_ppk_no_spec_limits	PASS
URS-FUNC_V	test_ppk_negative_values	PASS
URS-FUNC_V	test_ppk_high_capability	PASS
URS-FUNC_V	test_ppk_low_capability	PASS
URS-FUNC_V	test_ppk_invalid_std_zero	PASS
URS-FUNC_V	test_ppk_invalid_std_negative	PASS
URS-FUNC_V	test_ppk_mean_at_usl	PASS
URS-FUNC_V	test_ppk_mean_at_lsl	PASS
URS-FUNC_V	test_property_ppk_calculation_correctness	PASS
URS-FUNC_V	test_pass_both_limits_within_spec	PASS
URS-FUNC_V	test_fail_lower_limit_violation	PASS
URS-FUNC_V	test_fail_upper_limit_violation	PASS
URS-FUNC_V	test_fail_both_limits_violation	PASS
URS-FUNC_V	test_pass_at_boundary	PASS
URS-FUNC_V	test_only_usl_pass	PASS
URS-FUNC_V	test_only_usl_fail	PASS
URS-FUNC_V	test_only_lsl_pass	PASS
URS-FUNC_V	test_only_lsl_fail	PASS
URS-FUNC_V	test_no_spec_limits	PASS

URS-FUNC_V	test_negative_values	PASS
URS-FUNC_V	test_very_small_margins	PASS
URS-FUNC_V	test_very_small_negative_margins	PASS
URS-FUNC_V	test_property_specification_comparison_logic	PASS
URS-FUNC_V	test_two_sided_with_spec_limits_pass	PASS
URS-FUNC_V	test_two_sided_with_spec_limits_fail	PASS
URS-FUNC_V	test_one_sided_with_usl_only	PASS
URS-FUNC_V	test_two_sided_without_spec_limits	PASS
URS-FUNC_V	test_known_statistical_values	PASS
URS-FUNC_V	test_ppk_calculation_integration	PASS
URS-FUNC_V	test_tolerance_factor_differs_by_sided	PASS
URS-FUNC_V	test_negative_mean_and_spec_limits	PASS
URS-FUNC_V	test_high_confidence_high_reliability	PASS
URS-FUNC_V	test_small_sample_size	PASS
URS-FUNC_V	test_large_sample_size	PASS
URS-FUNC_V	test_result_model_structure	PASS
URS-FUNC_V	test_consistency_with_individual_functions	PASS

Validation Summary

Overall Status: **PASSED**

Validated Hash: a4826d4db0e60972182dada4617a3c12cbff54167676b7a1a5d7e55c4