Unit Testing and Integration Testing Report - Actuator Module

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Introduction:

This document presents the results of unit testing conducted on the Actuator Module code. The purpose of this testing is to verify the correctness and reliability of individual components within the codebase. The unit tests focus on specific functions, methods, and modules to ensure their functionality aligns with the intended design.

Integration Testing ensures that individual software components seamlessly work together cohesively within the complete system. This phase validates interactions between modules, aiming to detect and address any issues arising from the integration of diverse components, ensuring a robust and reliable software product.

Unit Test:

Test Case	Description	Expected Result	Actual Result	Pass/Fail
1	Verify WiFiManager setup	WiFiManager initializes successfully	Initialization successful	Pass
2	Check the initialization of ThingSpeak	ThingSpeak client initialized without errors	Initialization without errors	Pass
3	Test WiFi connection	Successfully connect to the WiFi network	Connected to WiFi	Pass
4	Verify GPIO pin modes	Ensure correct initialization of GPIO pins	GPIO pins initialized correctly	Pass
5	Check LED control logic	Validate the control logic for LEDs based on ThingSpeak data	LED control logic functioning as expected	Pass

Integration Test:

Test Case	Description	Expected Result	Actual Result	Pass/Fail
1	Verify end-to-end functionality	Actuator Module successfully connects to WiFi, reads ThingSpeak data, and controls actuators accordingly	All steps completed successfully	Pass
2	Test error handling	Simulate WiFi connection failure and ensure proper error handling and recovery	WiFi connection failure handled, and recovery successful	Pass
3	Check for correct ThingSpeak integration	Confirm that the Actuator Module reads data from the specified ThingSpeak fields and performs the expected actions	Data read from ThingSpeak and actuators controlled correctly	Pass
4	Validate actuation scenarios	Test various scenarios for actuation based on different values of ThingSpeak fields	Actuators respond appropriately to different scenarios	Pass
5	Test restart functionality	Verify that the Actuator Module restarts if WiFi connection issues persist	Module restarts when WiFi connection issues persist	Pass