

## Test Procedure Document

### 1. Testing of Components:

#### 1.1 Arduino Uno:

- Verify proper power supply to Arduino Uno.
- Test digital and analog input/output pins.
- Validate communication with connected sensors and actuators.

#### 1.2 NodeMCU ESP8266:

- Ensure Wi-Fi connectivity and proper configuration.
- Test GPIO pins for sensor and actuator integration.
- Validate compatibility with the Blynk mobile app.

#### 1.3 Bluetooth Module (Option 1):

- Establish a connection between Arduino Uno and the Bluetooth module.
- Test data transmission and reception reliability.
- Ensure compatibility with the Blynk mobile app through Bluetooth.

#### 1.4 Wi-Fi Module (Option 2):

- Validate NodeMCU's connectivity to Wi-Fi.
- Test data transmission and reception reliability through Wi-Fi.
- Confirm compatibility with the Blynk mobile app through Wi-Fi.

#### 1.5 Sensors (e.g., Temperature and Humidity):

- Verify accurate data readings.
- Test sensor response to environmental changes.
- Validate integration with the main controllers (Arduino Uno or NodeMCU).

#### 1.6 Actuators (e.g., LED, Fans):

- Confirm proper on/off control.
- Validate responsiveness to commands from the main controllers.
- Test compatibility with the Blynk mobile app.

## **2. Integration Testing:**

### *2.1 Initial Integration:*

- Integrate Arduino Uno or NodeMCU individually with sensors and actuators.
- Validate basic functionalities, such as turning on/off lights and reading sensor data.

### *2.2 Communication Module Integration:*

- Integrate Bluetooth or Wi-Fi module with the main controller.
- Test communication reliability between the main controller and the mobile app.

### *2.3 Complete System Integration:*

- Connect all components (main controller, communication module, sensors, actuators).
- Validate end-to-end functionality, including remote control through the Blynk mobile app.
- Conduct stress testing to assess system robustness.

### *2.4 User Interface Testing:*

- Ensure the Blynk mobile app's compatibility with both Arduino Uno and NodeMCU.
- Verify smooth navigation and responsiveness of the app.
- Test voice command functionalities if applicable.

## **Conclusion:**

This test procedure ensures a thorough examination of individual components and their integration into a cohesive system. By systematically testing each element and progressively integrating them, the team aims to identify and address any issues early in the development process, ensuring a robust and reliable Smart Home Automation System.