Functional Testing: End-to-End Scenario-based Test Cases

1. **Publishing data in to the MQTT Mosquito Broker**
    a) Run Thermometer.py file displays the thermometer location prompt “Where is this Thermometer located?”
    b) Then enter the location of the thermometer; it can contain min. 3 characters, which can only be letters, numbers, spaces and '-'.)
    c) If any validations are not met, the programme displays the error message and exits the program ("Error: Invalid device label given. Please make sure to use at least 3 characters and only use letters, numbers, spaces and hyphens.").
    d) If validation rules are met, a publish message is displayed (Send "you entered location: temperature" to topic "thermometers/temp"). Ex: (Send "Bed Room: 25.89766546" to topic " thermometers/temp)
    e) If the system cannot locate the broker, it displays the error message “Failed to send message to topic”.
    f) If the communication break in the middle of a transmission period, it displays the error message “Failed to send message to topic”.

2. **Subscribing to topic**
    a) Run Main.py file displays the message “What menu would you like to access?” Option 1: Temperature Overview. Option 2: Broker Logs.
    b) Choosing the menu Option 1 “Temperature Overview”, prints the message “Connecting to Broker.” and “Subscribing to topic thermometers/temp”.
    c) Then it displays the room temperature.
    d) In the menu option, if you choose the wrong number, it displays an error message and exits the program as "Error: Invalid Input. Please try again."

3. **Broker Logs**
    a) Choosing the menu Option 2 “Broker Logs”, prints the messages “Connecting to Broker..” and “Subscribing to topic $SYS/broker/log/#”
    b) If the existing connection disconnects, it displays the message "Socket error on client Thermometer/Bed Room, disconnecting."
    c) If the device makes a new connection, it displays the messages “New connection from {IP_ADDRESS} on port 1884.” and “New client connected from {IP_ADDRESS} as Thermometer/Living Room”

4. Security

a) When a user executes the Main.py and the Thermometer.py files, the programme always verifies the file signature prior to executing the main part of the code. If it detects a code changed or a modification, it displays the error message “Error: Files have been tempered with."