**SPxY Project : Electrical Cabinet Testing Plan**

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# **Scope**

This Document sets up a method for testing the electrical cabinet of the SPxY project. The tests that are determined in this note are to be performed as part of the qualification process but also in the maintenance of the electrical cabinet.

# **Validation test and Qualification**

Initial Inspection:

Check the physical integrity of the IP66 casing for any visible damages or defects.

Ensure all components (power supplies, security systems, Teensy 4.0) are properly installed and secured within the cabinet.

**Electrical Functionality Testing:**

Power Supply Testing:

Measure output voltage levels (48V, 24V, 5V) using a multimeter to ensure they meet specified parameters.

Verify stability and consistency of power output under varying loads.

Test for voltage spikes or fluctuations during startup and shutdown sequences.

Security System Testing:

Test emergency stop button functionality to ensure it halts power supply immediately when pressed.

Activate the circuit breaker and verify its response in interrupting power flow during simulated faults.

Teensy 4.0 Testing:

Check communication between Teensy 4.0 and other components within the system.

Verify proper functioning of Teensy 4.0 by running test scripts or programs.

Ensure Teensy 4.0 responds correctly to input commands and initiates required actions.

OBD Testing:

Check communication between onboard computer and EPFL network and connection with the microcontroller.

Verify proper functioning of OBD by running test scripts or programs.

Ensure Teensy 4.0 responds correctly to input commands and initiates required actions.

IP66 Casing Testing:

Conduct a water and dust ingress test to validate IP66 rating.

Subject the casing to simulated environmental conditions (temperature, humidity) to ensure its resilience.

Verify that all cable entries and seals maintain their integrity under stress or movement.

Safety Testing:

Perform a safety inspection to ensure there are no exposed wires or components that could cause electric shocks or other hazards.

Check grounding and insulation to prevent any risk of electrical shorts or malfunctions.

Functional Integration Testing:

Test the entire system as a whole to ensure all components work together seamlessly.

Validate that the power supply, security systems, and Teensy 4.0 collectively respond appropriately to simulated scenarios (such as power interruptions, emergency stops, etc.).

Verify that the antenna pointing mechanism functions correctly with the supplied power and commands from Teensy 4.0.

Documentation and Reporting (Set Number):

Record all test results, including any issues encountered and their resolutions.

Generate a comprehensive report detailing the testing process, results, and any recommendations for improvements or further actions.

# Maintenance procedure

**Weekly Checks:**

* **Visual Inspection:**
  + Check for any signs of overheating, unusual smells, or physical damage.
  + Verify that indicator lights on the power supplies are functioning properly
* **Functional Testing:**
  + Test emergency stop button functionality.
  + Activate the circuit breaker to ensure it interrupts power flow correctly.
  + Verify stability and consistency of power output from the supplies.

**Monthly Checks:**

* **Internal Inspection:**
  + Open the cabinet and inspect internal components for dust accumulation or any loose connections.
  + Check for signs of corrosion on terminals or circuitry.

**Quarterly Checks:**

* **Performance Testing:**
  + Conduct load testing on power supplies to ensure consistent output under varying loads.
  + Run diagnostic tests on the Teensy 4.0 and OBD for proper functionality.

**Semi-Annual Checks:**

* **IP66 Casing Inspection:**
  + Perform a thorough inspection of the casing for any signs of wear, cracks, or damage that could compromise its IP66 rating.
  + Check seals and gaskets for integrity (Presse etoupe, door gasket).

**Annual Checks:**

* **Comprehensive Testing:**
  + Verify compliance with European standards and regulations for electrical setups.
  + Conduct insulation resistance tests and earth continuity tests.

**Bi-Annual Maintenance:**

* **Preventive Maintenance:**
  + Clean internal components, removing dust and debris.
  + Tighten any loose connections and fasteners.

**Documentation and Reporting:**

* Record all maintenance activities performed, including any observations, repairs, or replacements made.
* Maintain a logbook detailing each check, test, and action taken during maintenance (Cf doc excel)