**Testing Procedure Plan for Laser Safety Runner Application**

**Equipment**

* Endlas Laptop (64-bit, x86 based processor, 16.0 GB RAM, and Windows 10 Pro OS)
* Raspberry Pi 3 (Raspian 10 OS)
* Micro USB to USB Cable

**Setup**

Assuming both the laptop and the RPi are powered on, connect the devices using the USB cable. There will be a program written in Processing on the laptop that will open the laptop’s serial communication port being used by the USB cable. The program then directs the laptop to send serial outputs through the USB cable to the RPi. The RPi will run the Laser Safety Runner Application.

**Procedure**

After following the setup instructions, first execute the Laser Safety Runner Application on the RPi. After the application is running, the testing program on the laptop should then be executed. At this point, the laptop will begin sending serial signals through the USB cable to the RPi. The runner should be listening for serial inputs simultaneously. Then, an automated series of unique signals are sent to the RPi. These test signals will test simple, complex, and edge cases of signal output. After the test signals are finished being sent, the RPi should indicate whether each test passed. If a test fails, it should be easy to find which file and line the failure occurred.

**Considerations**

Also, if there are any hardware dependent anomalies that could occur during laser use that result in strange signal inputs to the runner, these should also be tested for. Anomalies include but are not limited to:

* Signal bounce
* Signal noise
* Signal delays