



Project Name:

Sunset LED Specification test sheet

Test Case ID: BDCSUNSET01Temp	Test Designed by: Adenowo Gbadebo
Test Title: Operating Temperature range evaluation	Test Designed date: 11 Feb 2019
Description: Testing Sunset prototype LEDs to evaluate it works consistently in the expected temperature range	Test Executed by: Adenowo Gbadebo
Between -40°C and 80°C	Test Execution date: 18 Feb – 15 Mar 2019

<p>Test Conditions and parameters:</p> <ul style="list-style-type: none"> • The LED was exposed to the maximum and minimum temperatures over time. • The time was gradually increased from 5 mins to 1 week. • The LED was measured for 1 hour after exposure to ensure constant operation. • Due to the high/low temperature of the environment the LEDs could not be tested while in the extreme temperatures (Could not run the LED and test equipment into the environment). • The measurements were then plotted on a color map that make fluctuations in parameter obvious from inspection • The Data intensity and its Fourier transform were plotted on the color map • Measurements were taken every 5s • To reduce the criticality of alignment across experiments that data is normalised

Step	Test Steps	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	LED put into temperature chamber	No variation in LED performance when LED removed from chamber	No variation in LED performance when LED removed from chamber	Pass	Slight discoloration of connection terminals in high temperature. The material became slightly pinkish after a week of exposure to 80°C
2	LED measured outside chamber for a proportion of the exposure time	No variation in LED performance when LED removed from chamber	No variation in LED performance when LED removed from chamber	Pass	The color maps show experimental errors (light color paths Figure 4) these is attributed to the measurement procedure during short measurements

Post-conditions:

<ul style="list-style-type: none"> • There was no effect of temperature on the performance of the LEDs • Measurements were taken every 5s • Measurements were saved on a computer using a photodiode, amplifier and Arduino

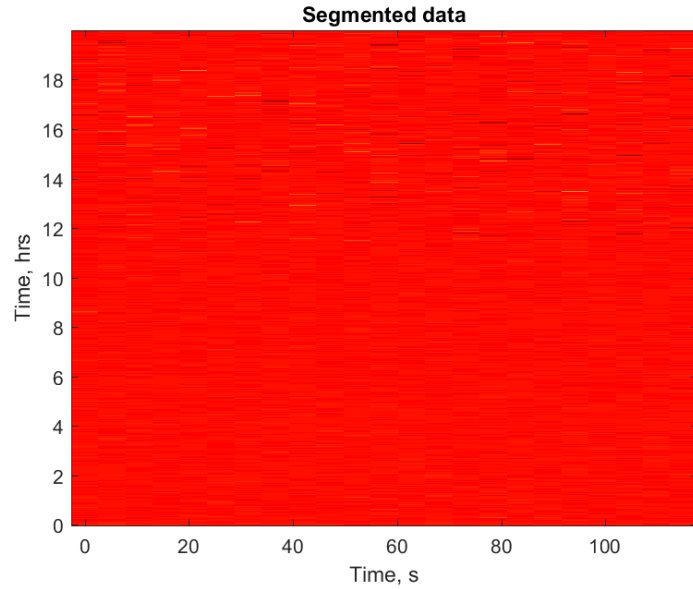


Figure 1 Post freeze intensity (24 hours): Single red color indicates constant output

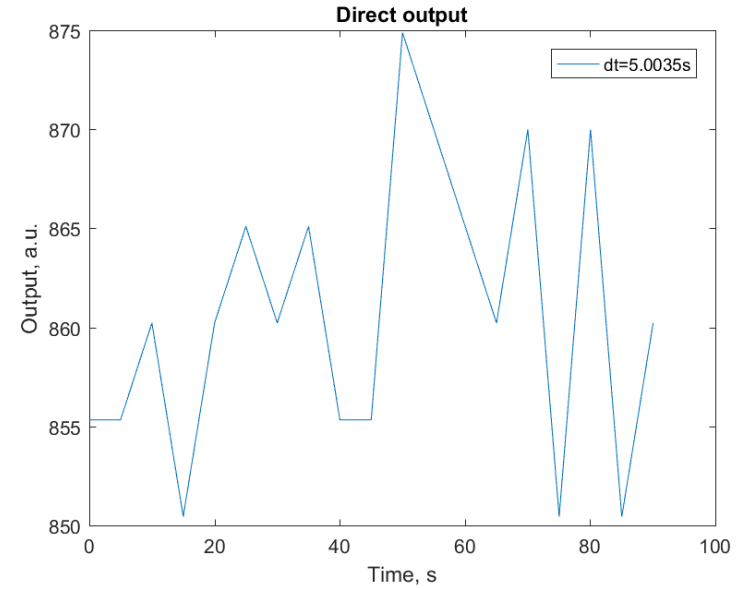


Figure 3 Post freeze frequency across 120s. LEDs were measured every 5s

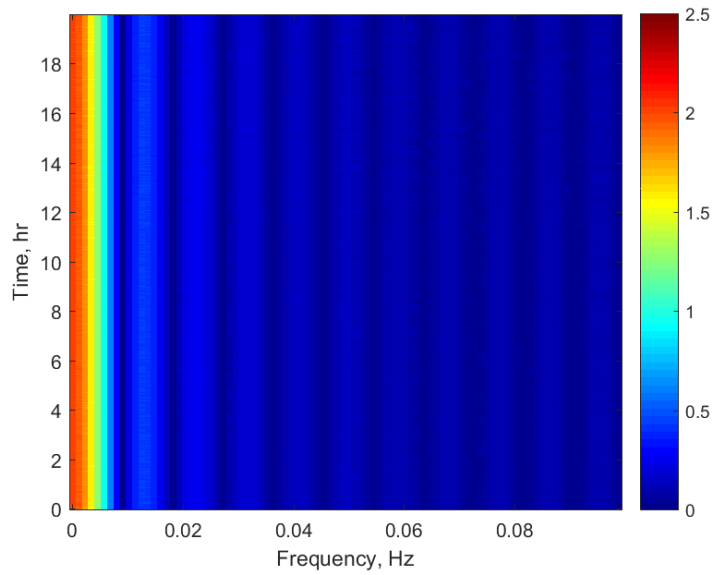


Figure 2 Post freeze frequency (24 hours): Red 0 frequency implies no variation in position of LED during measurement

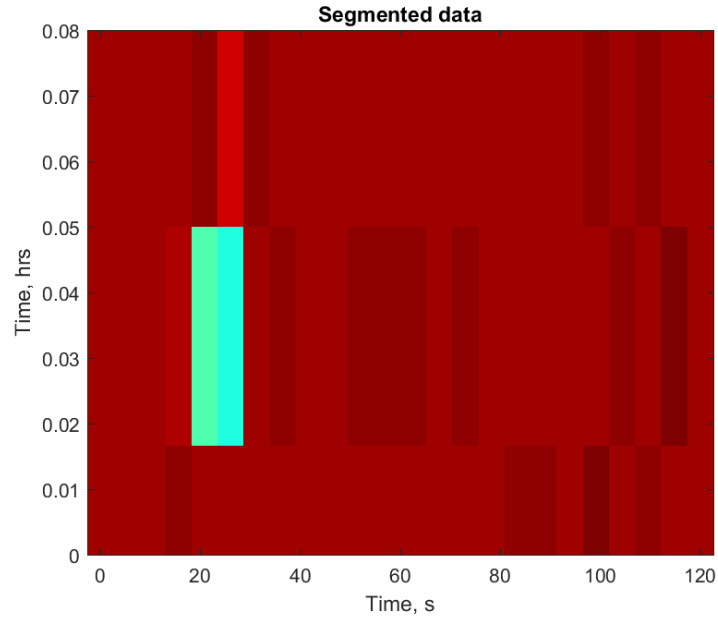


Figure 4 Post Heat intensity (1 hour) Single red color indicates constant output

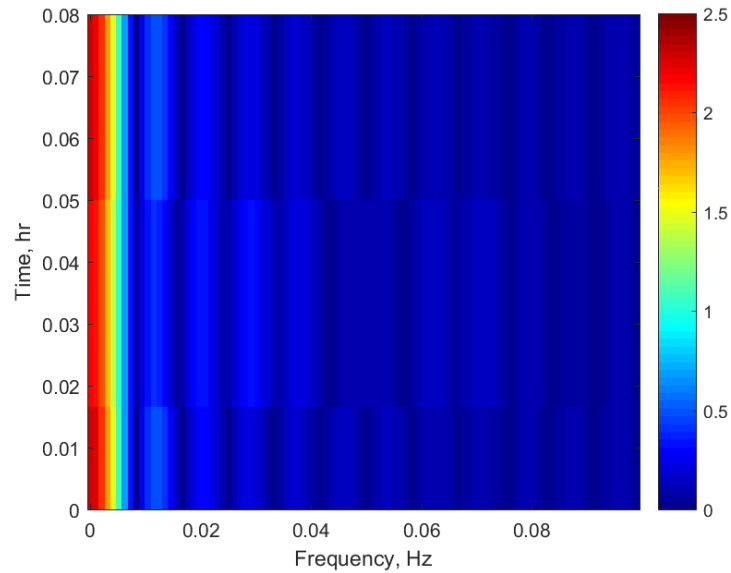


Figure 5 Post Heat frequency (1 hours): Red 0 frequency implies no variation in position of LED during measurement

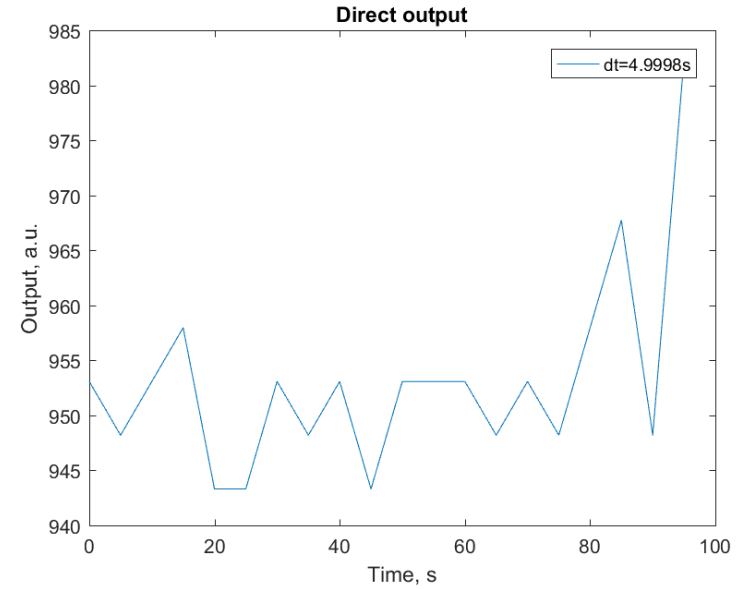


Figure 6 Post Heat frequency across 120s. LEDs were measured every 5s

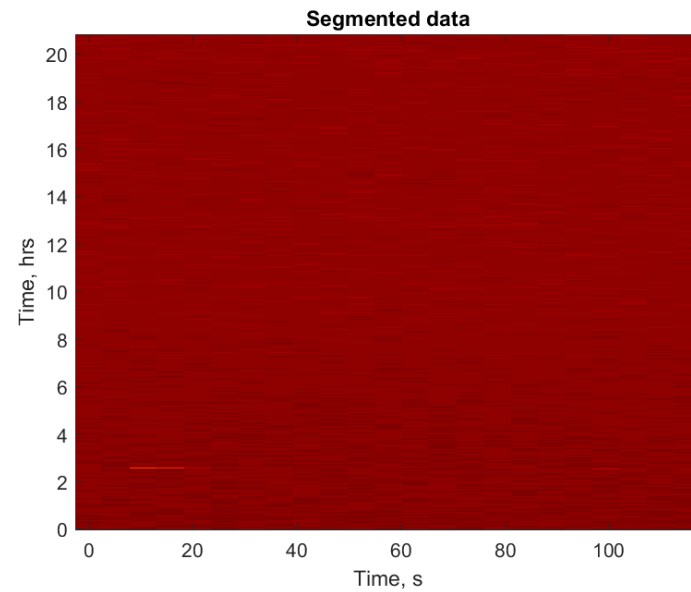


Figure 7 Post Heat intensity (24 hour) Single red color indicates constant output

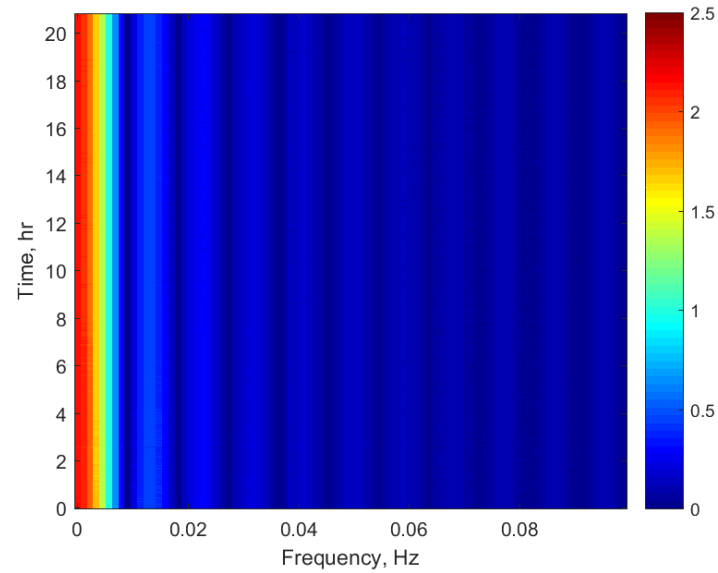


Figure 8 Post Heat frequency (24 hours): Red 0 frequency implies no variation in position of LED during measurement

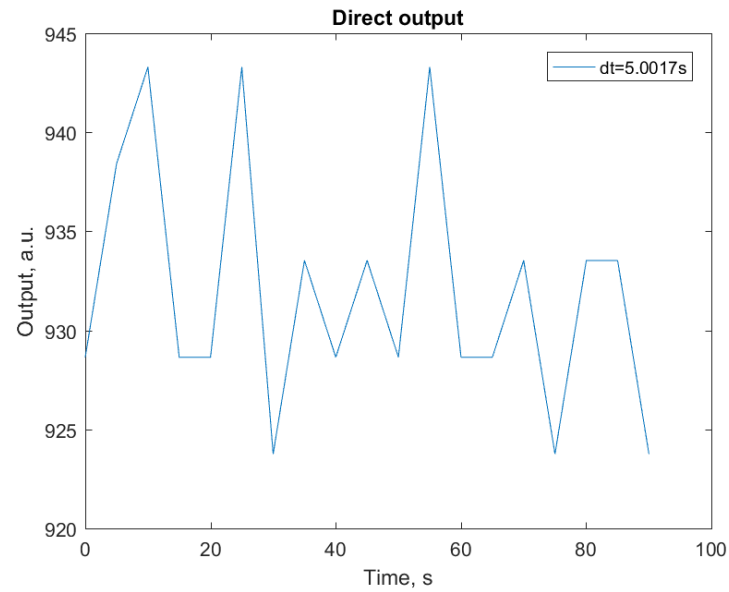


Figure 9 Post Heat frequency across 120s. LEDs were measured every 5s