

INTERMODAL MATERIÉL  
AND  
NAUTICAL/NUCLEAR ANALYSIS  
**IMANNA**  
LABORATORY INC.

# CERTIFICATION TEST REPORT

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CERTIFICATION TEST REPORT  
20012-2  
NAVIGATIONAL LIGHT TESTING  
2 MILE AAW NAVIGATION LIGHT  
TO  
ABYC AND NMMA REQUIREMENTS  
FOR  
LUNASEA LIGHTING / DIGITRON

**CUSTOMER:**

Digitron Electronics  
9619 Yulee Dr.  
Homosassa, FL 34448

**MANUFACTURER**  
**OF TEST ARTICLE:** Lunasea Lighting / Digitron

**REPORT NO.:** 20012-2

**IMANNA JOB NO.:** 20012

**CUSTOMER P.O. NO.:** 105408

**CONTRACT:** N/A

**DATE:** June 24, 2014

**PAGES IN REPORT:** 12

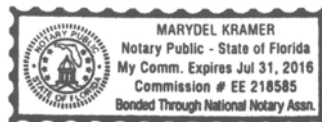
**STATE OF FLORIDA**

ROBERT L. WHITE, being duly sworn, deposes and says: The information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects.

*Robert L. White*

SUBSCRIBED and sworn to before me this 24th day of June, 2014.

*Marydel Kramer*



Imanna shall have no liability for damages of any kind to person or property, including special or consequential damages resulting from Imanna's providing the service covered by the report.

IMANNA LABORATORY, Inc.

TEST BY

ALAN BELL  
PROJ. MANAGER

1. TEST ARTICLE

One Series 40 Aqua Signal, All-Around, Navigational light fixture equipped with a Digitron LED bulb / light source assembly was received for test. The light is designed to be mounted above the sheer line on a boat deck.

2. MODEL NUMBER

LLB-28NW-24-xx (Digitron) LED assembly  
Series 40 All-Around (Aqua Signal)  
designed to meet 2 Mile requirements

3. REQUIREMENTS

The requirements for this effort are to test the light in accordance with the USCG COLREG 1972 (IMO) standards and verify conformance of the light assembly, equipped with the replacement Digitron bulb / light source, with the navigation light regulations of ABYC A-16

4. PROCEDURES

The procedure used in performing this test program is IMANNA Laboratory, Inc. Test Procedure NAV-LITE-1. This procedure details the requirements and procedures specified in the NMMA Certification Handbook under the section entitled Navigation Lights without additions or deletions. The procedure contains the detailed steps necessary to determine the compliance of the test specimen to the USCG IMO requirements.

5. TESTING SEQUENCE

- Receiving Inspection
- Functional Operation
- Chromaticity Test
- Luminous Intensity Tests
- Cut-off Angle Verification
- Weathertightness Test

6. RESULTS

The results of the tests performed are presented below by their order within the test sequence.

6.1 RECEIVING INSPECTION

One AAW Aqua Signal, Series 40, light and a Digitron replacement LED bulb / light assembly were received for test. The light and LED assembly appeared to in good condition and ready for testing.

6.2 FUNCTIONAL OPERATION

The light with the replacement LED light source was mounted on a panel simulating a boat deck surface then operated and tested using a DC electrical power supply set at 12.84 VDC.

6.3 CHROMATICITY TEST

The chromaticity of the light emissions from the lens was measured and found to be within the "White Light" range as specified by the standards. The chromaticity chart is included in the Appendix.

6.4 LUMINOUS INTENSITY TESTS

The luminous intensity of the light was measured to be above the 2 mile limit of 4.3 candelas in the critical required areas.

6.5 CUT-OFF ANGLE VERIFICATION

The light intensity that was measured was graphed and included in the appendix. The graph also includes the minimum required cut-off angle of 4.3 candelas.

The data for the light sample shows that the light emits sufficient light in the required zones and prevents light from entering the "keep out" zones. This indicates that the light meets the photometric requirements of the standard.

6.6 WEATHERTIGHTNESS TEST

The Weathertightness test was not conducted as the test program was designed to validate the Digitron bulb / light source in the Aqua Signal Series 40 assembly not the Aqua Signal light assembly.

7.0 COMMENTS AND OBSERVATIONS

The data from these tests show that the Aqua Signal, Series 40, AAW navigation light meets the performance requirements of the standards listed above for power driven vessels under 20 meters in length when equipped with the Digitron replacement LED bulb / light source.

The results presented herein apply only to the test specimen as prepared and as tested on the date reported. All equipment used in the performance of these tests was calibrated to standards traceable to the N.I.S.T and/or verified at the time of the test using internationally recognized methods to validate the accuracy and repeatability of the values recorded or collected during the tests.



**Figure 1: view of Digitron LED assembly**



**Figure 2: Aqua Signal Series 40 Fixture**

# **APPENDIX SUPPORTING DATA**

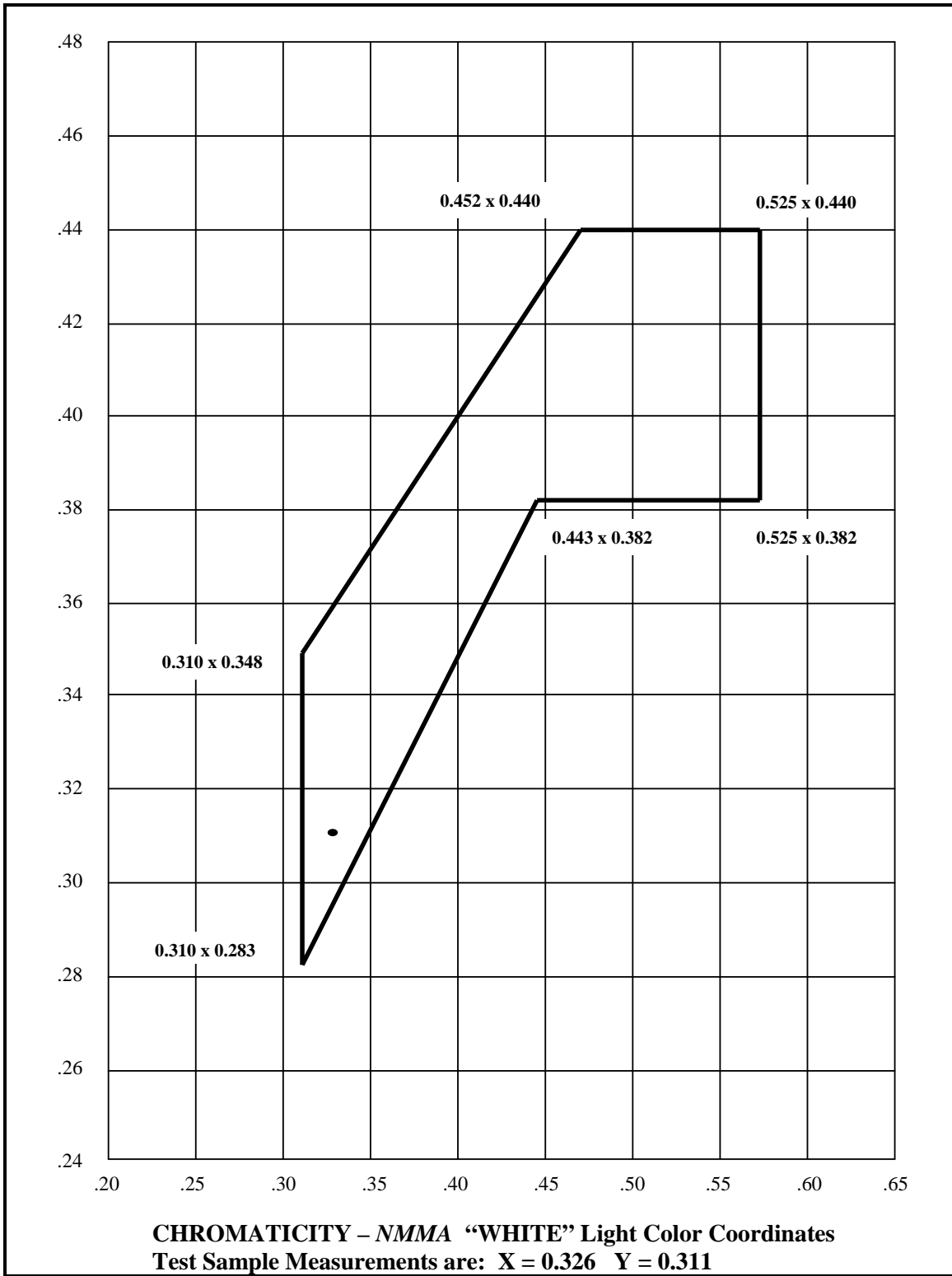


Figure 3: Chromaticity

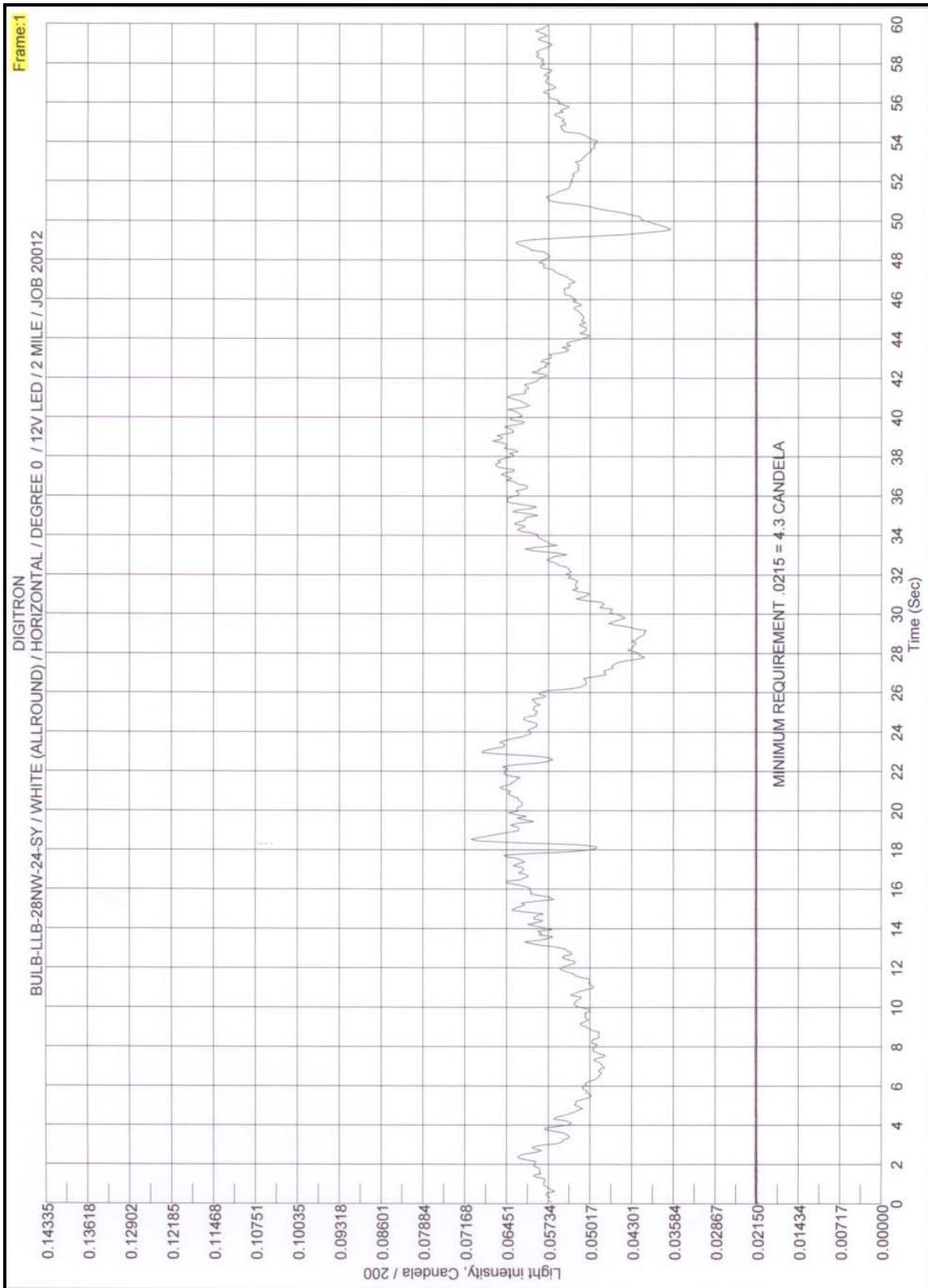


Figure 4: Horizontal Cut-Offs (0 deg)

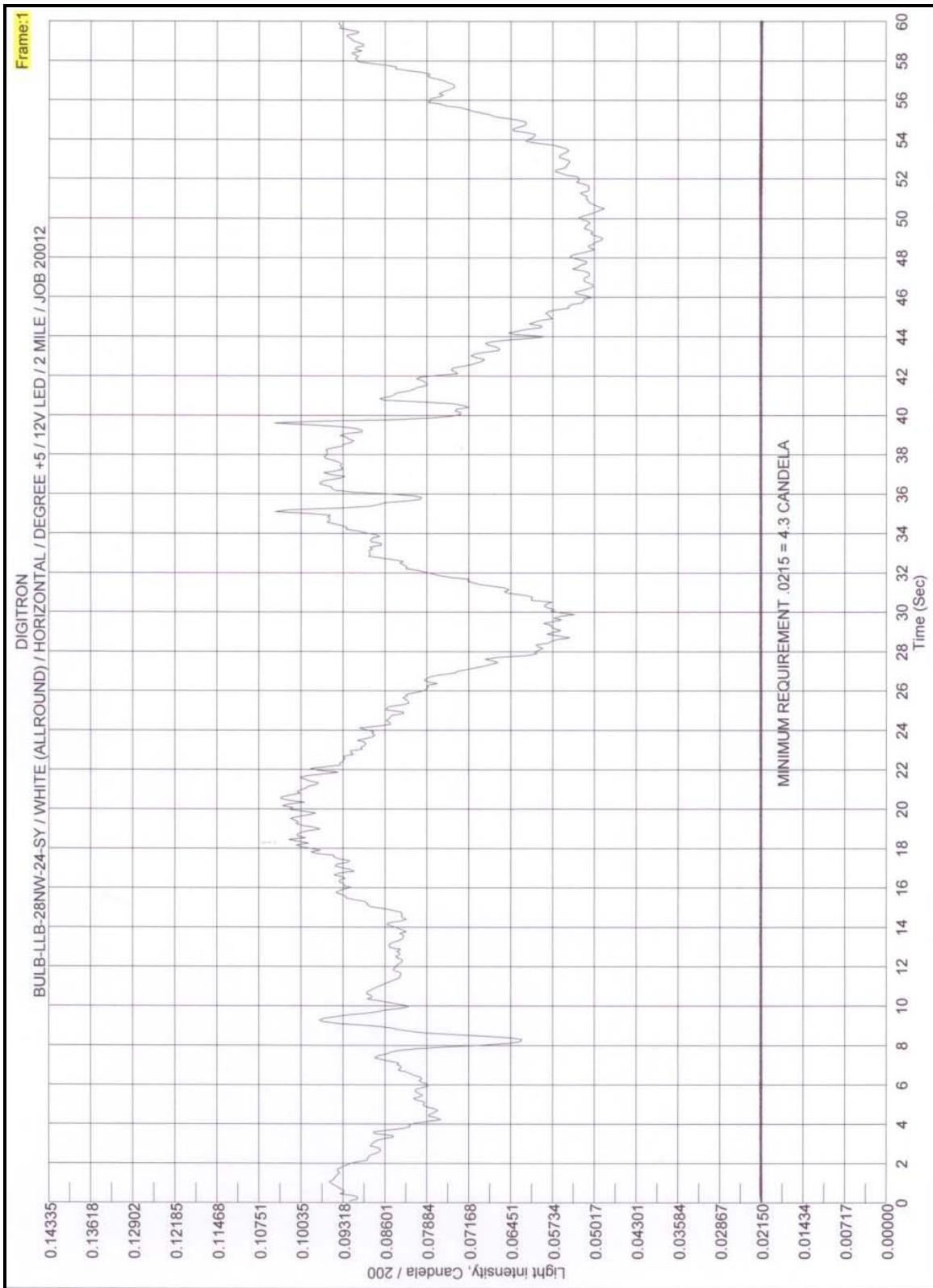


Figure 5: Horizontal Cut-Offs (+5 deg)



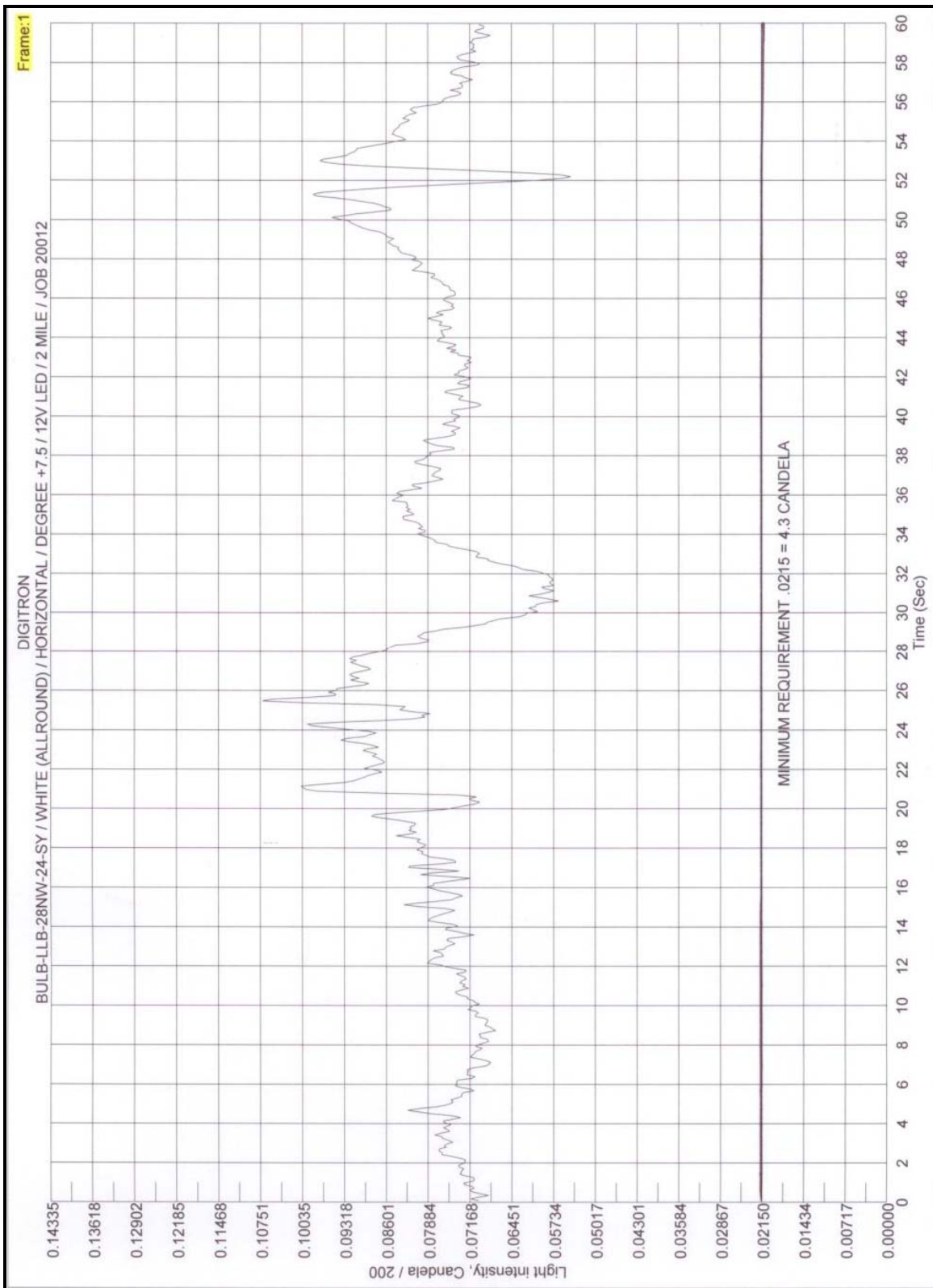


Figure 6: Horizontal Cut-Offs (+7.5 deg)

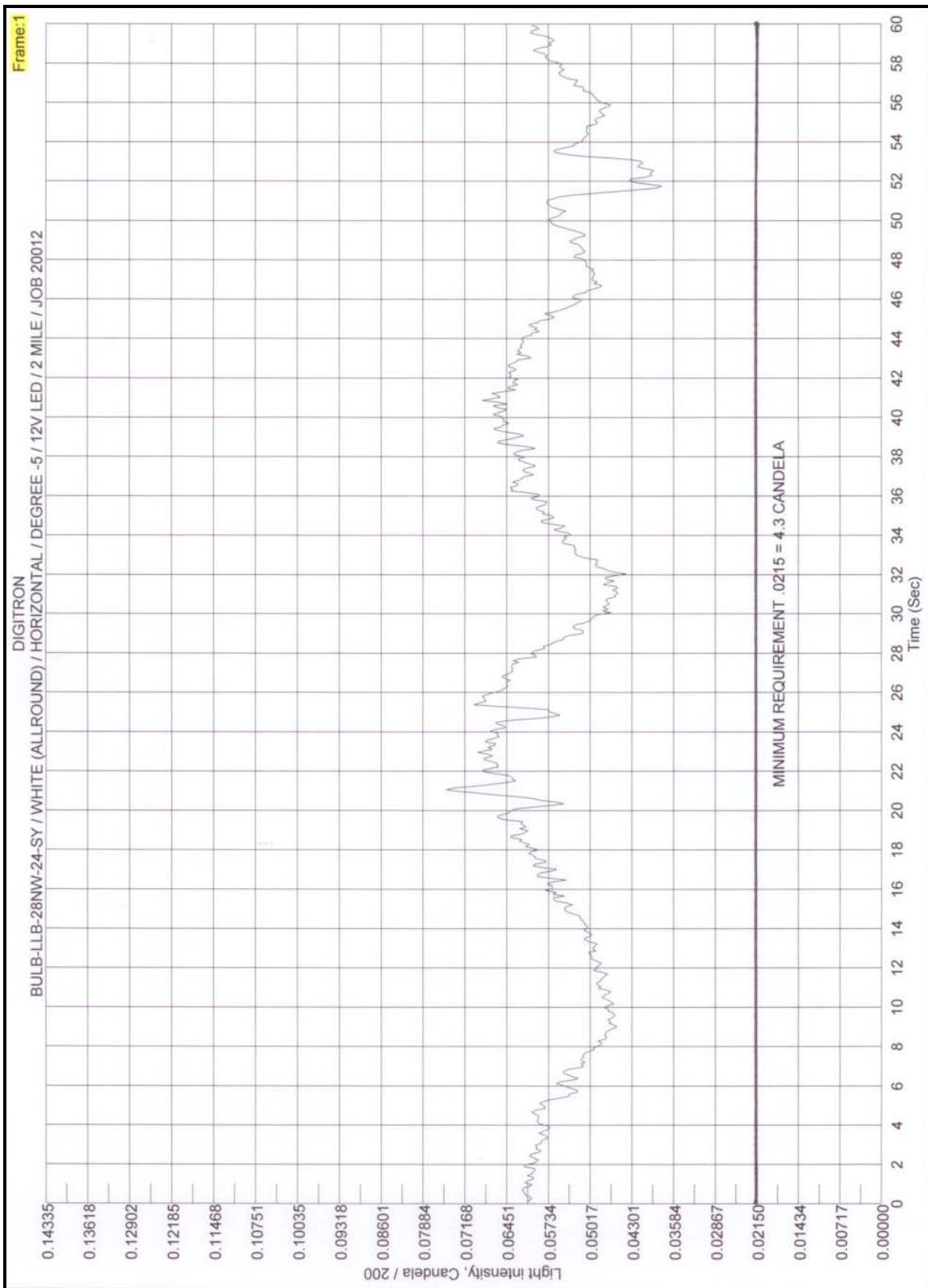


Figure 7: Horizontal Cut-Offs (-5 deg)

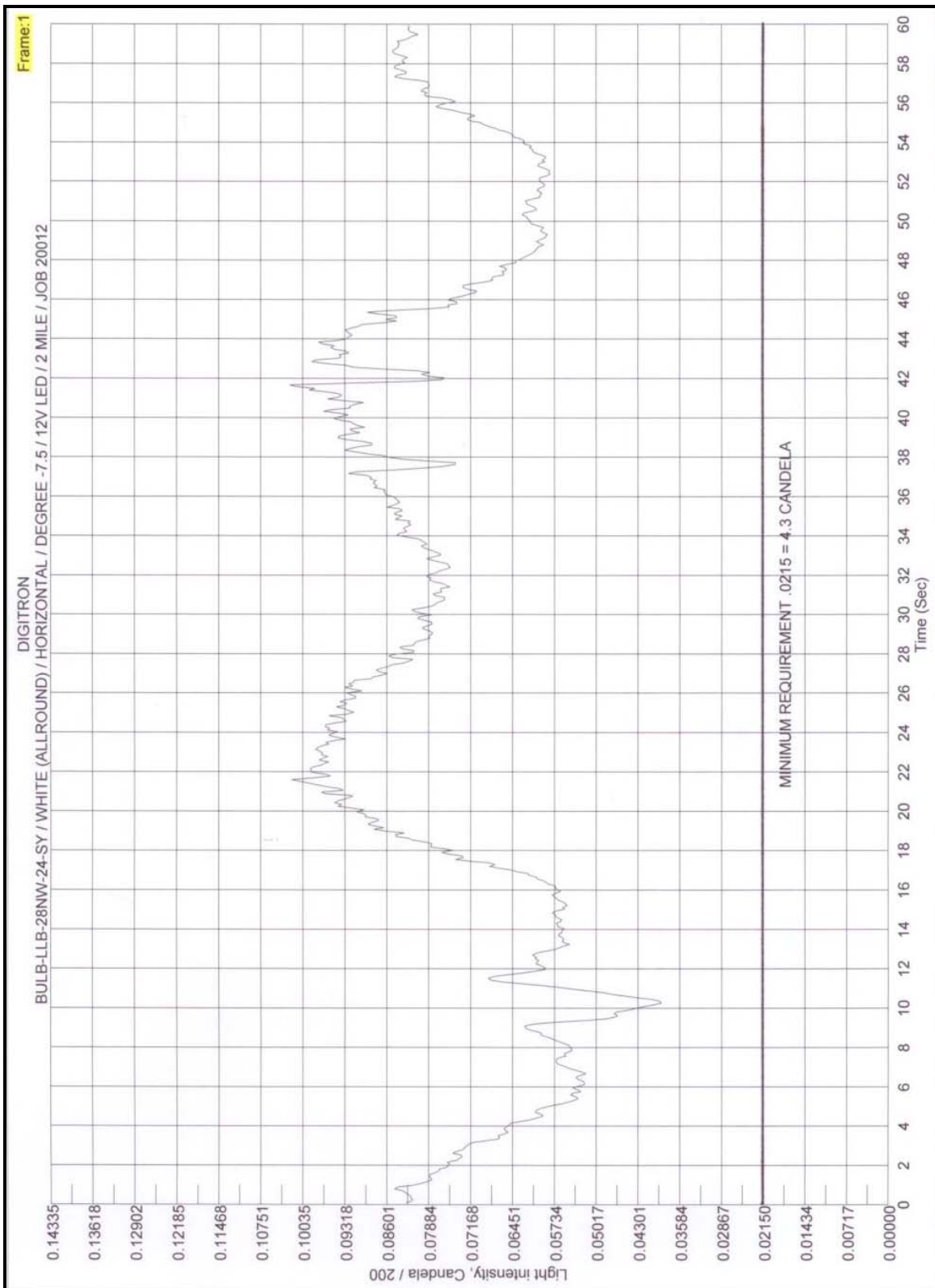


Figure 8: Horizontal Cut-Offs (-7.5 deg)

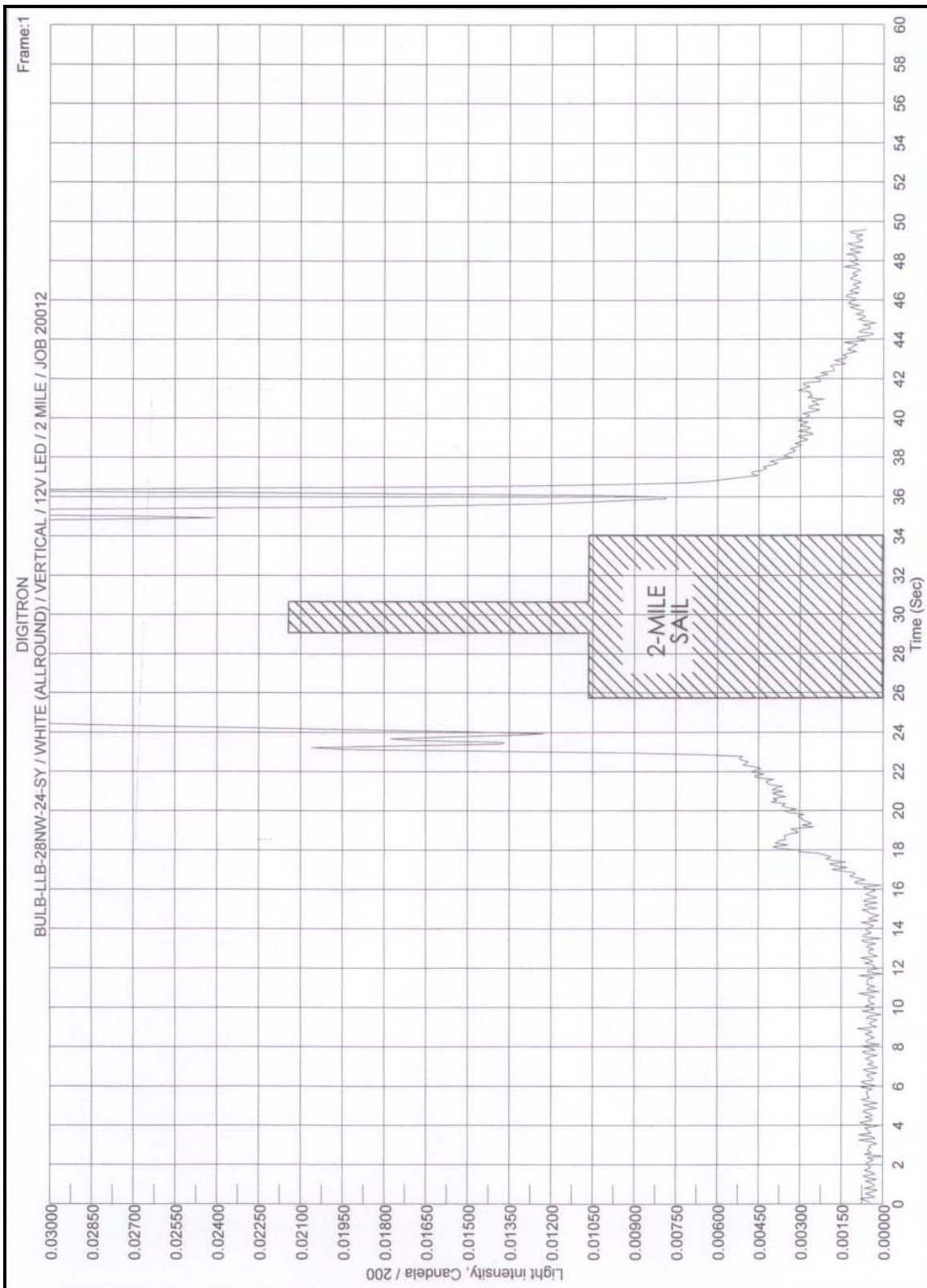


Figure 9: Vertical Cut-Offs