

TBI-FORENSIC SERVICES DIVISION PERFORMANCE VERIFICATION FORM

Instrument/Method to Verify:

Check the appropriate box: New Validation ☒ Modification ☐ Performance Check ☒

Laboratory: NCL ☒ KCL ☐ MCL ☐ Unit: Forensic Chemistry

Based on training and competency, the following analyst(s) are authorized by the Technical Leader to participate in this study:

Name Rebecca Stout Title SA/FS Initials RMS
Completed: Signature Rebecca Stout Date 10-6-20

Name NA Title _____ Initials _____
Completed: Signature _____ Date _____

Name NA Title _____ Initials _____
Completed: Signature _____ Date _____

Verification of final review:

Unit Supervisor Blum Ewert Date 10-12-20

Unit Supervisor NA Date _____

Unit Supervisor NA Date _____

Crime Laboratory Regional Supervisor Jennifer Hall Date 10.15.20

Crime Laboratory Regional Supervisor NA Date _____

Crime Laboratory Regional Supervisor NA Date _____

Quality Assurance Manager Chl Dye Date 10/09/20

By signing below, I have verified this study meets all requirements and I deem this procedure/instrument fit for the intended use:

Technical Leader Blum B. Ewert Date 10-12-20

All information must be submitted to the Quality Assurance Manager prior to the implementation of the procedure/instrument. If applicable, include training plan and competency testing schedule.

Training for Cary 60 UV-VIS Spectrophotometer and Cary WinUV Software

Training Given by:
Rebecca Stout

Initials: RMS

Training Received by:

Isabella Barnette

Initials: IB

Brandi Brown

Initials: BB

Ella Carpenter

Initials: EC

Laura Cole

Initials: LC

Lela Jackson Dixon

Initials: LJD

Glenn Everett

Initials: GE

Cassandra Franklin

Initials: CF

Rachel Freeman

Initials: RF

Glen Glenn

Initials: GG

Rebecca Hernandez

Initials: RH

Ben Hubert

Initials: BH

Scott Jenkins

Initials: SJ

Andrea King

Initials: AK

Laura Newberry

Initials: LN

John Scott

Initials: JS

Jennifer Sullivan

Initials: JS

Brett Trotter

Initials: BT

UV-VIS

Sheldon

Cary WinUV

Software Version: 5.1.3.1042

Instrument Serial Number:
MY20309228

Tennessee Bureau of Investigation Nashville Crime laboratory
Forensic Chemistry
Validation and Performance Check
Ultraviolet- Visible Spectrophotometer (Serial Number: MY20309228)

Summary and Conclusion

Agilent Technologies installed a new Cary 60 UV-VIS spectrophotometer on September 28, 2020 in the Nashville Crime laboratory. This instrument's operations and internal setup differ from those of the Agilent 8453 previously utilized in the Nashville laboratory. This instrument utilizes Cary WinUV software version 5.1.3.1042. The following includes performance check data and comparison data between standards run using the new Cary 60 UV-Vis Spectrophotometer and the previously used Agilent 8453 UV-Vis Spectrophotometer.

Standards used for performance verification

Cocaine HCl –Sigma Lot # SLCF487	Methylone – Australian NMI Lot # 09-D14
Diazepam – Sigma Lot # 15F451	Butalbital – Sandos Lot # 217001
Methamphetamine - Lipomed Lot # 301.1B4.1	

Solvents used for performance verification

0.1N HCl - Fisher Lot # 490766	9.4 Buffer – Boric Acid Lot # 030291
Saturated NaOH - Lot # 117238	NaOH Lot # 117238
Methanol - Fisher Lot # 202169	

The instrument's performance was checked using the validate application of the Cary 60 WinUV software. The software performed Xenon line scan, Photo noise, and Baseline flatness tests to ensure the instrument was operating within specifications. The standards listed above were run according to the standard operating procedure listed in chapter 19. The data obtained from these standards was then compared to those run using the Agilent 8453.

The instrument performance tests performed in the validation program all passed indicating the instrument is operating within specifications. All standard spectra obtained using the Cary 60 produced wavelength maxima comparable to those of the previously utilized Agilent 8453. Sample preparation, data interpretation, basic operations, and the basic theory of UV absorption for the Cary 60 model do not differ from the 8453 model. There are differences in software and maintenance functions. Employment of the new Cary 60 WinUV Software will be discussed and demonstrated to analysts. This demonstration will include loading the instrument method, as well as reviewing, annotating, and printing off data. A roster will be kept of analysts who have successfully completed the training.

CARY 60 UV-VIS SPECTROPHOTOMETER OPERATIONS

Initialization:

1. Ensure the power is on to all components.
2. Enter the Cary WinUV software via the computer desktop and select the **Scan** application.
3. To load the method, go to **File**, then **Open Method** and load the **drugs.MSW** method.
4. (A shortcut to this is to simply click on the **drugs.MSW** icon on the desktop if it has already been placed there). If a baseline hasn't been run for the day, a baseline window may appear when starting the application. Click **OK**.
5. Go to **File**, **Open Data...**, and under **Files of type:**, choose **Graph Template(*.GSW)**; choose the appropriate template for the instrument you are working on and click **OK**.

****These steps should load all of the necessary operating parameters for the instrument.**

Sample Analysis:

1. Click the **Zero** button on the left side of the screen. A window will appear. Clear the sample compartment and click **OK**. This will zero the existing ordinate value.
2. Obtain a baseline by clicking the **Baseline** button on the left side of the screen. A window will appear. Be sure the sample compartment is clear and click **OK**. This is the equivalent of an "air blank" on the Agilent 8453 and will subtract the instrument's raw transmission data from the sample data. A printed baseline spectrum is not required, so click the **Remove Graph** icon on the toolbar to delete it. The spectrum remains in the instrument and the word "baseline" will appear in red in the upper left corner of the screen.
3. Samples may now be collected by following Chapter 19.0 in the Forensic Chemistry Standard Operating Procedure Manual.

Note: The application will automatically overlay spectra in a single graph window. However, you may obtain individual spectra by running one spectrum at a time, printing your data, and beginning again, OR by clicking on the **Add Graph** icon on the toolbar. This will add an empty graph window on top of the existing one.

Monthly Instrument Performance Testing:

1. Restart the Cary 60 by turning the instrument off and back on. The instrument calibrates automatically on start up.
2. Enter the Cary WinUV software and choose the **Validate** application.
3. Click the **Test...** button on the left of the screen.

4. Choose **Instrument Performance Tests** and observe that there are three tests. The **Xenon Line Test**, the **Photo Noise Test**, and the **Baseline Flatness Test**.
5. You will see also the tabs **Wavelength Accuracy**, **Baseline**, and **Noise**. Do not change any information under these tabs. These are the specifications by which the instrument was tested upon installation and are outlined on the Customer Test Certificate for the instrument.
6. Select **OK** to close the Instrument Performance Test window.
7. Click the **Start** button at the top of the screen. Be sure the sample compartment is clear and click **OK**. Check that the sample compartment lid is closed and click **OK** again. The software will automatically run all three tests.
8. When the tests are finished, go to **File** and **Print** the Validation Report.

Note: The holmium oxide test will not be performed monthly on this instrument. "The light flashes from the xenon lamp are very intense, so they can be passed through a beam splitter to give simultaneous reference beam correction without causing excess photometric noise. This means that the wavelength shift errors associated with traditional scanning methods are eliminated." - Cary 60 Software and Instrument Information

Additional Note: If the instrument fails to meet any of the performance check requirements, the instrument will be taken out of service and arrangements will be made for repair.

This is not meant to be all inclusive as there may be more than one way to accomplish the same task.

10/1/2020 11:06:49 AM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory

Page 1 of 4



Cary Validation Report

Report time	10/1/2020 10:58:15 AM
Method:	
Report	C:\Users\Public\Documents\Agilent\Cary WinUV\10_1_2020 10:58:15 AM.RVO
Version	5.1.3.1042
Instrument	Cary 60

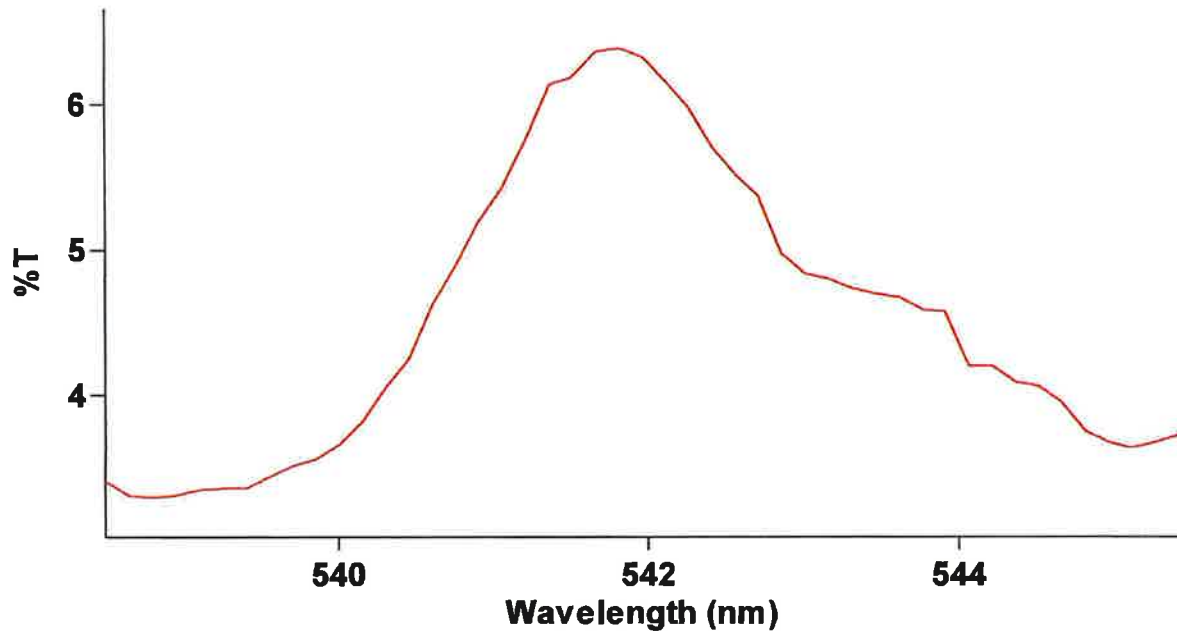
Wavelength Accuracy Test Xenon Line Scan Test

10/1/2020 10:58:16 AM
Instrument Settings

Ave Time :	2.000 sec
UV/Vis Interval :	0.150 nm
Tolerance for 541.9 Line	±0.50 nm

541.920 line found at 541.815 PASSED

hms



Wavelength Accuracy Test Xenon Line Scan Test PASSED

Photometric Noise Test

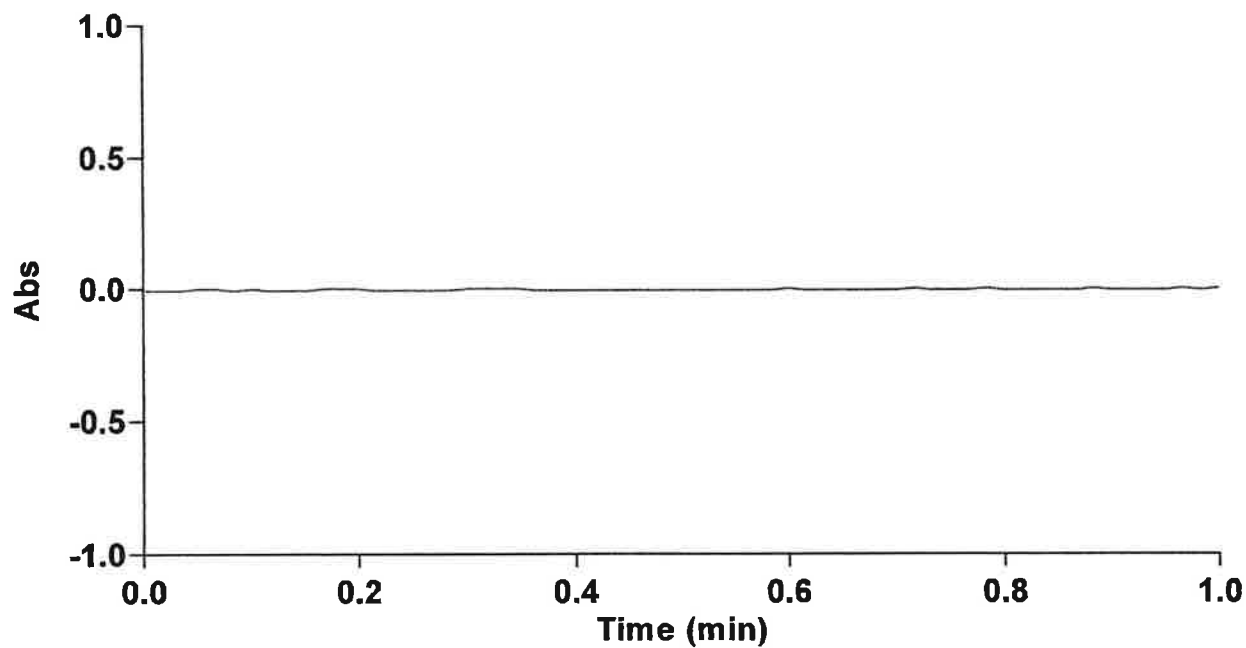
10/1/2020 10:59:55 AM

Instrument Settings

Ave Time : 1.000 sec

UV Wavelength : 500.00 nm
0.0 Abs Test: Mean = -0.000021 Abs
Tolerance < 0.00010000

RMS



RMS noise reading 0.00003322 PASSED

Photometric Noise Test PASSED

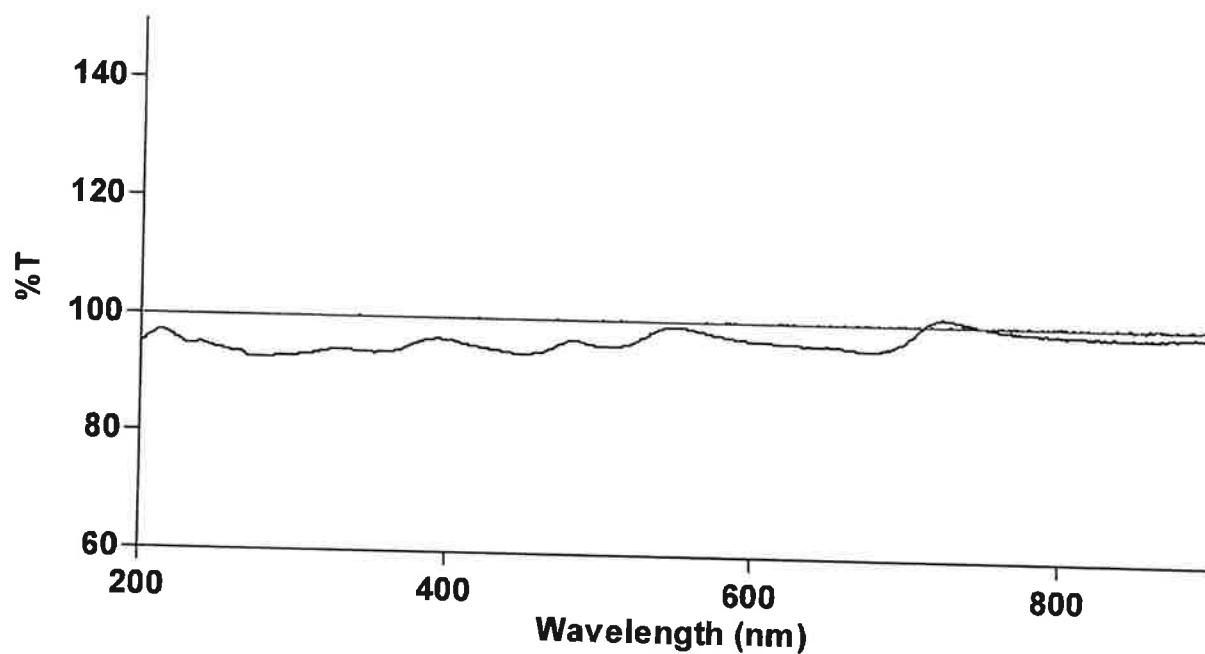
Baseline Flatness Test

10/1/2020 11:01:03 AM
Instrument Settings

Ave Time :	0.100 sec
Interval :	1.00 nm
Scan range :	200.00 - 900.00 nm
Corrected Baseline	200.00 - 850.00 nm, Tolerance ± 0.0010 Abs

Corrected Baseline	200.00 - 850.00 nm, Abs from -0.0003 to 0.0004 PASSED
Baseline Correction in Abs	0.0004

RMS



Baseline Flatness Test PASSED

Summary of Test Results

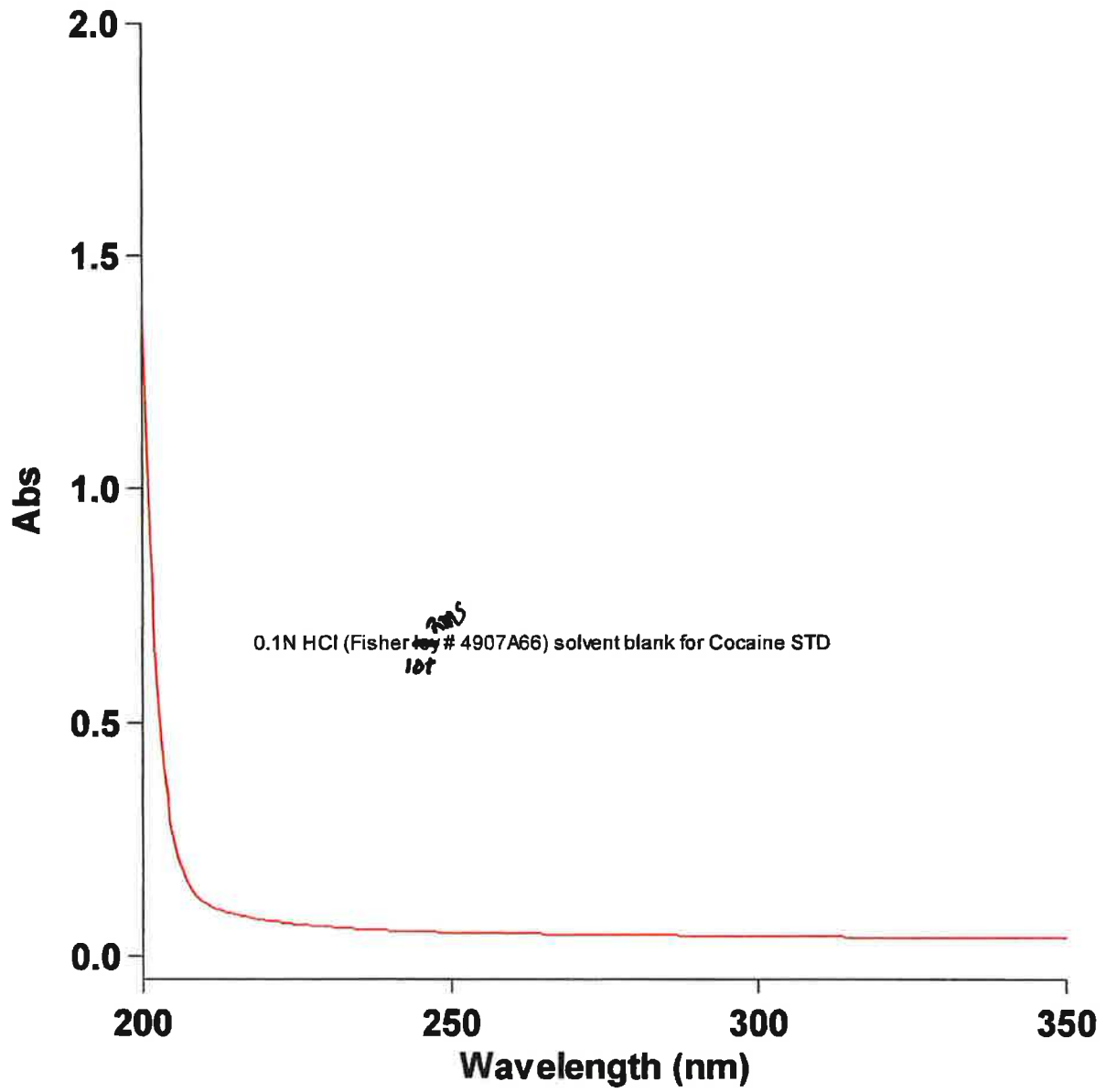
Wavelength Accuracy Test Xenon Line Scan Test
Photometric Noise Test
Baseline Flatness Test

PASSED
PASSED
PASSED

Operator Signature : Rebecca Stout Date : 10-1-20

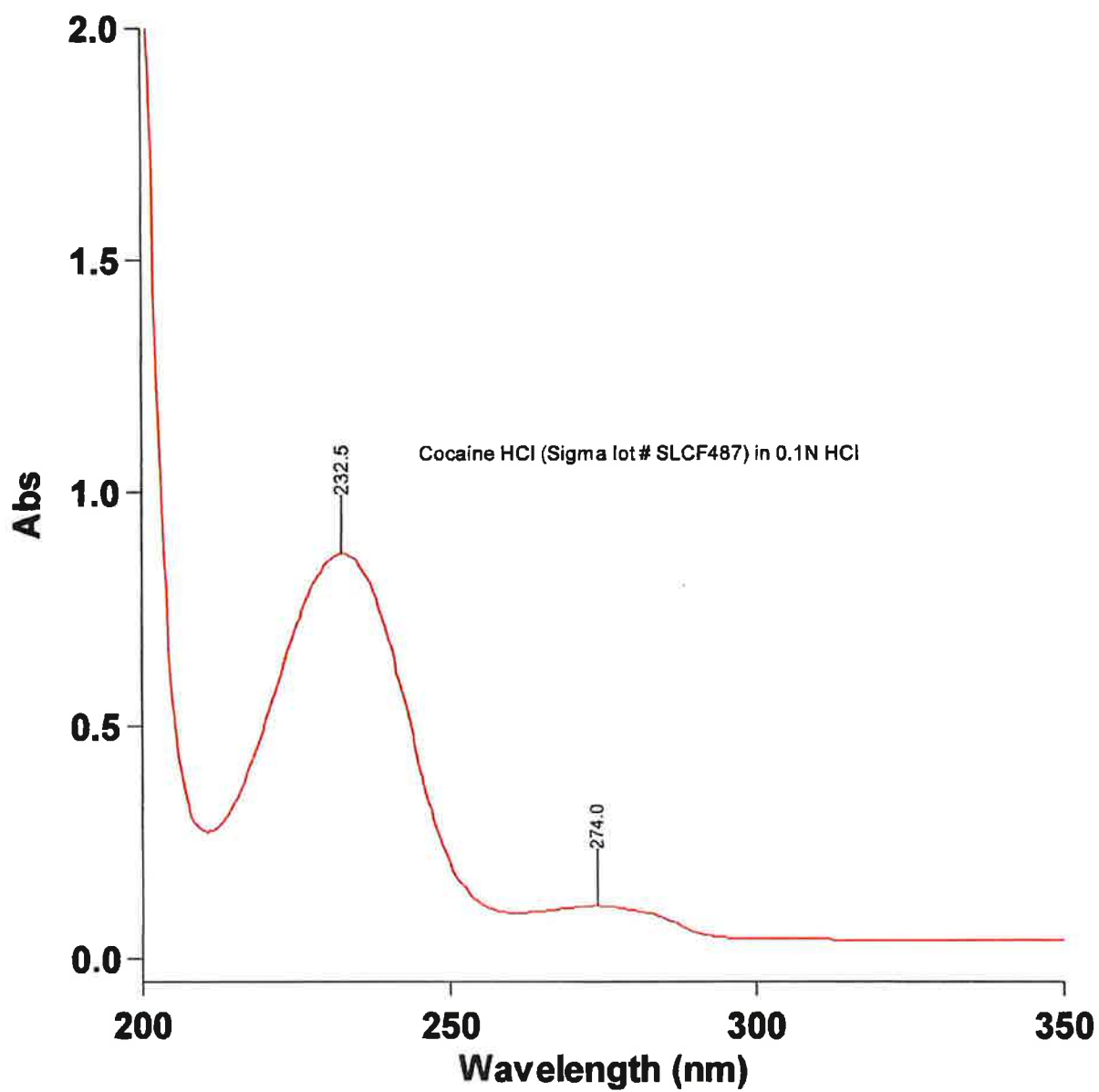
Supervisor Signature : _____ Date : _____

10/1/2020 11:16:10 AM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory

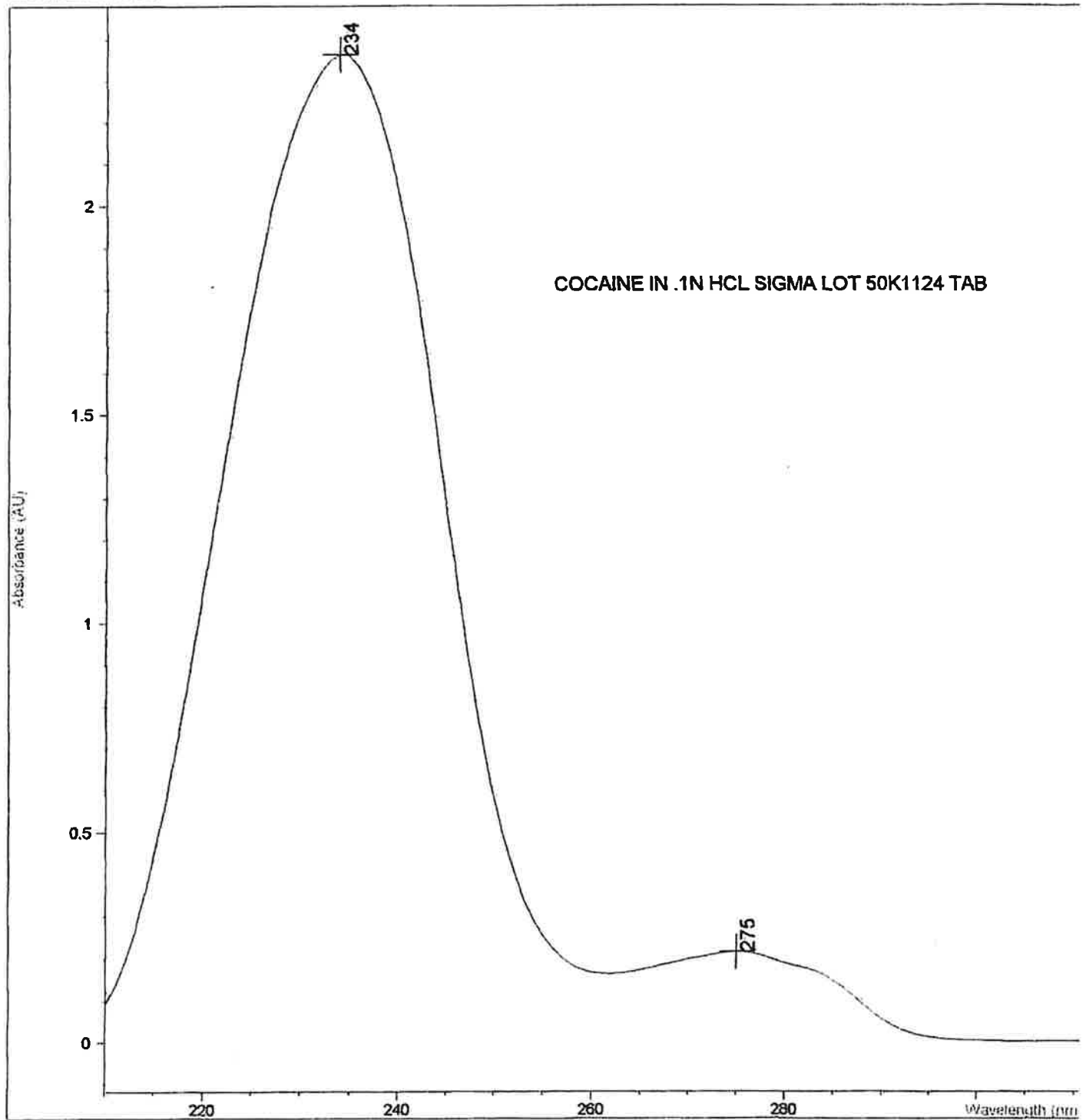


RMS

10/1/2020 11:23:06 AM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory

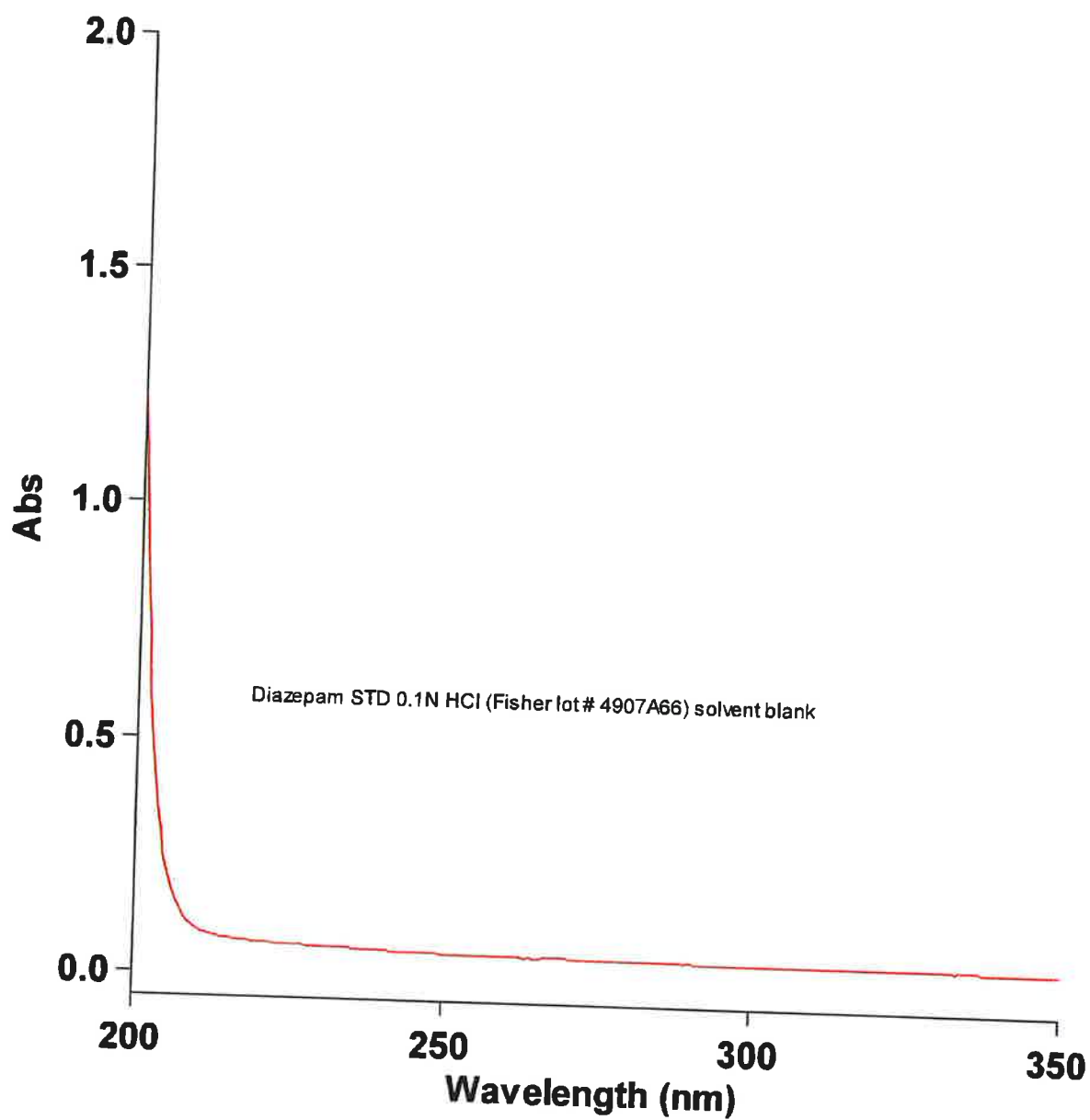


Last Sample Spectrum

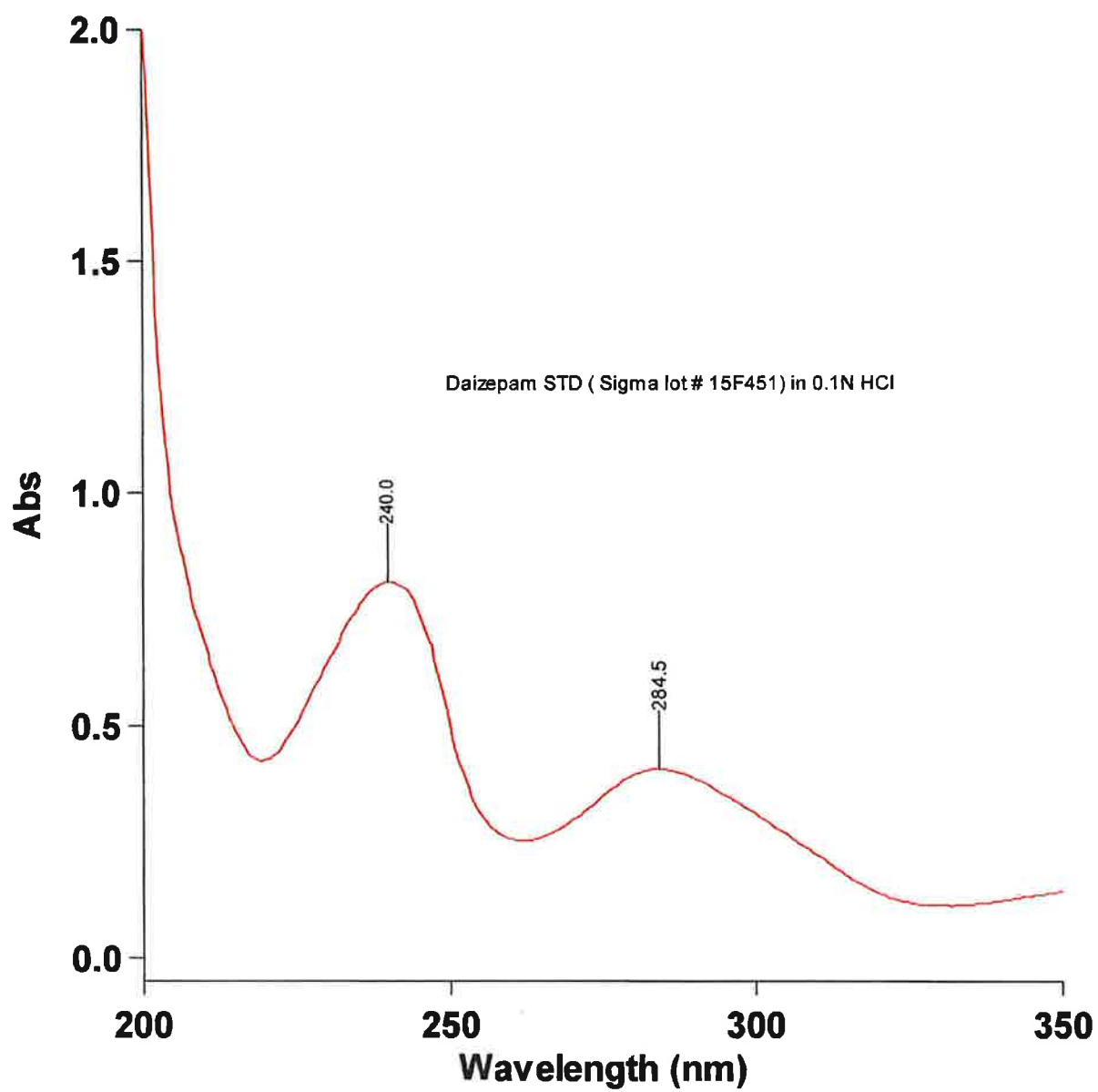


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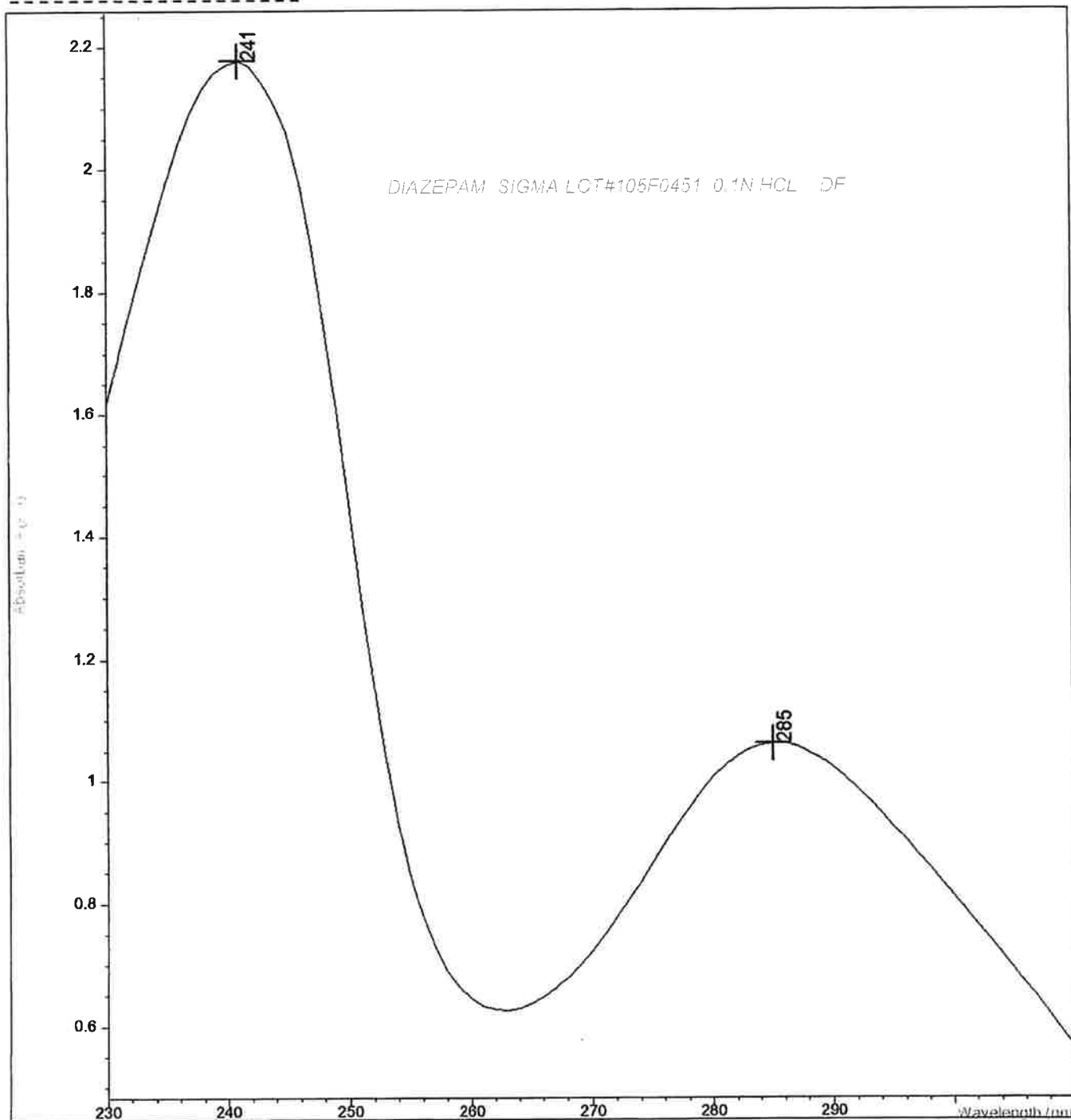
10/1/2020 12:54:14 PM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory



10/1/2020 1:02:54 PM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory

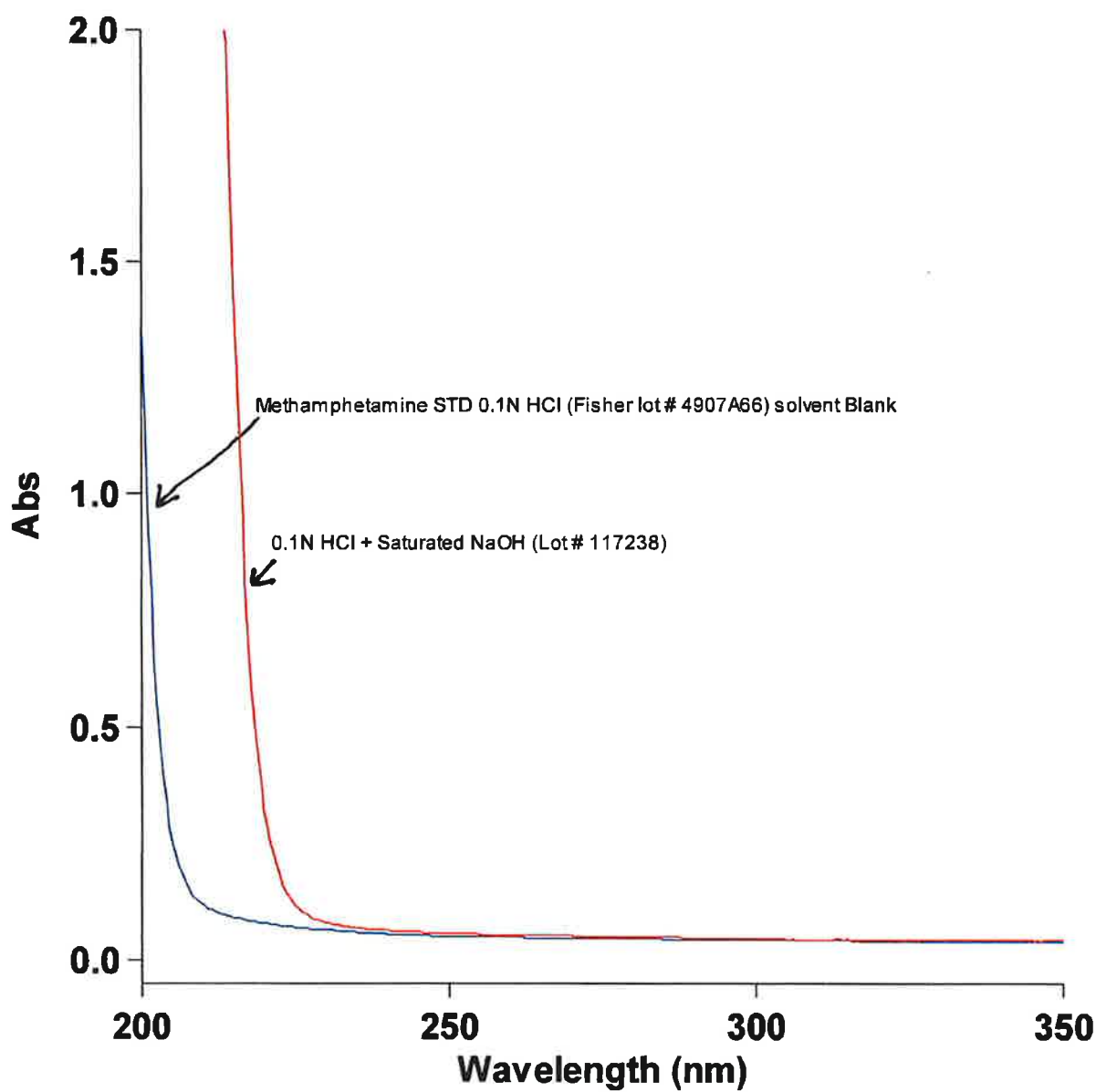


Last Sample Spectrum



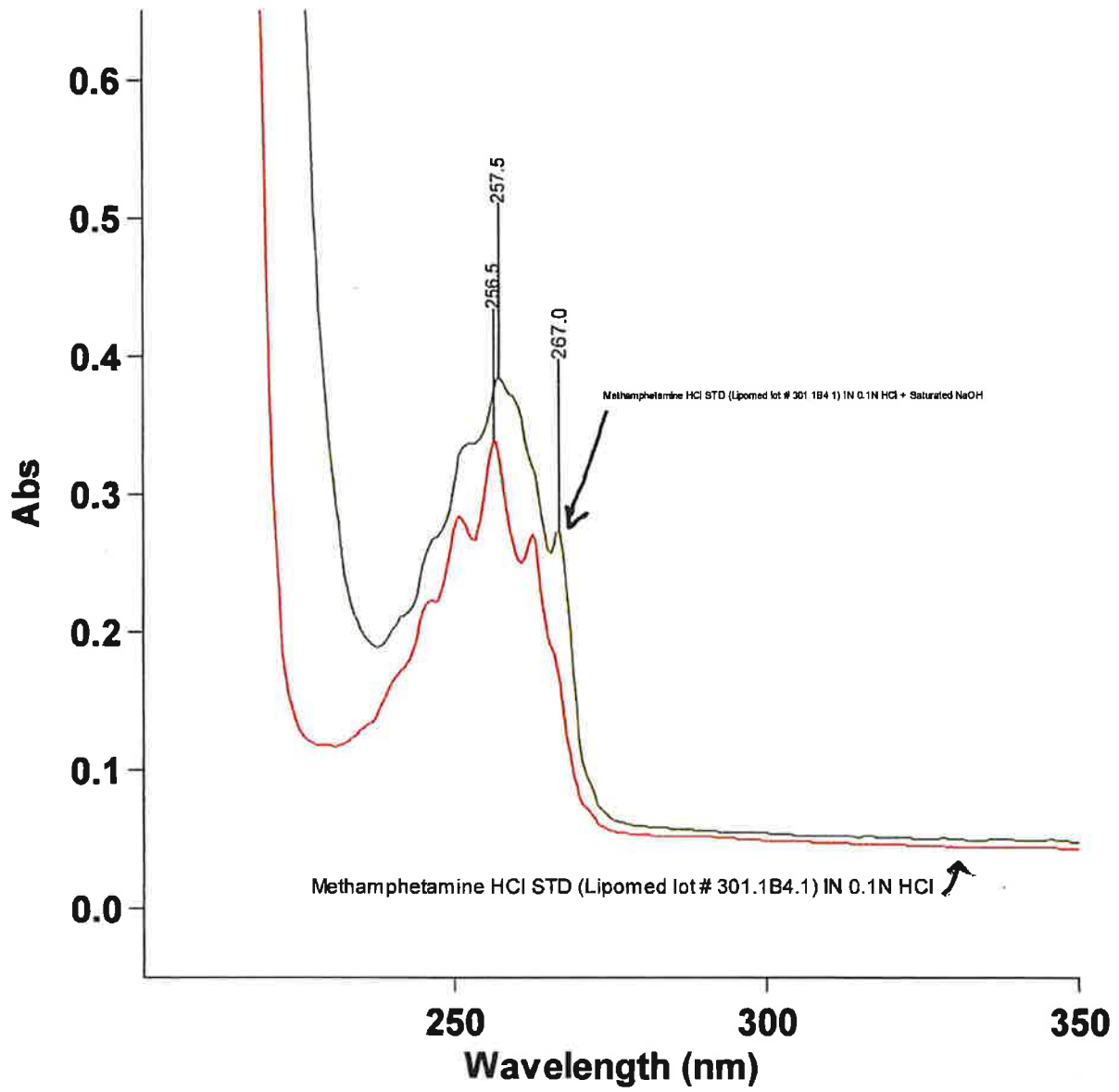
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10/1/2020 11:39:09 AM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory



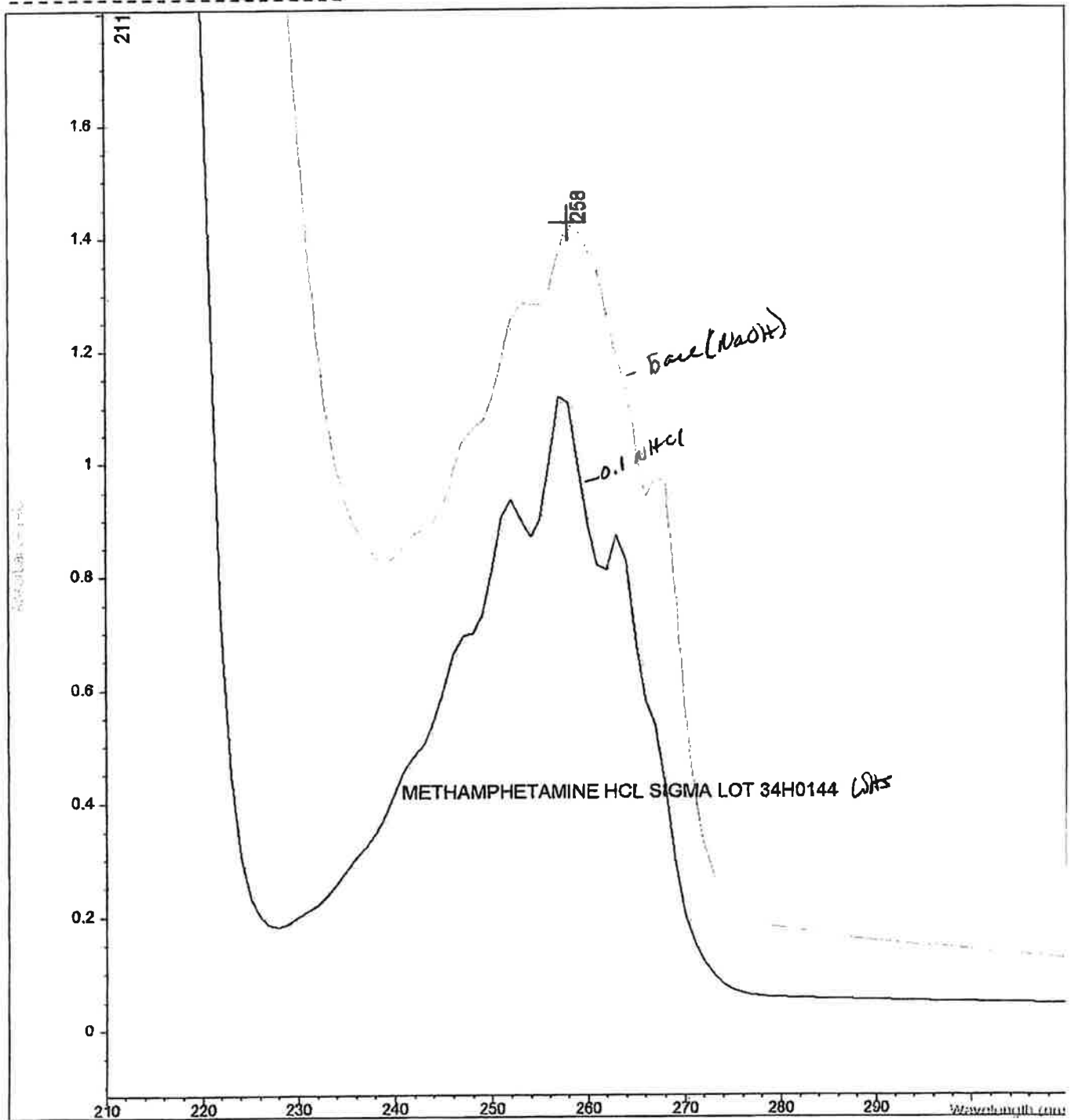
RMS

10/1/2020 11:52:45 AM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory



AMS

Overlaid Sample Spectra



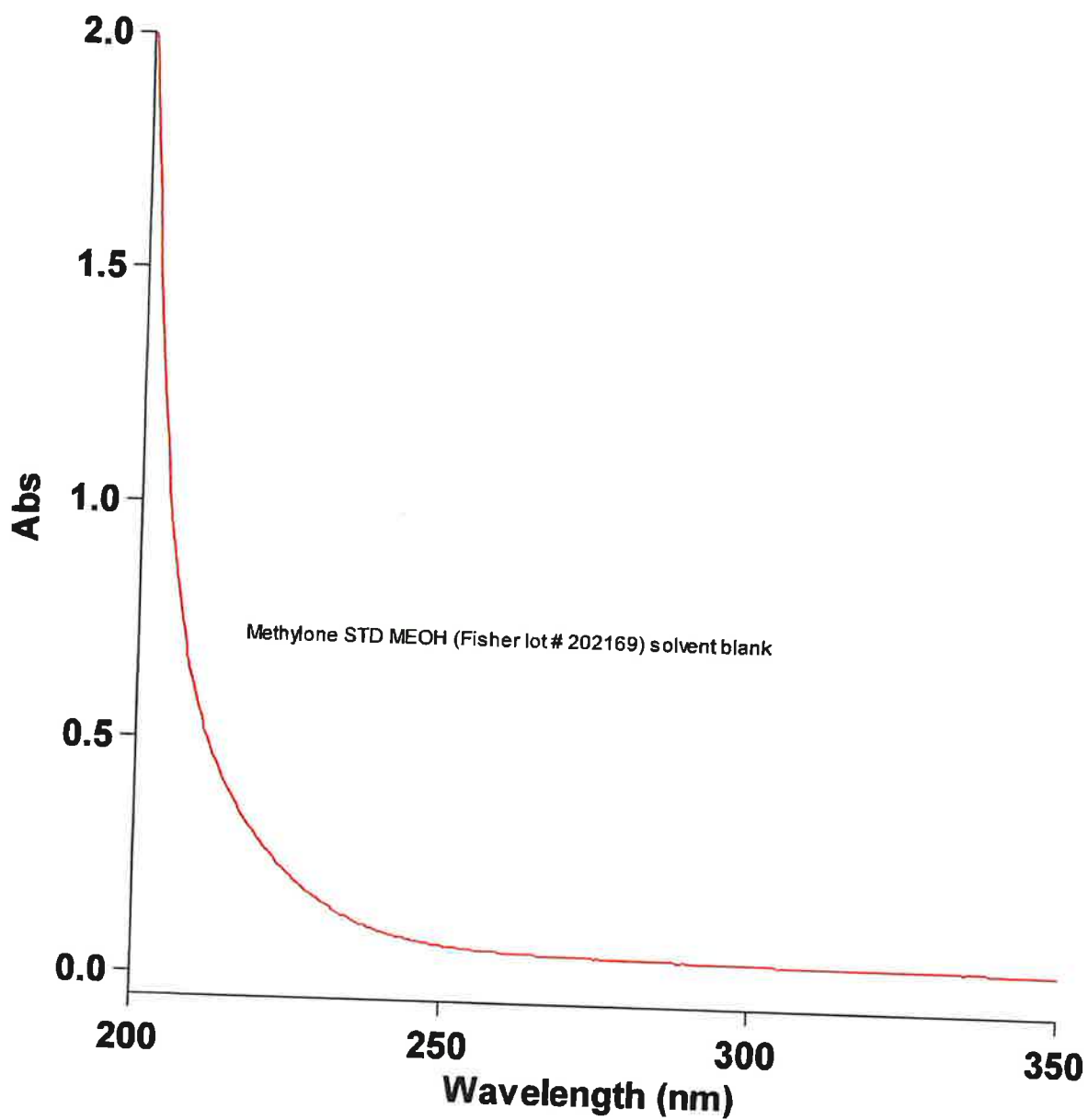
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10/1/2020 2:16:58 PM

Instrument name: Sheldon

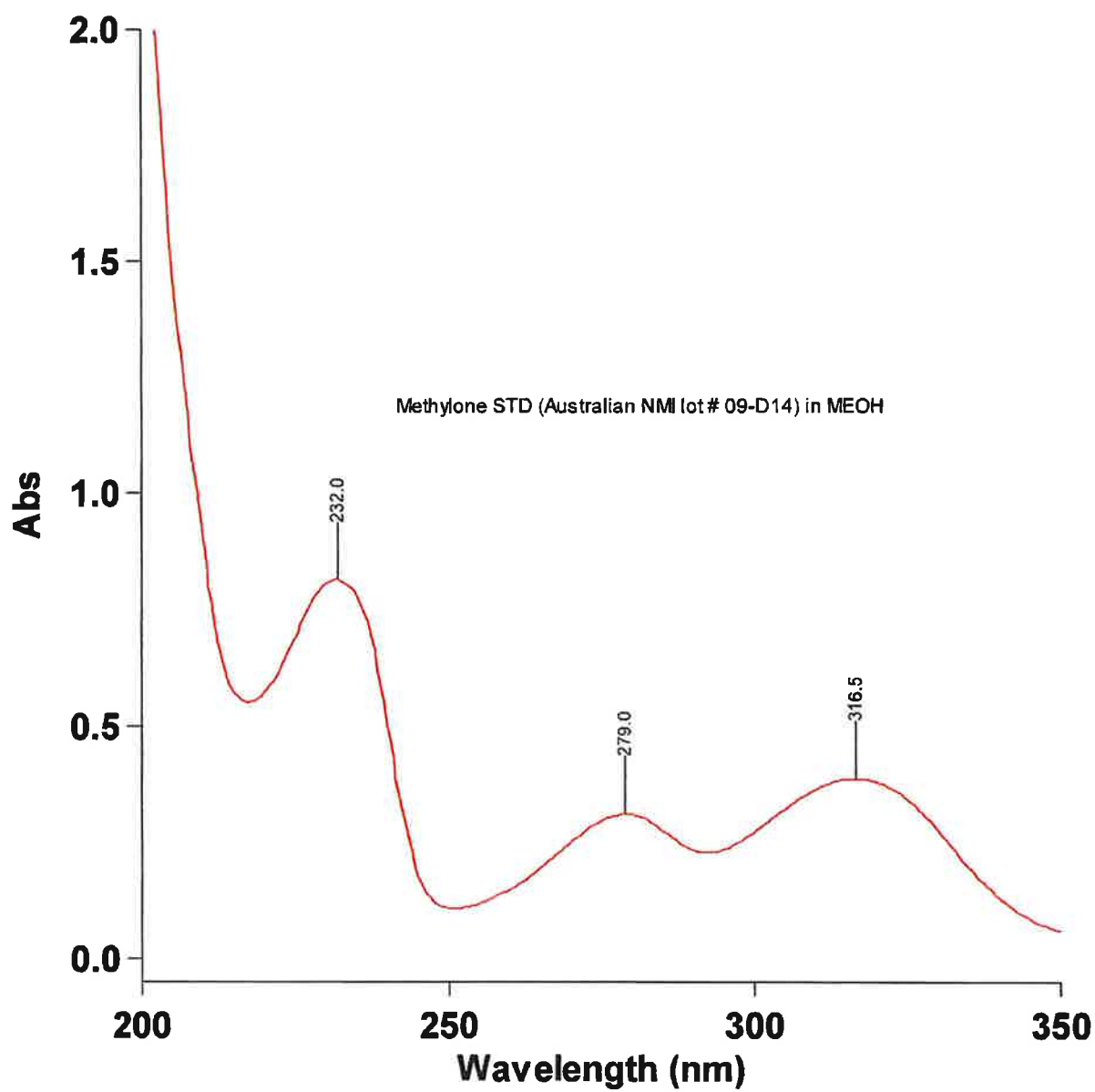
Tennessee Bureau of Investigation

Nashville Crime Laboratory



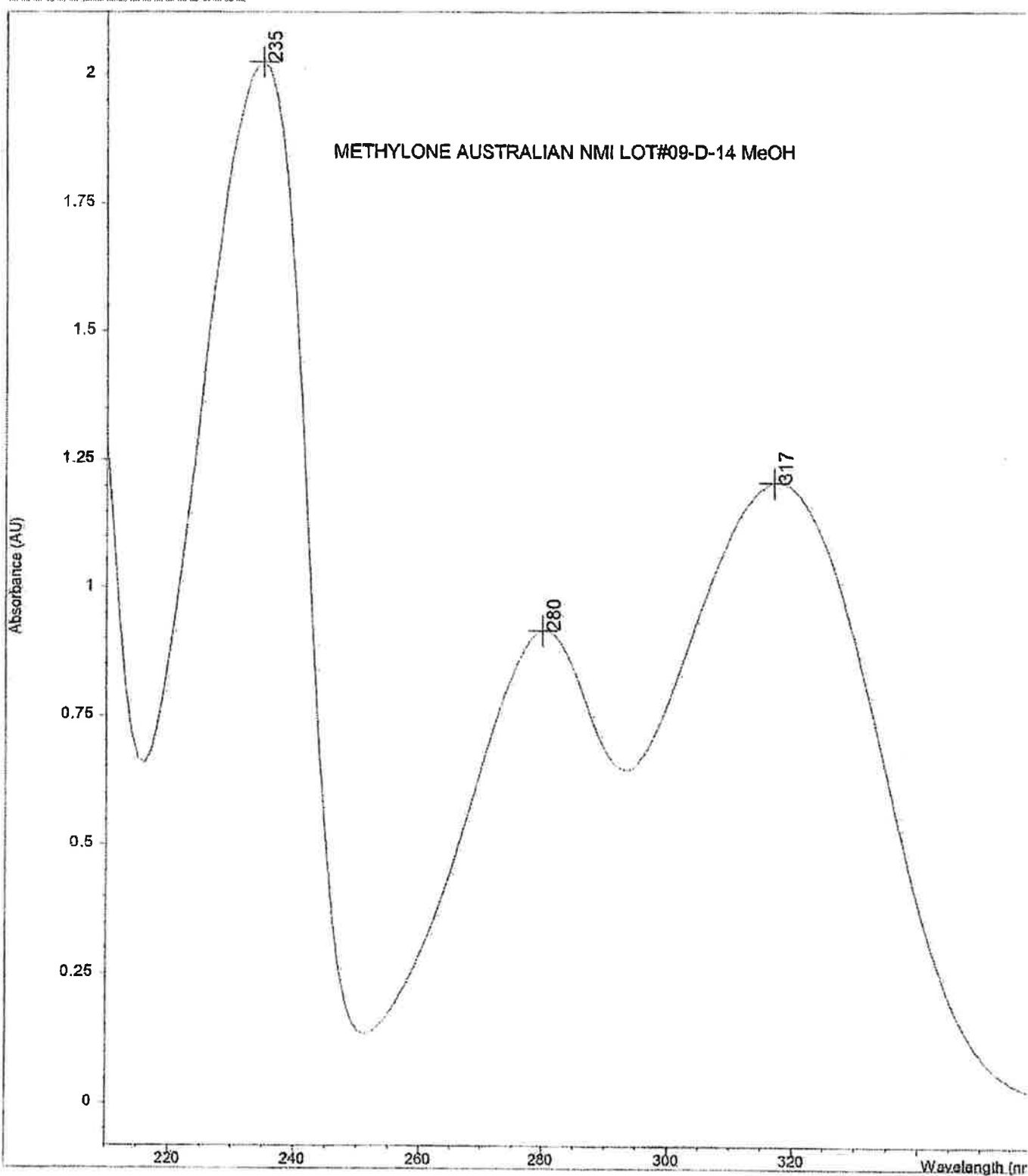
BMS

10/1/2020 2:21:47 PM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory



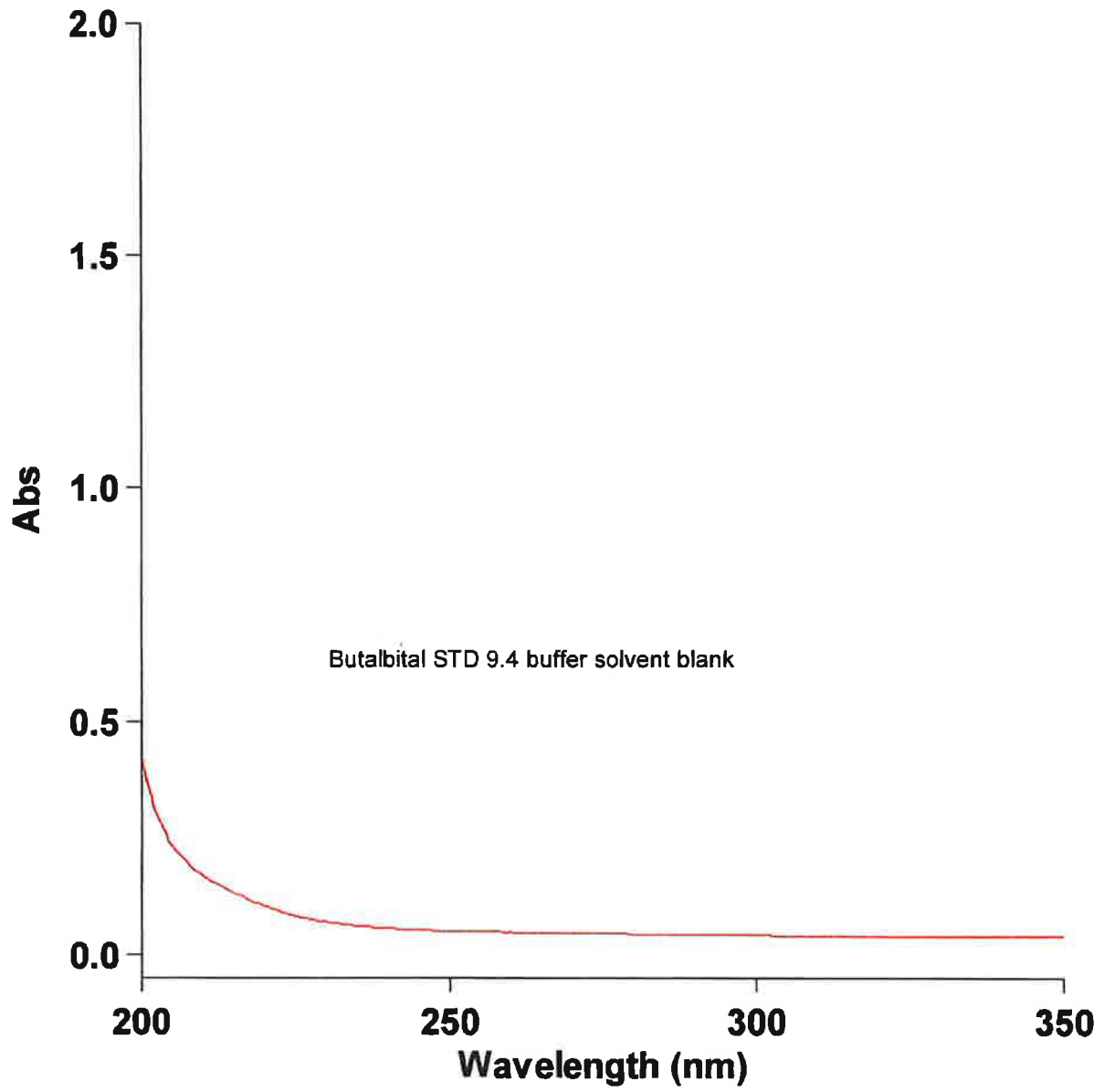
AMS

Last Sample Spectrum



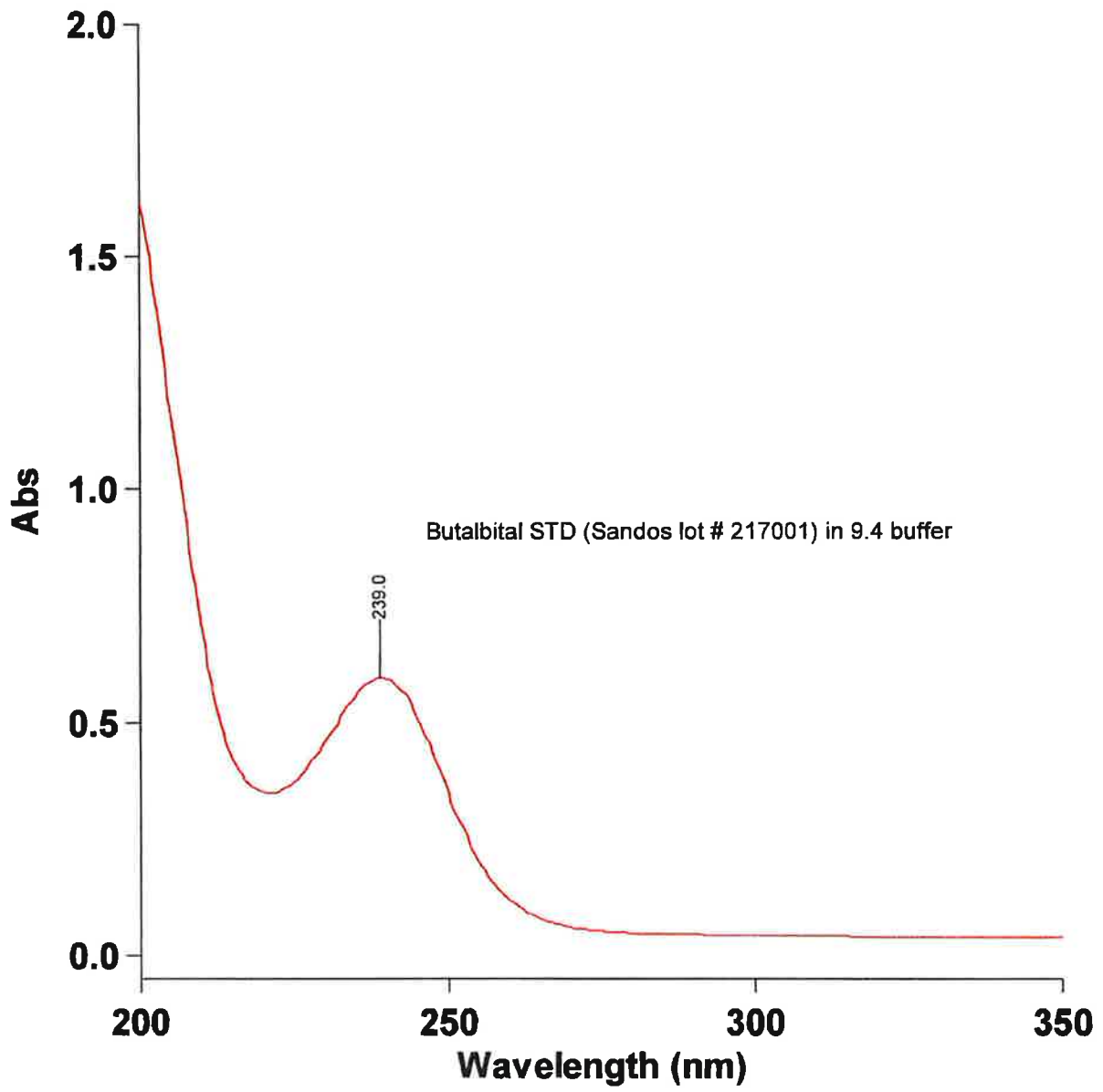
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10/2/2020 2:14:58 PM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory



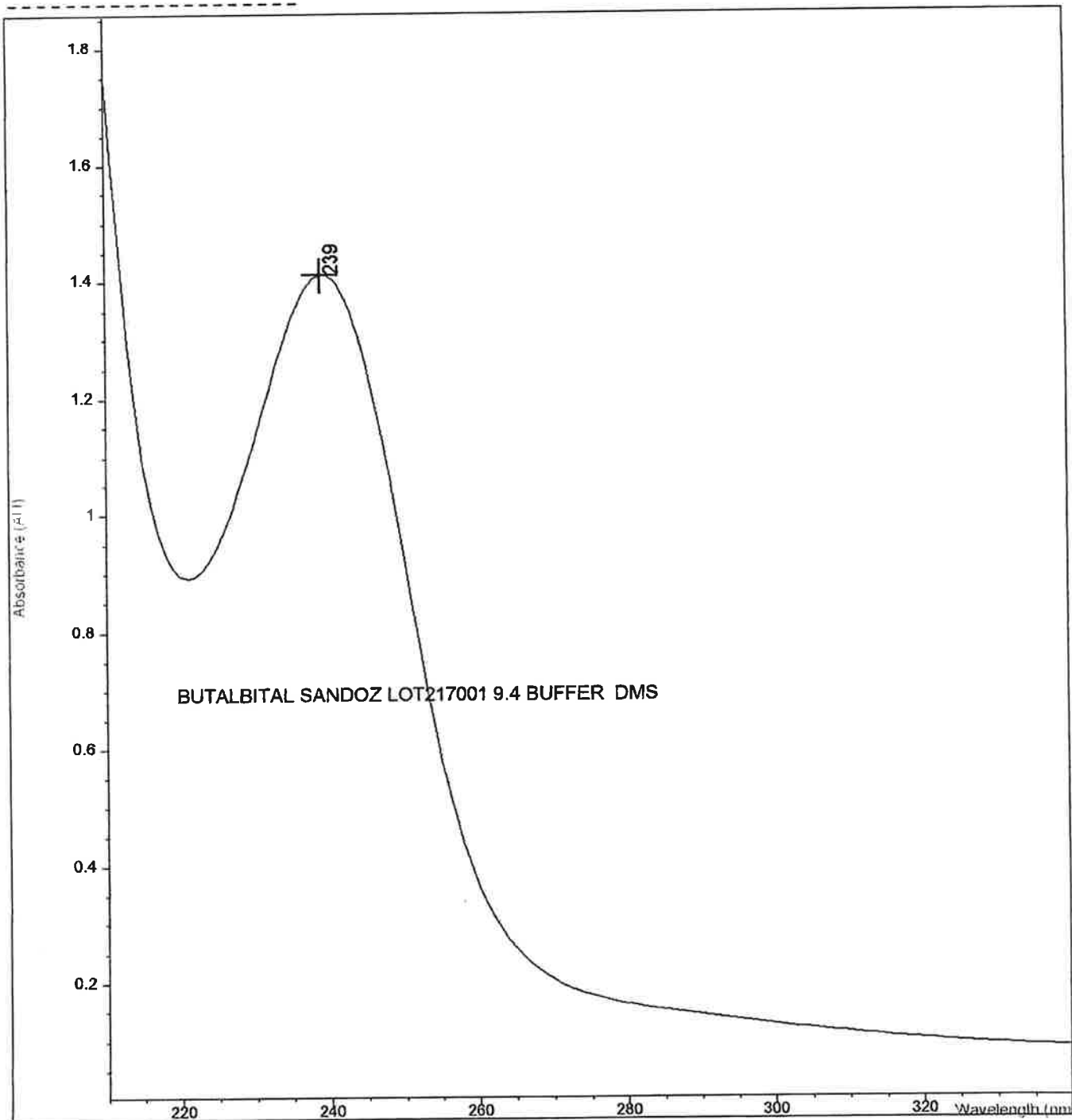
RMS

10/2/2020 2:18:53 PM
Instrument name: Sheldon
Tennessee Bureau of Investigation
Nashville Crime Laboratory



BMS

Last Sample Spectrum



*** End Hardcopy window ***



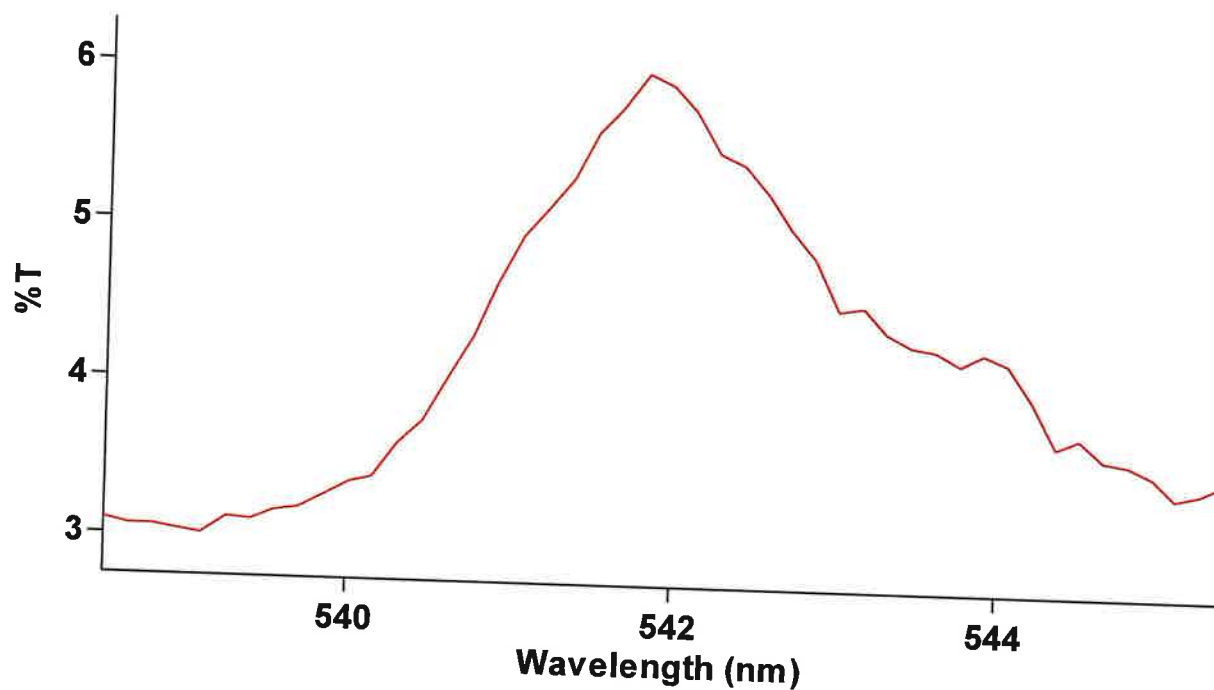
Cary Validation Report

Report time 10/9/2020 2:22:58 PM
Method:
Report F:\UV Validation 10-1-20\10_9_2020 2;22;58 PM.RVO
Version 5.1.3.1042
Instrument Cary 60

Wavelength Accuracy Test Xenon Line Scan Test

10/9/2020 2:22:59 PM
Instrument Settings
Ave Time : 2.000 sec
UV/Vis Interval : 0.150 nm
Tolerance for 541.9 Line ±0.50 nm
54 7 line found at 541.887 PASSED

AMS



Wavelength Accuracy Test Xenon Line Scan Test PASSED

Photometric Noise Test

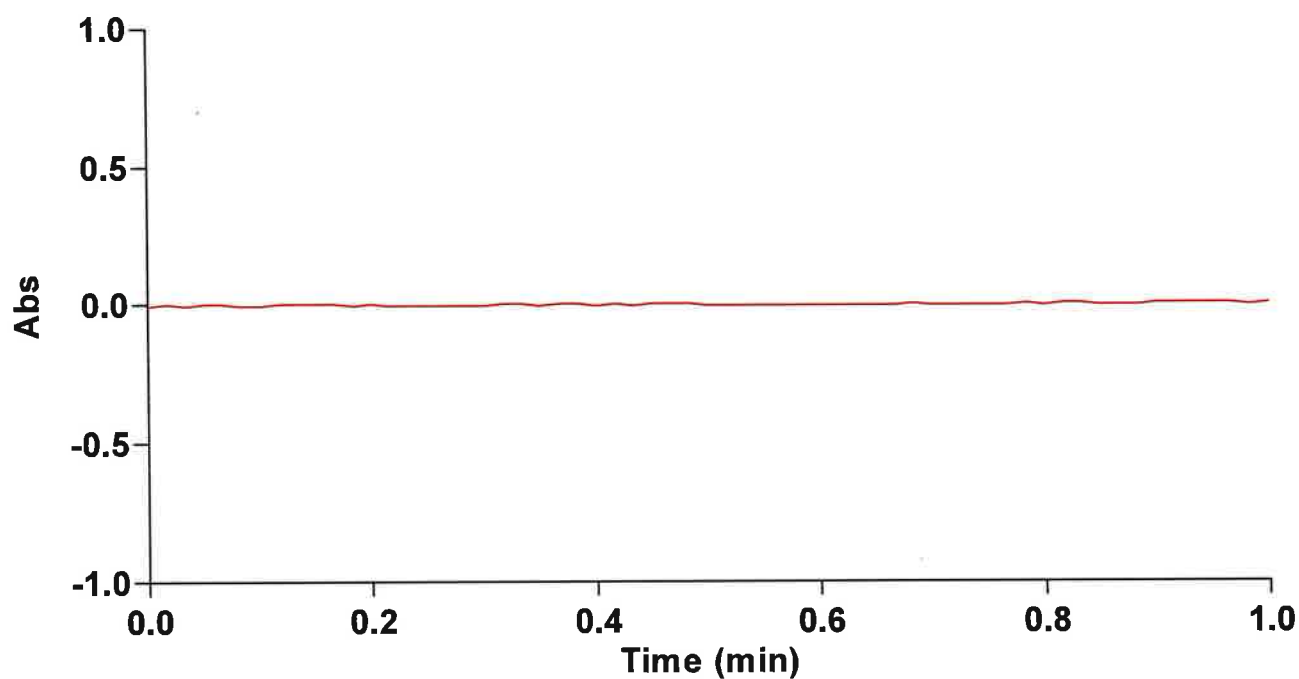
10/9/2020 2:24:38 PM

Instrument Settings

Ave Time : 1.000 sec

UV Wavelength : 500.00 nm
0.0 Abs Test: Mean = -0.000010 Abs
Tolerance < 0.00010000

RMS



RI Noise reading 0.00004093 PASSED

Photometric Noise Test PASSED

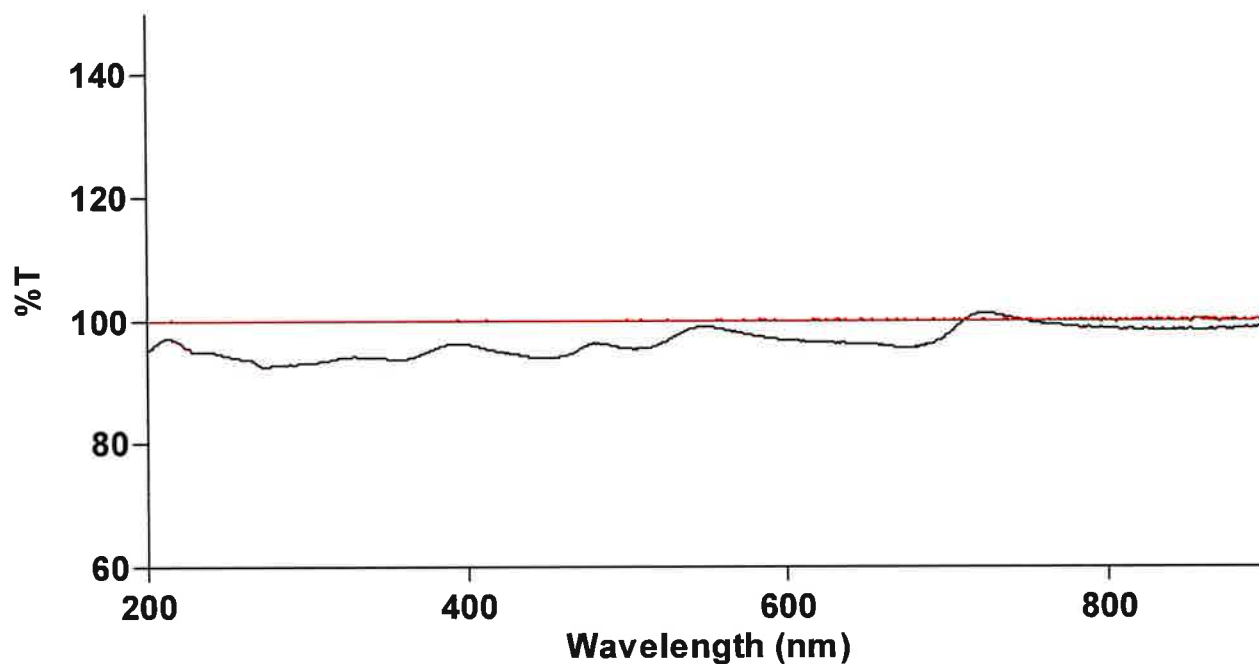
Baseline Flatness Test

10/9/2020 2:25:46 PM
Instrument Settings

Ave Time :	0.100 sec
Interval :	1.00 nm
Scan range :	200.00 - 900.00 nm
Corrected Baseline	200.00 - 850.00 nm, Tolerance ± 0.0010 Abs

Corrected Baseline	200.00 - 850.00 nm, Abs from -0.0002 to 0.0004 PASSED
Baseline Correction in Abs	0.0004

AMS



Baseline Flatness Test PASSED

Summary of Test Results

Wavelength Accuracy Test Xenon Line Scan Test

PASSED

Photometric Noise Test

PASSED

Baseline Flatness Test

PASSED

Operator Signature : Rebecca Stout Date : 10/9/20

Supervisor Signature : _____ Date : _____