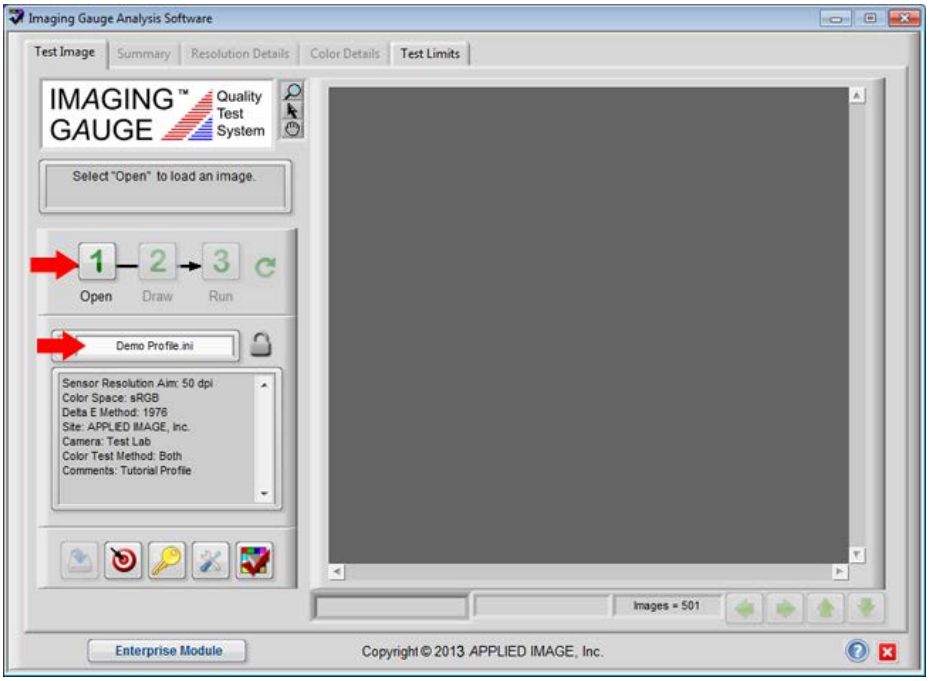
IMAGING™ Quality Test System
GAUGE

Tutorials for Enterprise and Engineering Editions

Tutorials are provided to demonstrate different aspects of the Imaging Gauge™ program. Completion of all tutorials is recommended to become comfortable with the system.

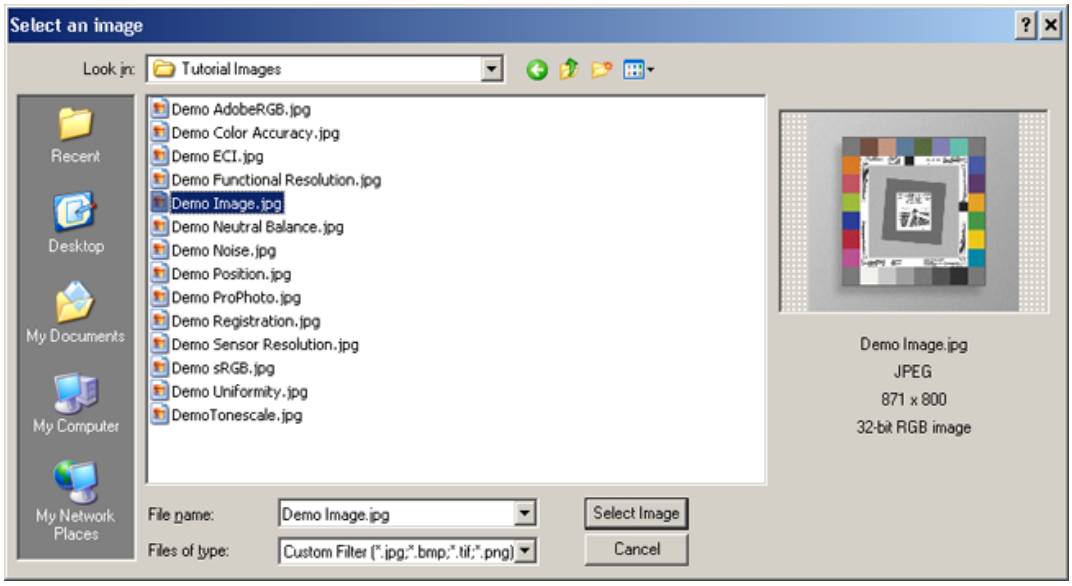
Tutorial 1: Image Adjustment Tools

1. Select "**Demo Profile.ini**" from the Profile Drop-Down list.

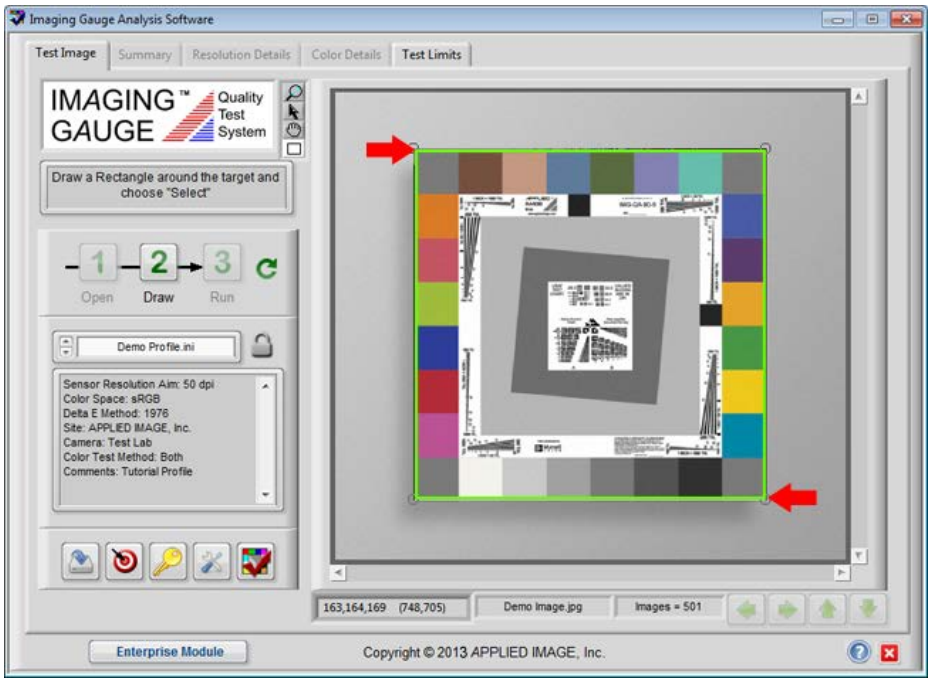


2. Select **Open**  to select a test image.

3. Select "**Demo Image.jpg**" from the dialog box.

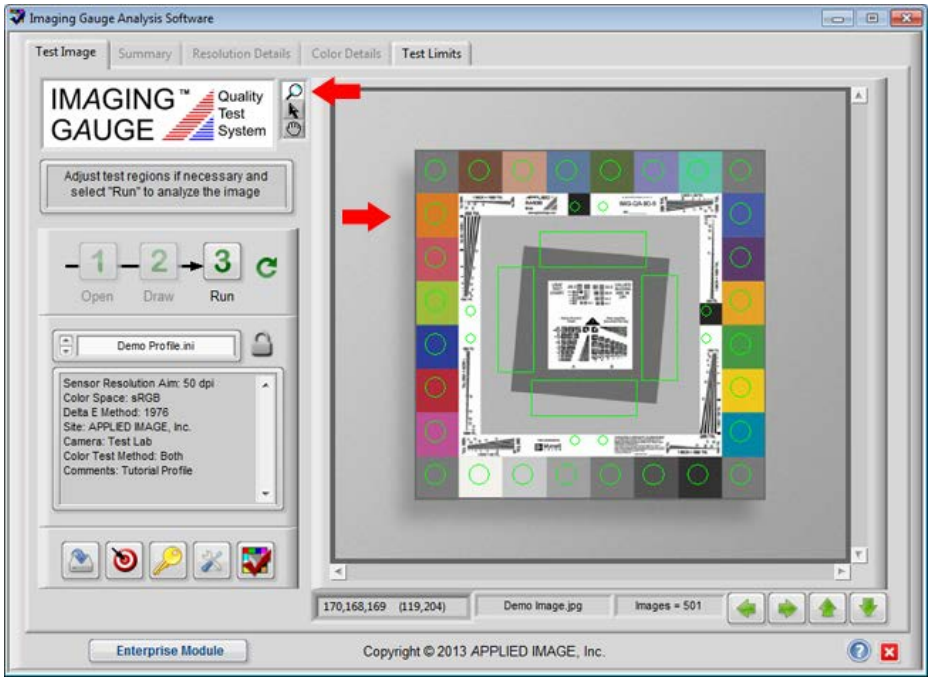


4. Press and hold the mouse from the upper left corner to the lower right corner of the target as shown. Release the mouse button when done.

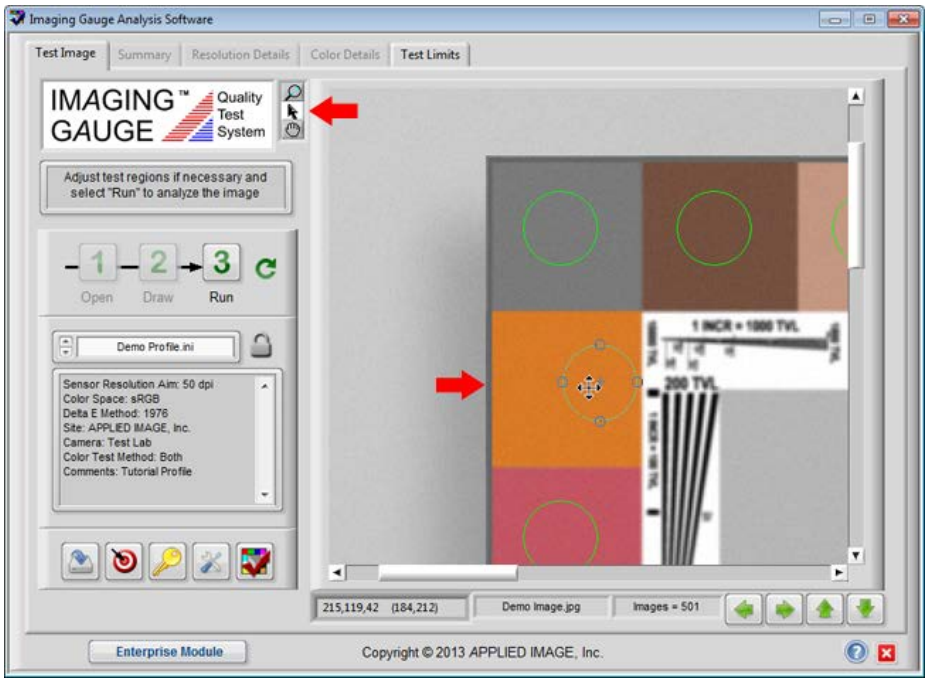


5. Choose **Draw**  to continue.

6. Select the **Zoom** tool  and click the mouse in the upper left corner of the image as shown:

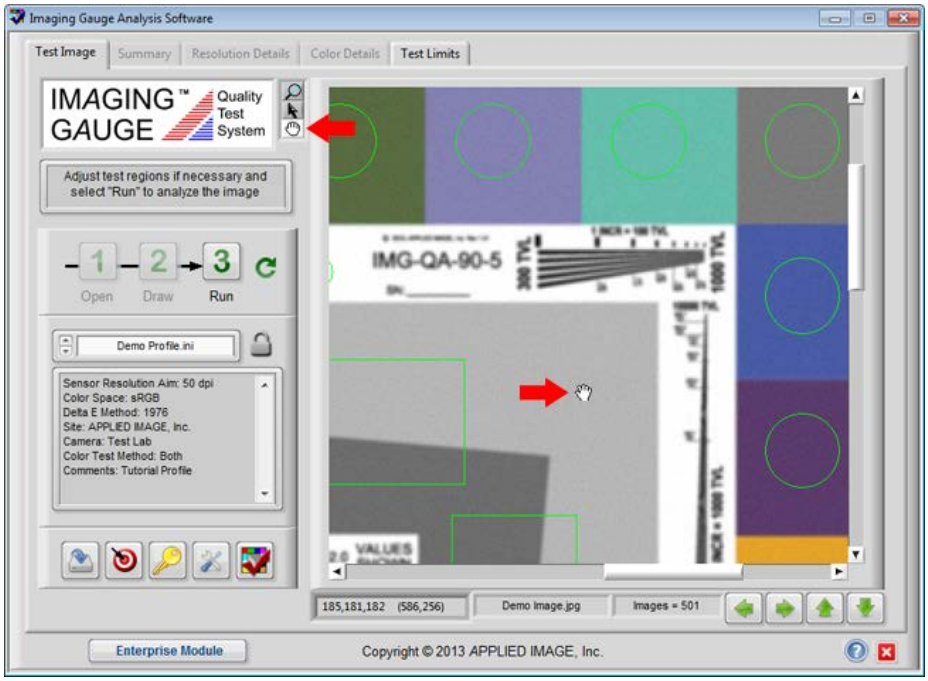


7. Select the **Pointer** tool  and move the cursor over a circular test region until the cursor shows a cross.

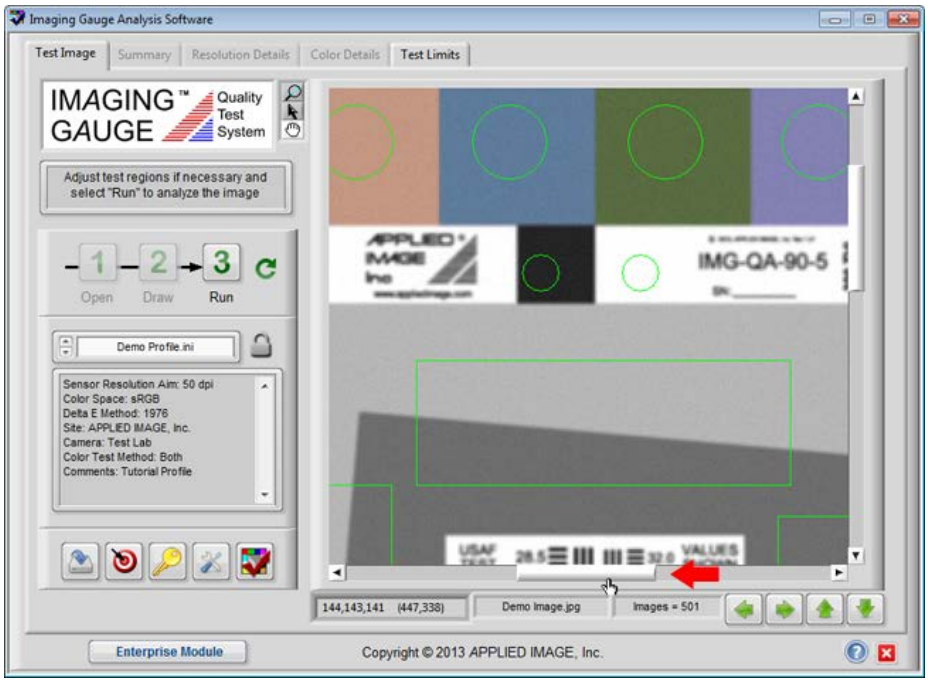


8. While holding down the mouse button, drag the circular test region to a slightly different location and release the mouse button.

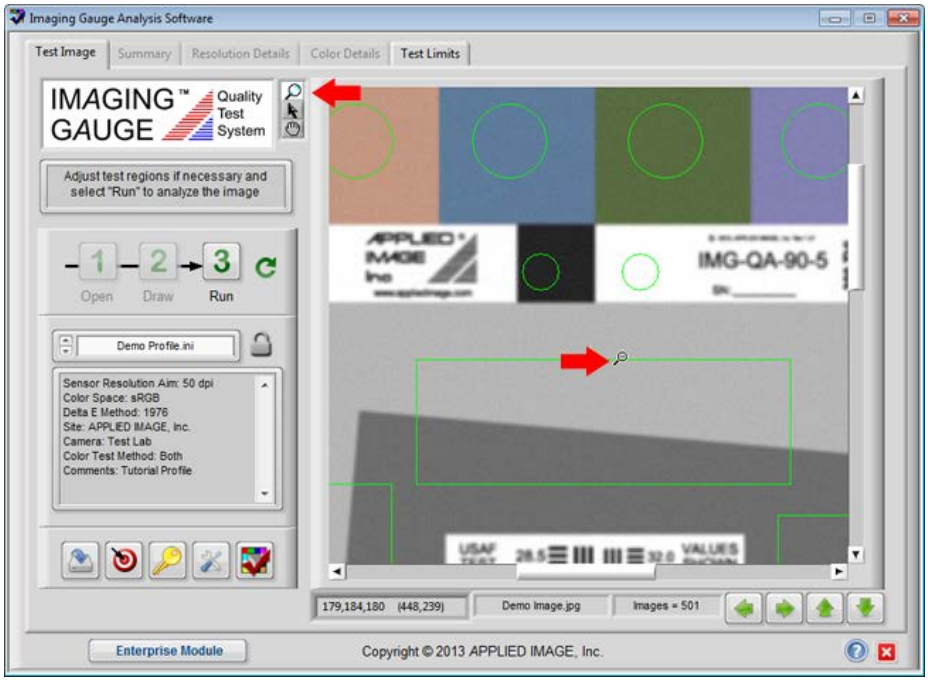
9. Select the **Pan** tool  . Click and drag the mouse to move across the top of the image.



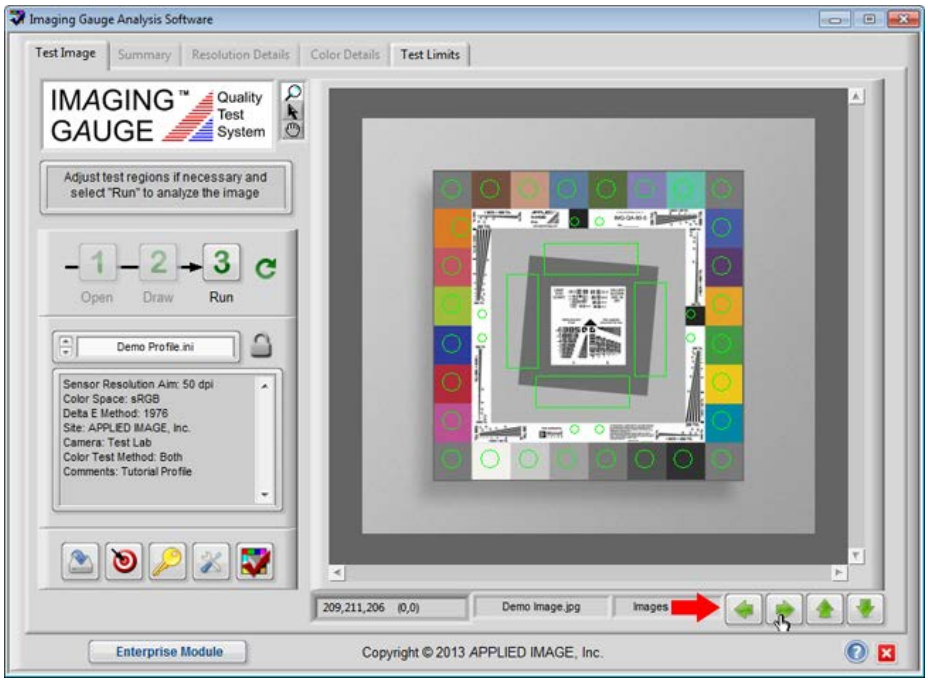
10. Use the horizontal scroll bar to move to the center of the image.



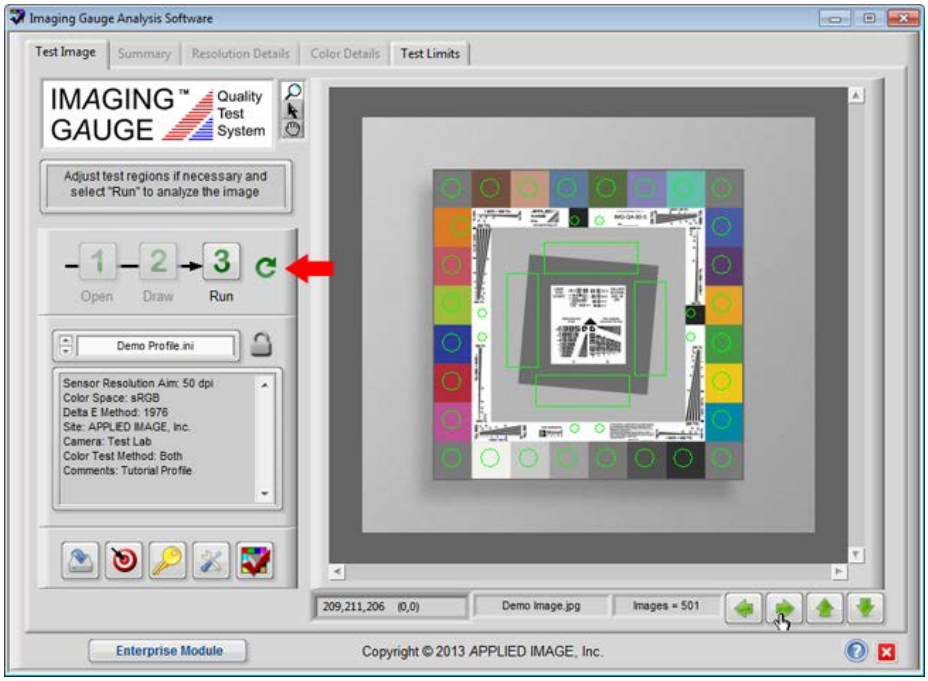
11. Select the **Zoom** tool  . Move the cursor into the image area hold down the **Shift** key. Notice that the cursor changes from a [+] to a [-]. While holding the **Shift** key, click the mouse in the center of the image. Notice that the image de-magnifies.



12. Adjust the test regions using the left, right, up and down arrows.



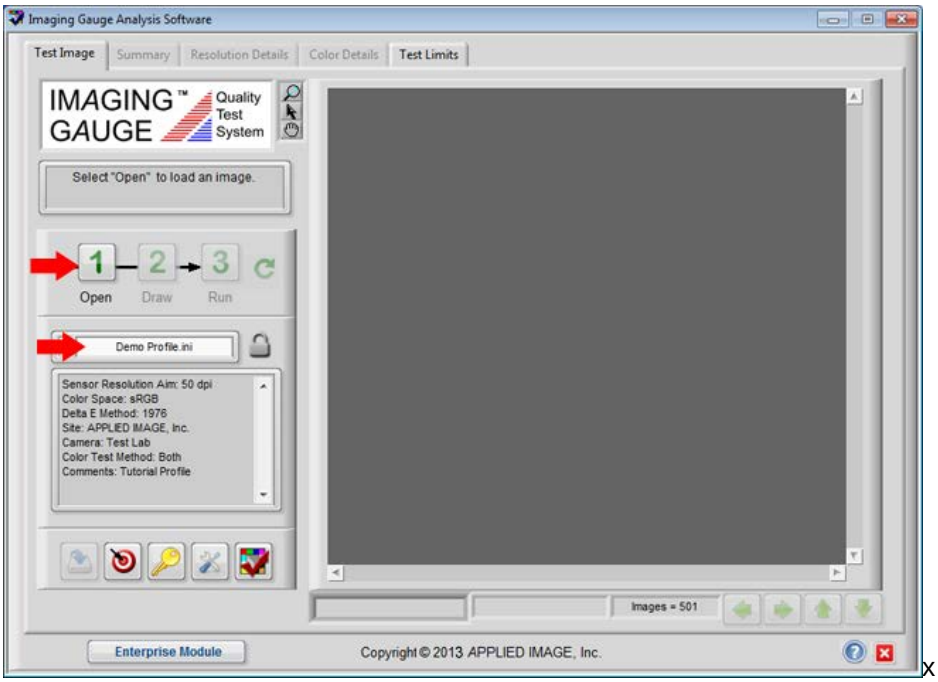
13. Select **Reset**  twice to clear all test regions and the original image.



End of Image Adjustment Tools Tutorial

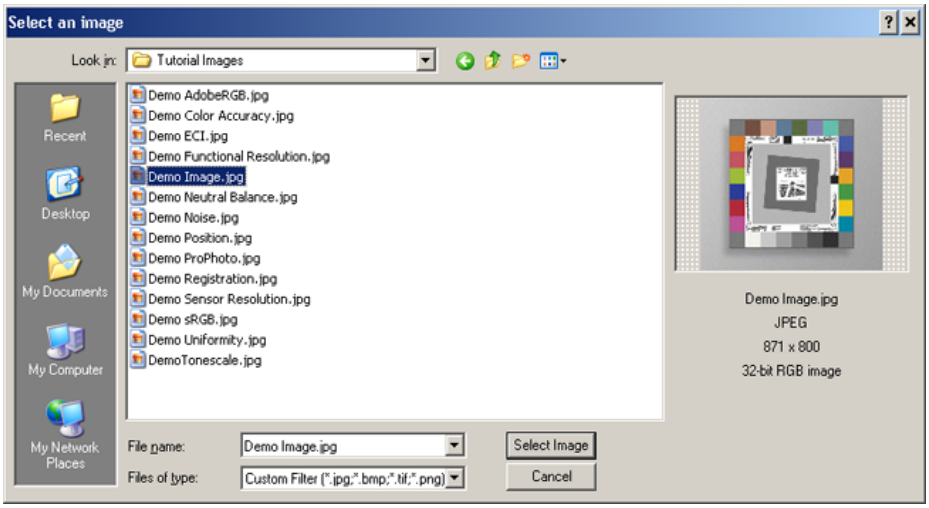
Tutorial 2: Color Accuracy

1. Select "**Demo Profile.ini**" from the Profile Drop-Down list.

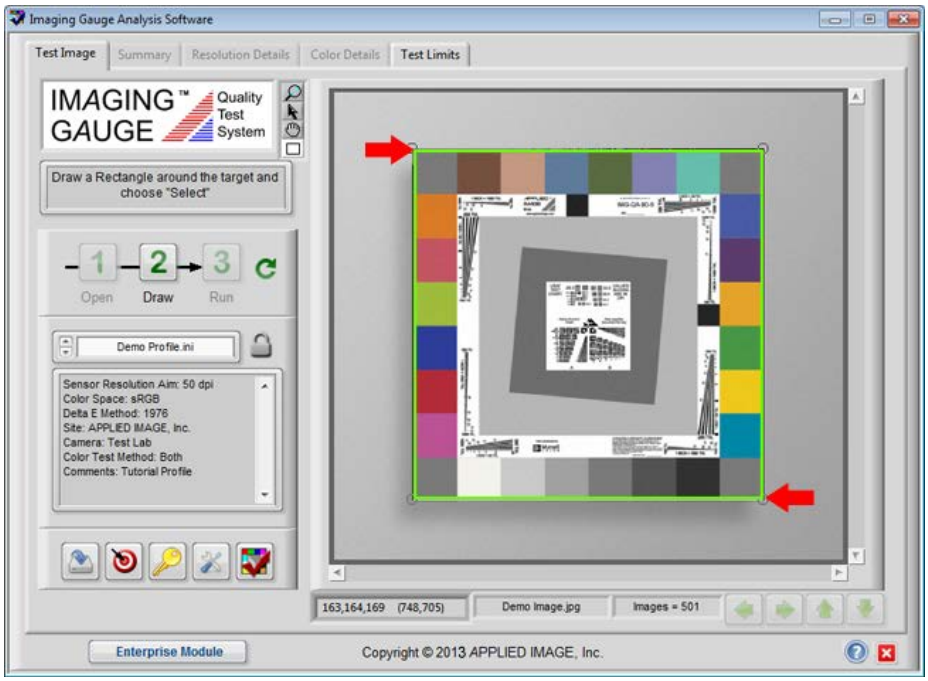


2. Select **Open**  to load a test image.

3. Select "**Demo Image.jpg**" from the dialog box.

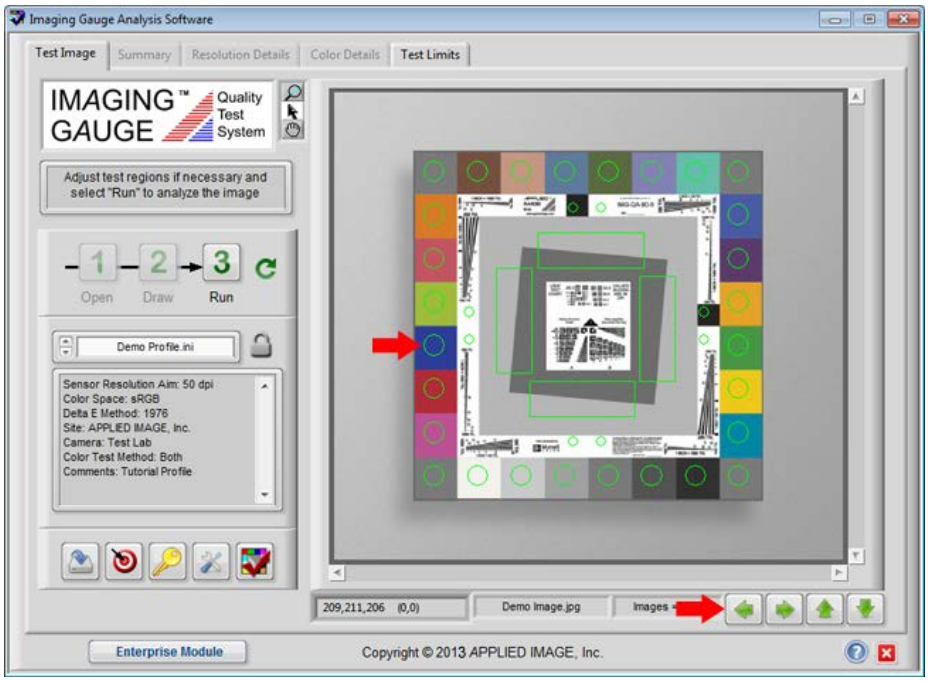


4. Press and hold the mouse from the upper left corner to the lower right corner of the target as shown.



5. Choose **Draw**  to continue.

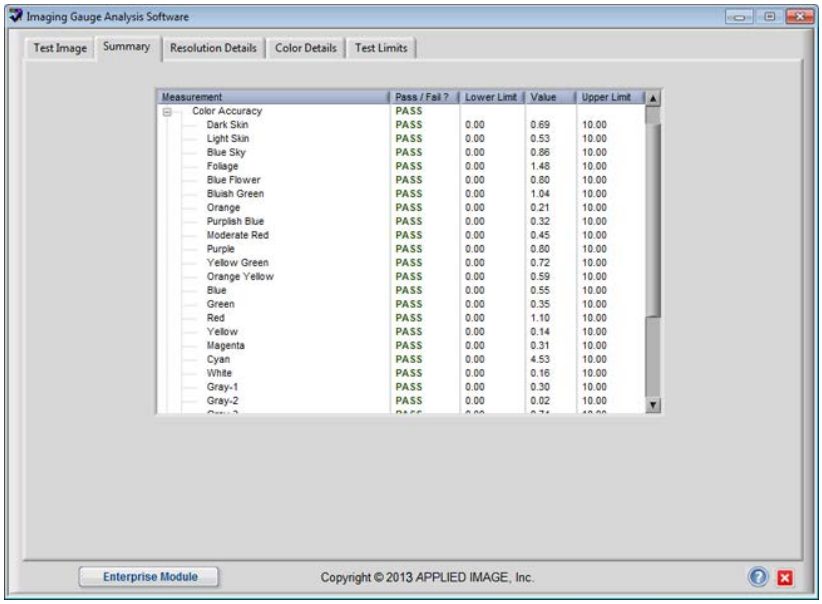
6. Inspect the location of all inspections regions and use the adjustment buttons, if necessary.



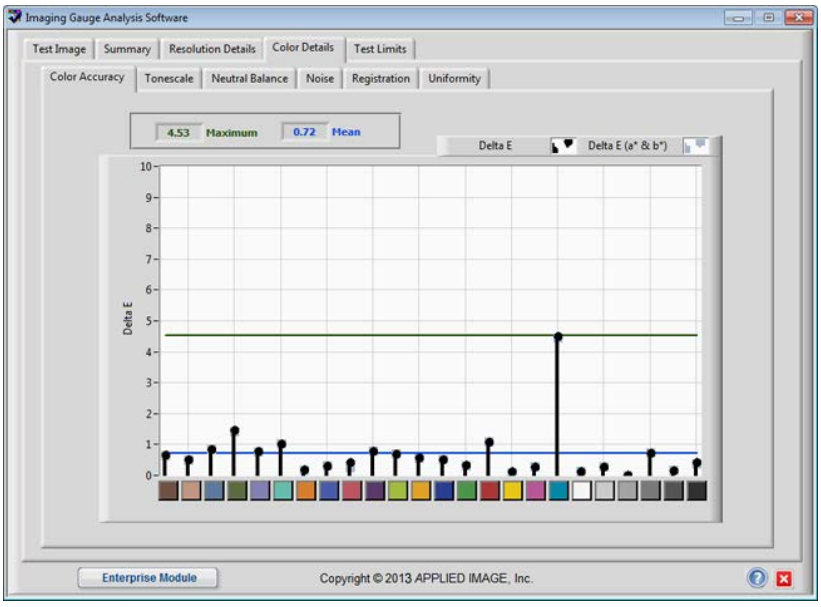
7. Select **Run**  when all regions are positioned properly.

8. Note the **Passed** notice when processing is completed.

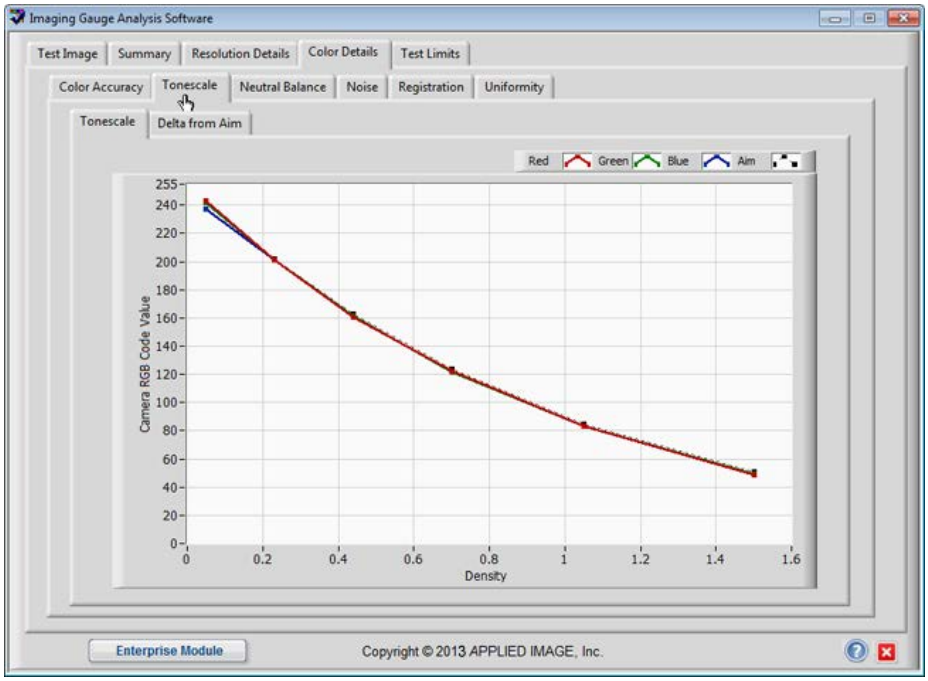
9. Select the **Summary** tab and select the [+] toggle to expand the **Color Accuracy** information. Note that all color patches passed below the maximum Delta E limit and that the mean Delta E of all patches passes.

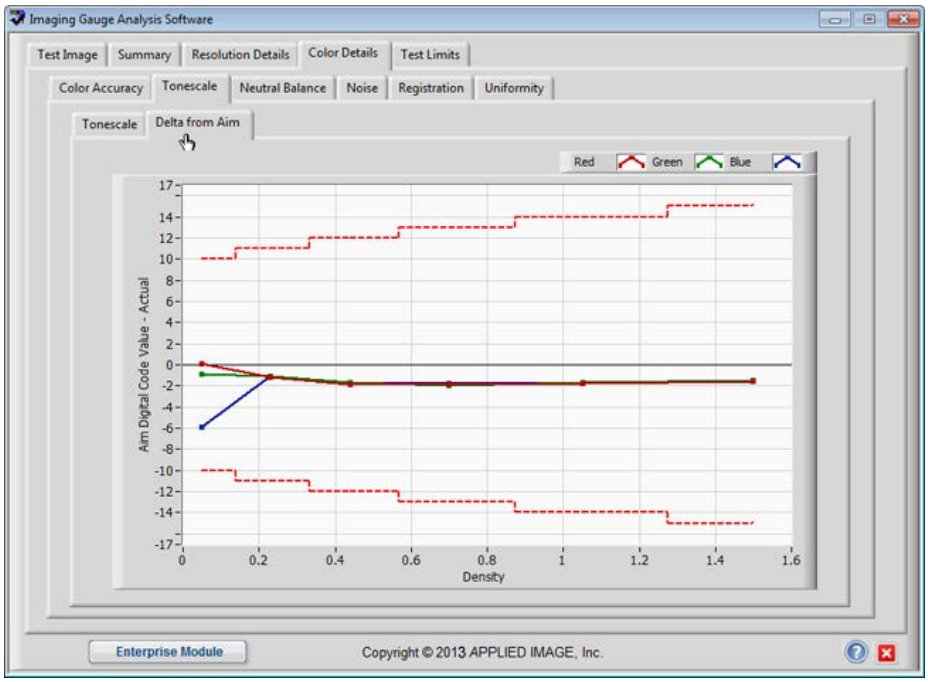


10. Select the **Color Details** tab and note the maximum and mean Delta E values.



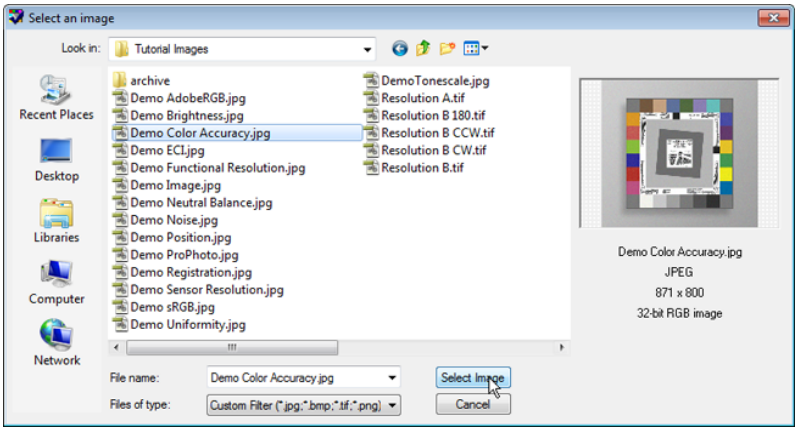
11. Select the **Tonescale** tab and inspect both Tonescale and Delta from Aim charts.





12. Return to the **Test Image** tab and select the Open  button.

13. Select "**Demo Color Accuracy.jpg**" and choose the **Select Image** button.

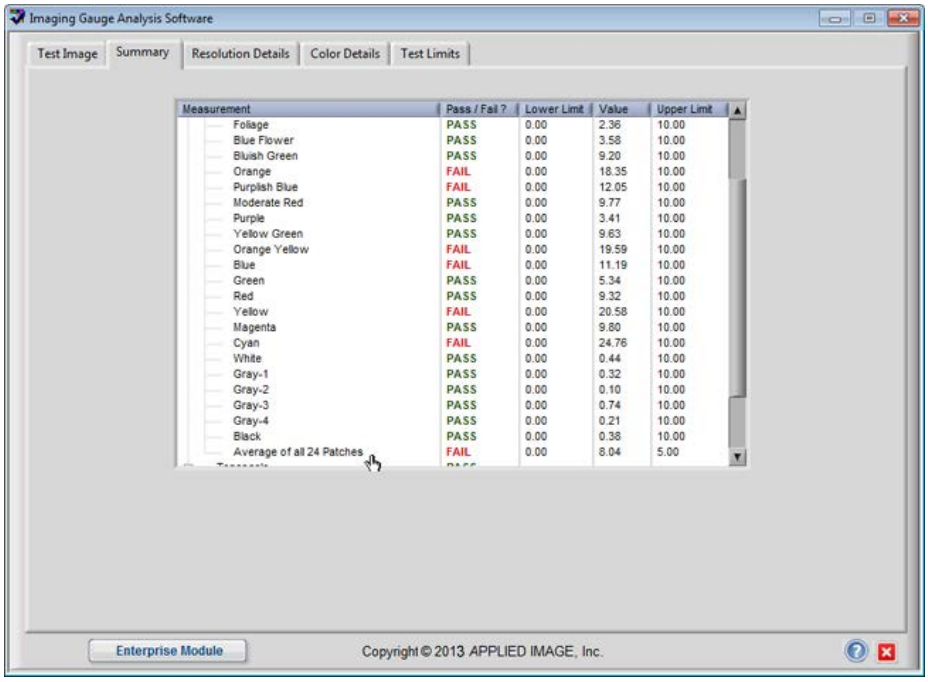


14. Draw a rectangular region around the target as in Step 4 and select **Draw**  .

15. Adjust the positions of the test regions, if necessary, and select **Run**  .

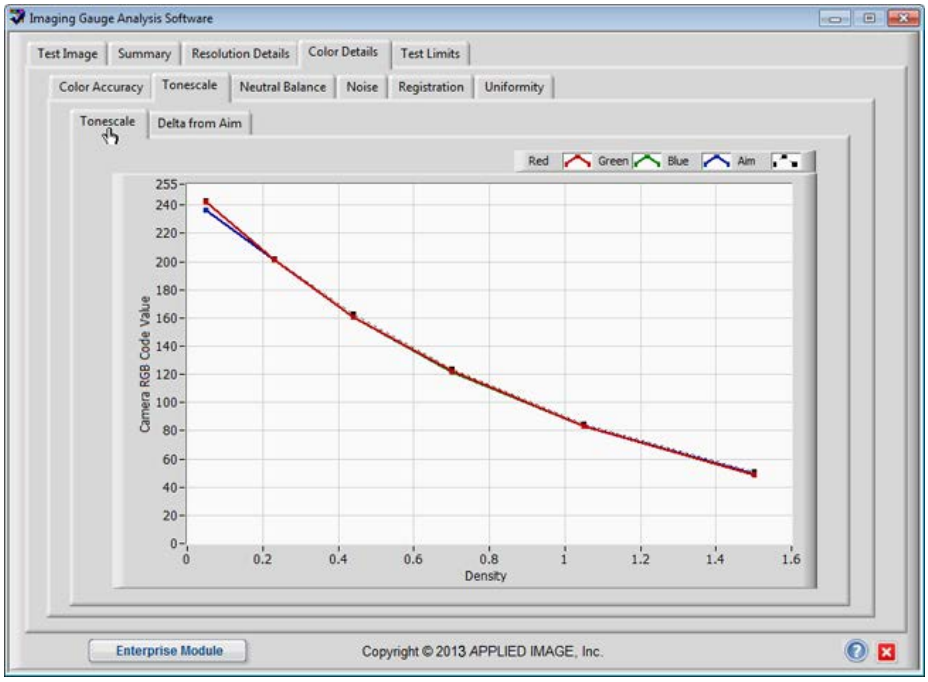
16. Note the **Failed** notice when processing is complete.

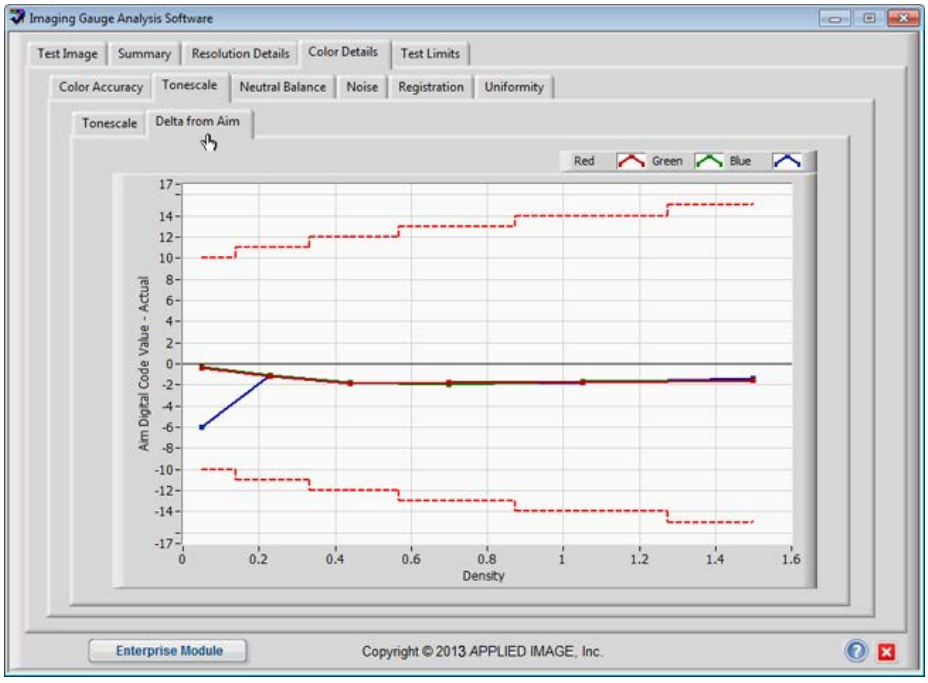
17. Select the **Summary** tab and toggle **Color Accuracy**. Note that a number of color patches exceeded the maximum Delta E limit of 10 and that the Average of all 24 patches exceeded the limit of 5.



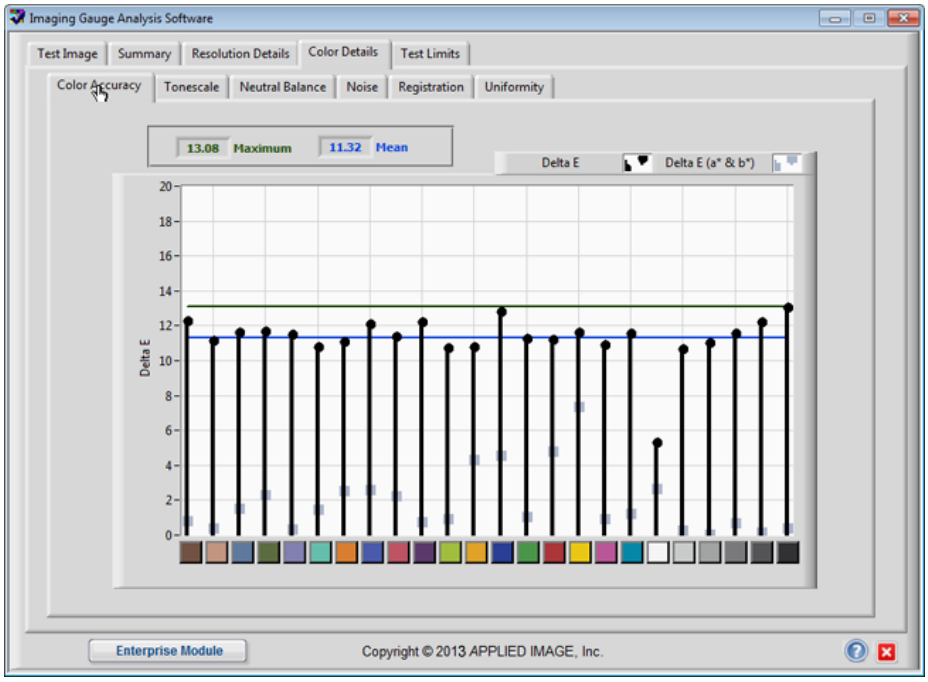
18. Select the **Color Details** tab and note the high Delta E values.

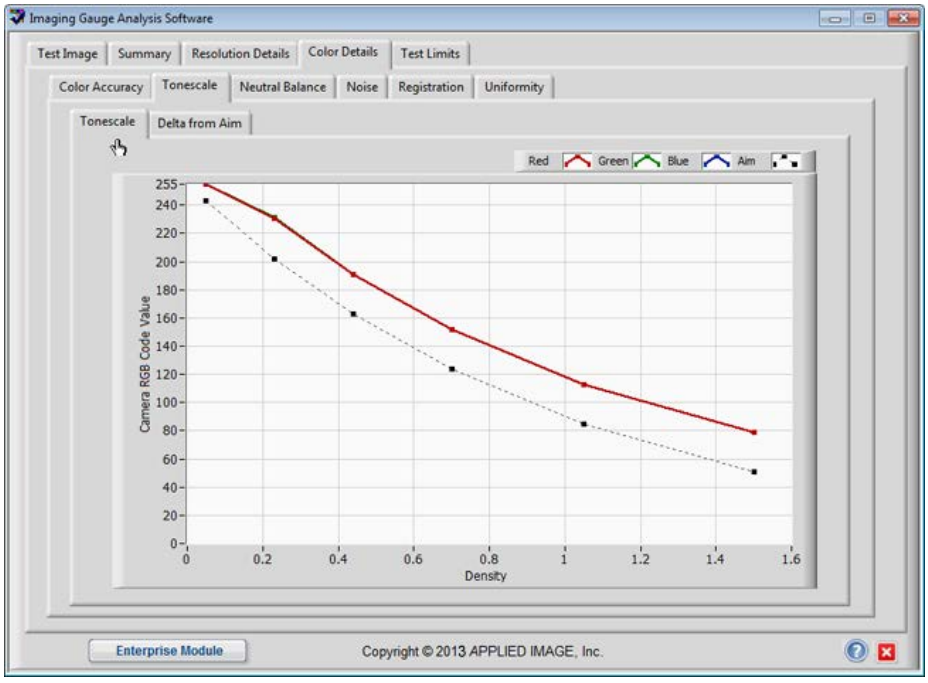
19. Select the "Tonescale" tab and inspect both Tonescale and Delta from Aim charts. Note that the red, green and blue digital code values for all six (6) color patches are within specification.





20. Repeat the analysis for the "**Demo Brightness.jpg**" image. Note the high average Delta E value and the tonescale difference.

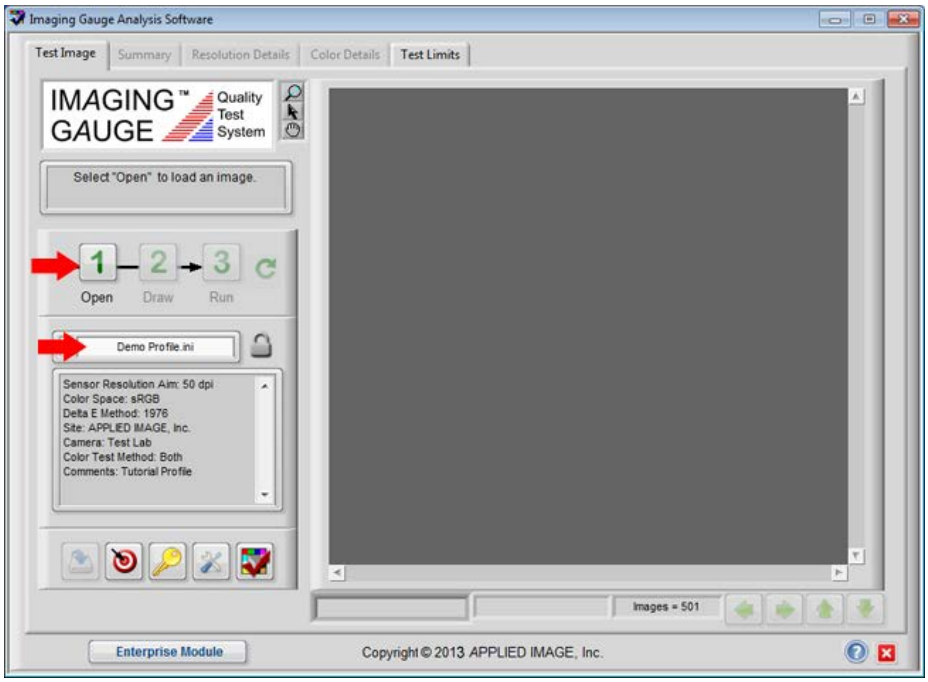




End of Color Accuracy Tutorial

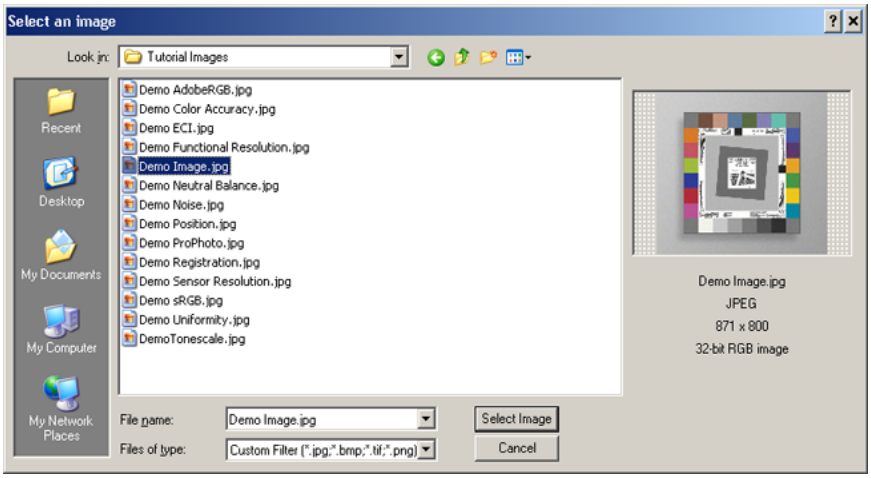
Tutorial 3: Resolution Measurements

1. Select "**Demo Profile.ini**" from the Profile Drop-down control.

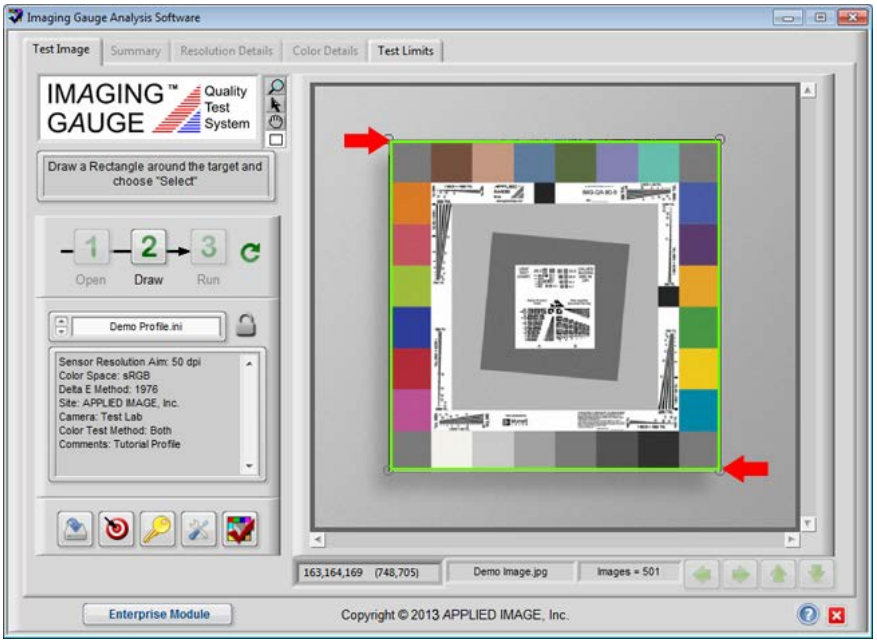


2. Select **Open**  to load a test image.

3. Select "**Demo Image.jpg**" from the dialog box and choose **Select Image**.

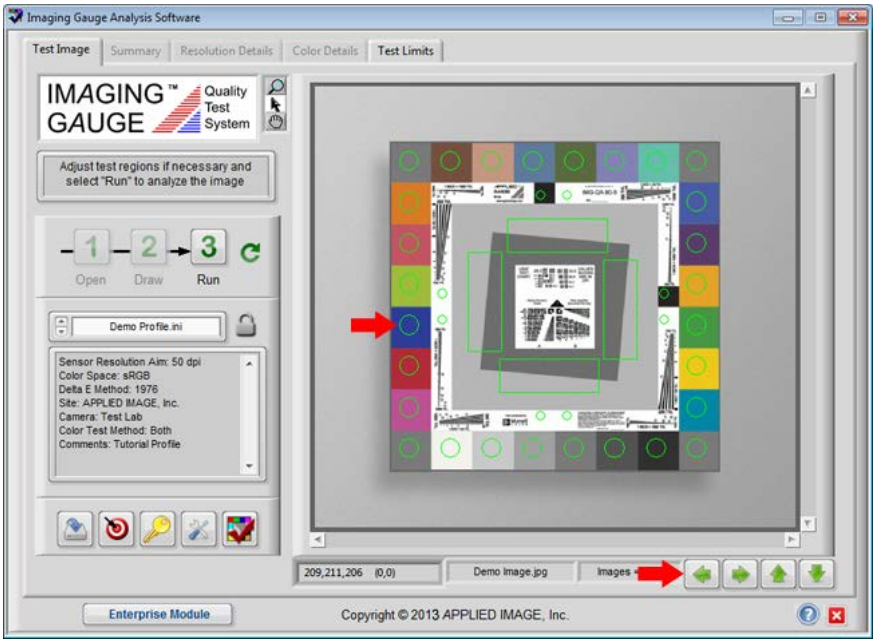


4. Press and hold the mouse from the upper left corner to the lower right corner of the target as shown.



5. Choose **Draw**  to continue.

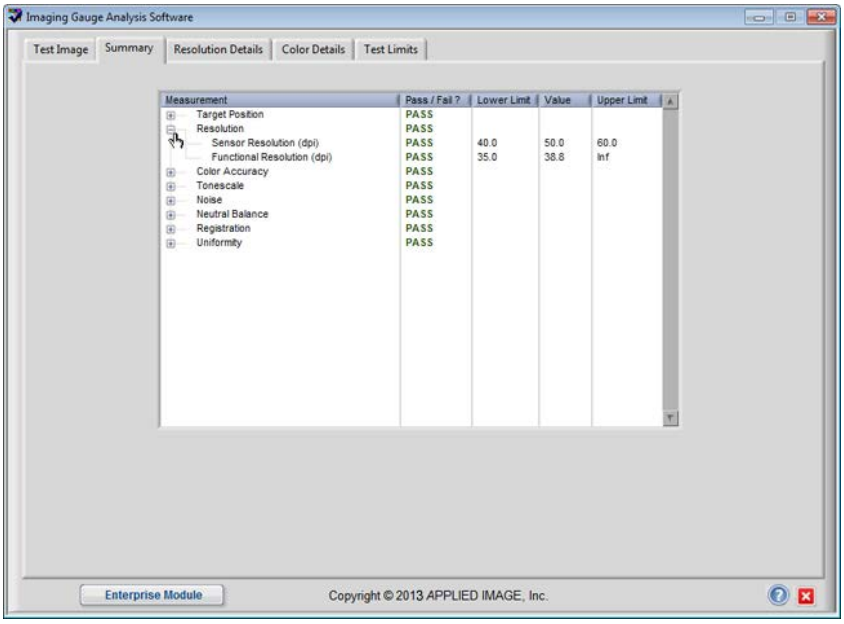
6. Inspect the location of all inspections regions and use the adjustment buttons to move all regions simultaneously. To move Individual regions, press and hold the left-mouse button, then drag the region to the new location. Release the button.



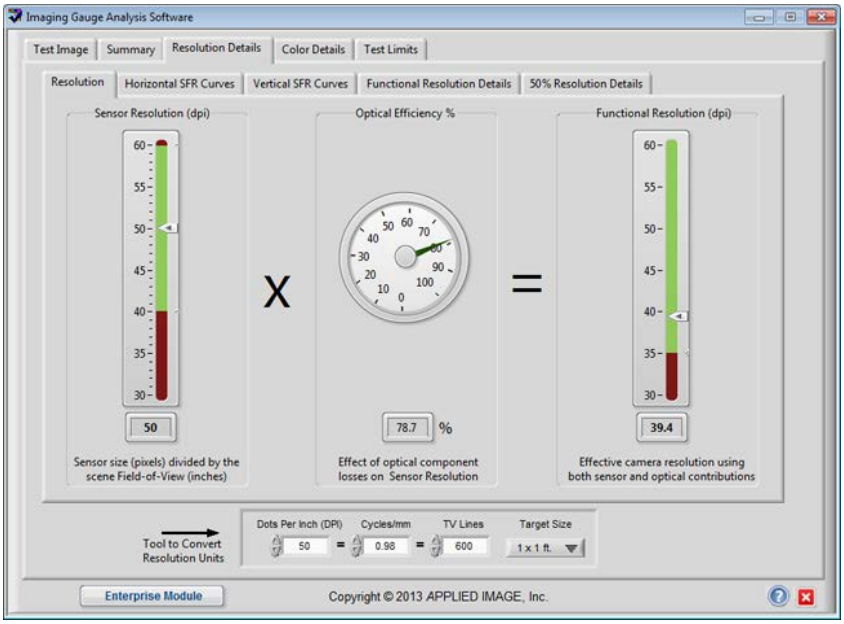
7. Select **Run**  when all regions are positioned properly.

8. Note the **Passed** notice when processing is completed.

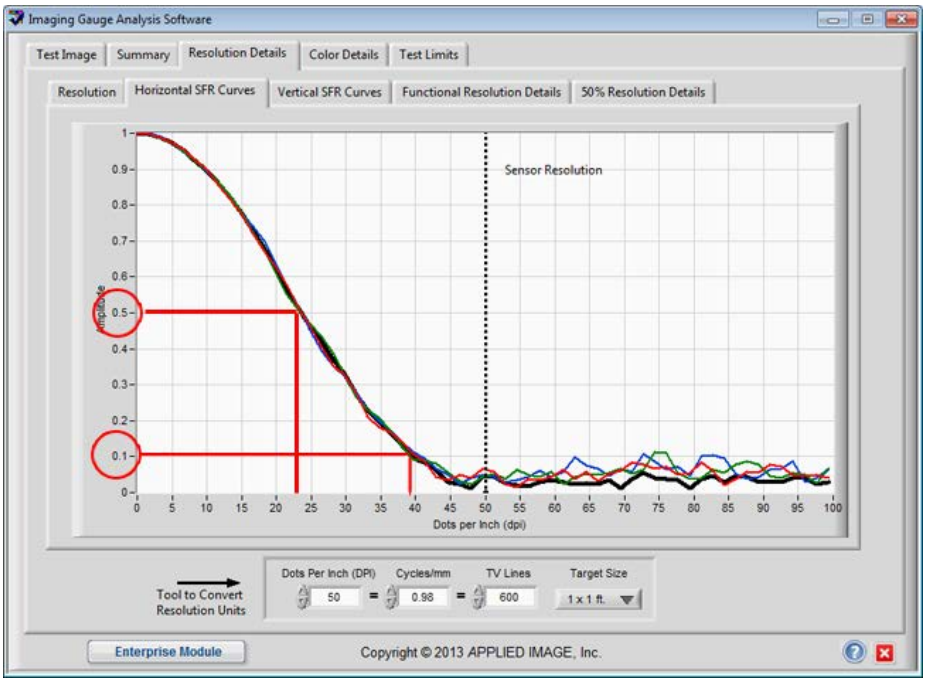
9. Select the **Summary** tab and select the [+] toggle to expand the **Resolution** information. Note that the **Sensor Resolution** is between the Lower and Upper Limits, and that the **Functional Resolution** is greater than the Lower Limit.



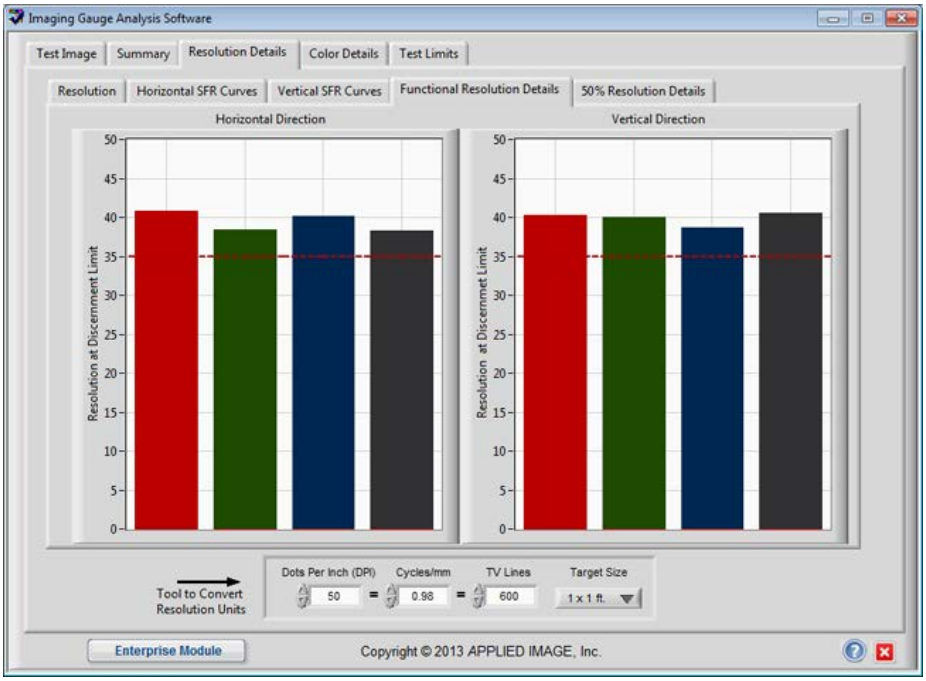
10. Select the **Resolution Details** tab. Notice that the information is identical to the **Summary** tab with the addition of **Optical Efficiency**.



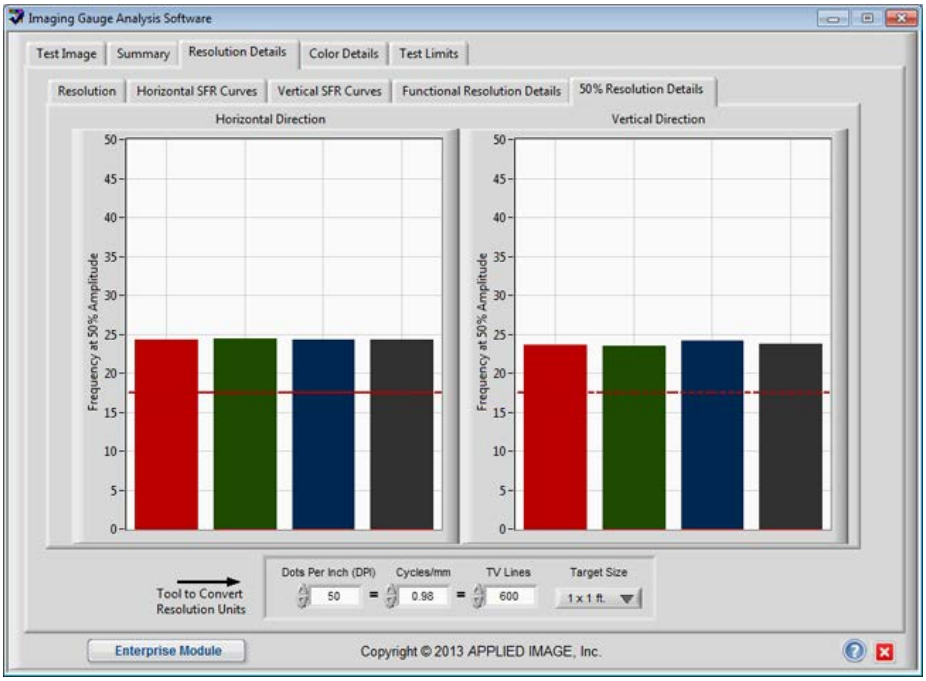
11. Select the **Horizontal SFR Curves** tab. Notice that the frequency corresponding to **0.1** amplitude (the Discernment Limit) is approximately 38 dpi (the functional resolution). Check the same value in the **Vertical SFR Curves** tab.



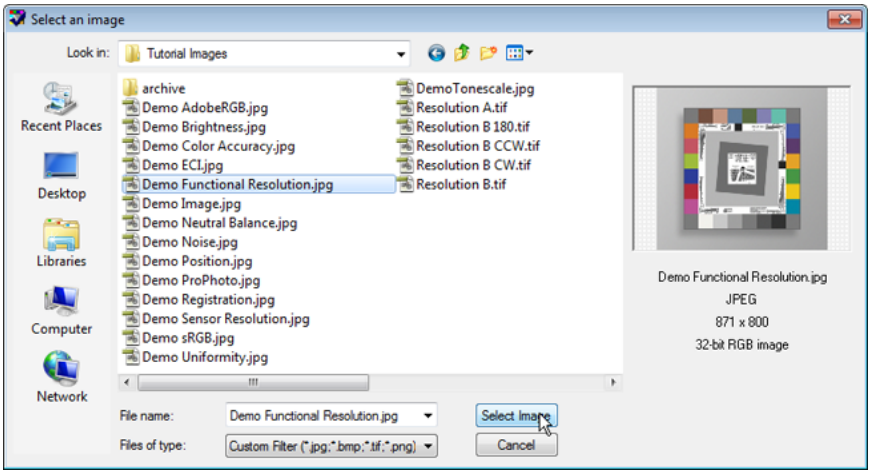
12. Select the **Functional Resolution Details** tab. Notice that the chart shows the resolution from the SFR Curves charts that correspond to the Discernment Limit. The dotted line represents the minimum acceptable Functional Resolution.



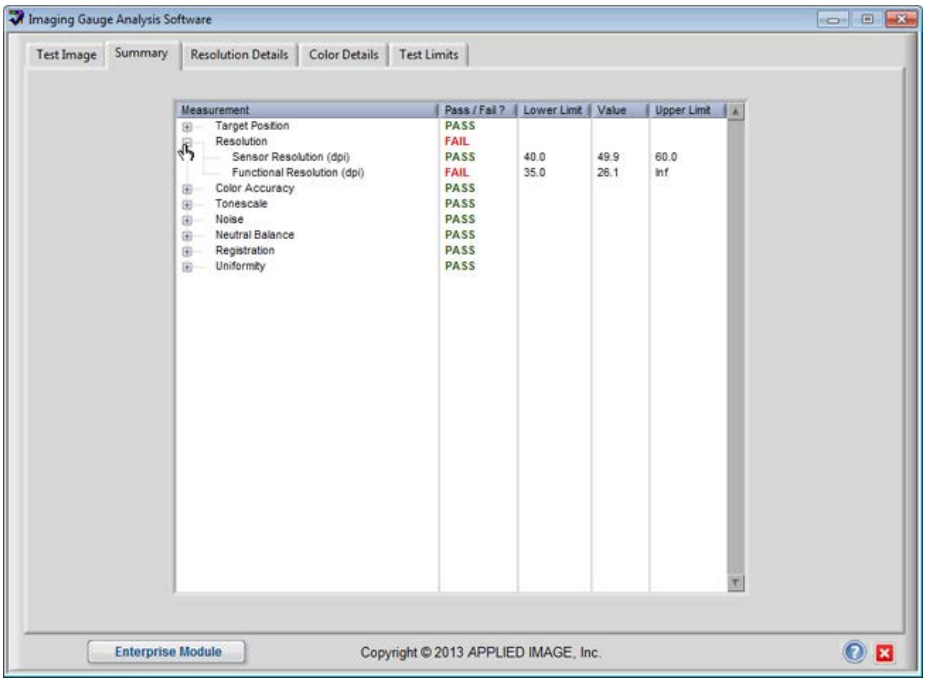
13. Select the **50% Resolution Details** tab. Notice that these values are above the expected 50% Resolution line (dotted). This reference line represents half the Sensor Resolution.



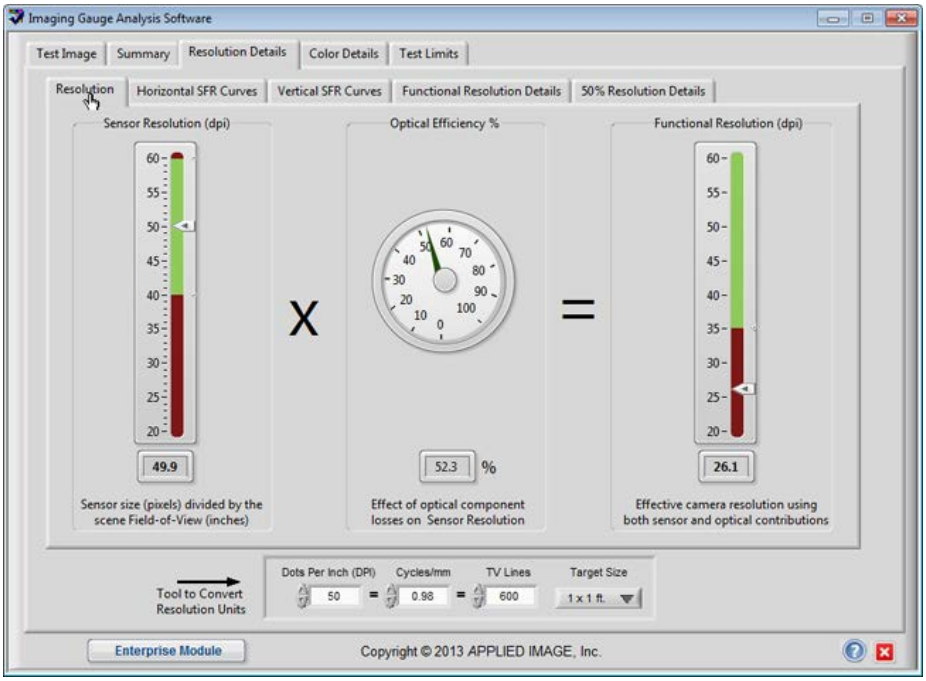
14. Return to the **Test Image** tab and repeat the analysis with the "**Demo Functional Resolution.jpg"** image.



15. Select the **Summary** tab and notice that the **Functional Resolution** is below specification. Also notice that the **Sensor Resolution** is unchanged from the original image.



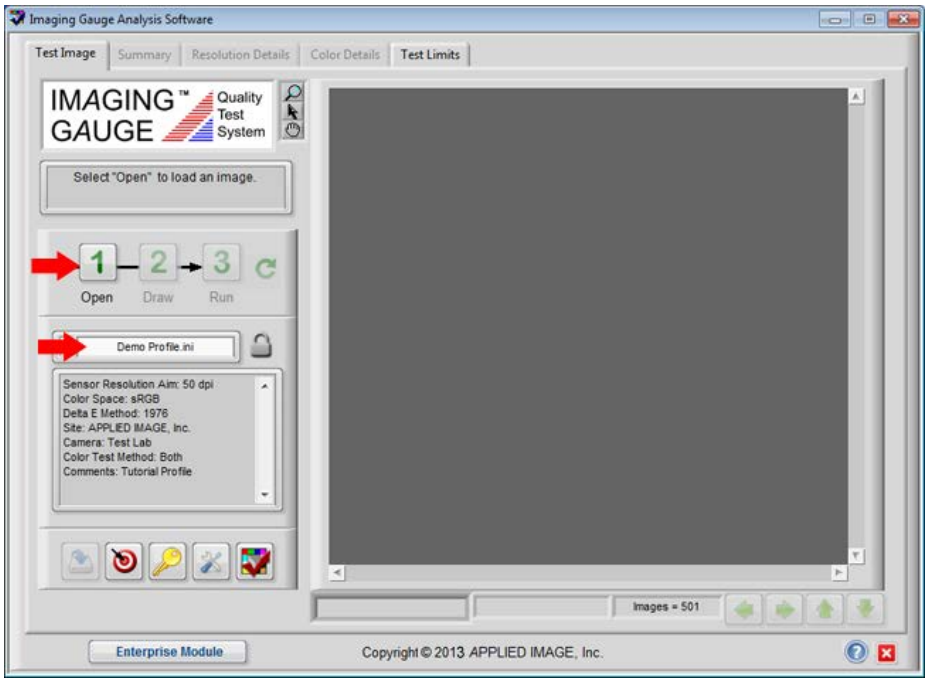
16. Select the **Resolution Details** tab and notice that the **Optical Efficiency %** has dropped from 72.1% to 52.3%. Also notice that the **Sensor Resolution** remained constant at 50 dpi. Review the details in the other tabs to compare these results with the original.



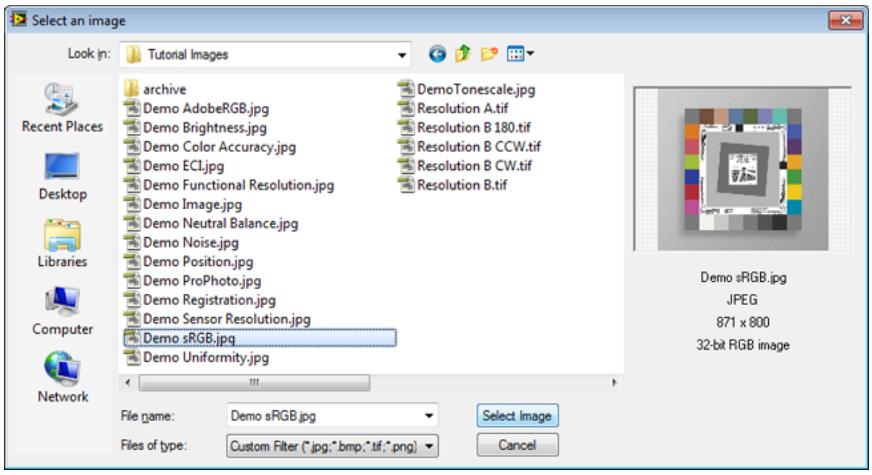
End of Resolution Tutorial

Tutorial 4: Color Space Tutorial

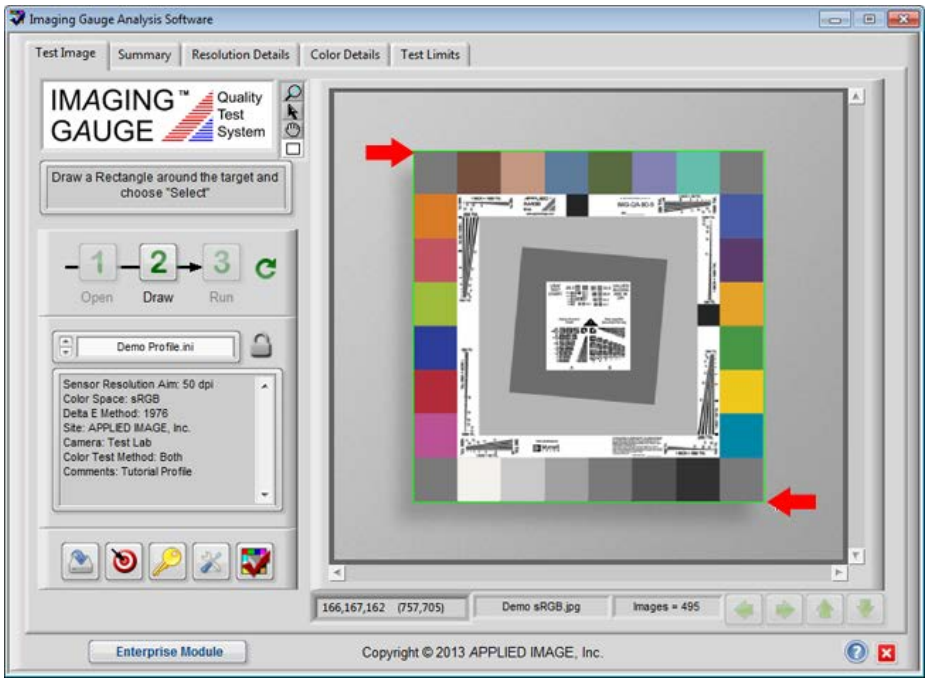
1. Select "**Demo Profile.ini**" from the Profile Drop-Down list.



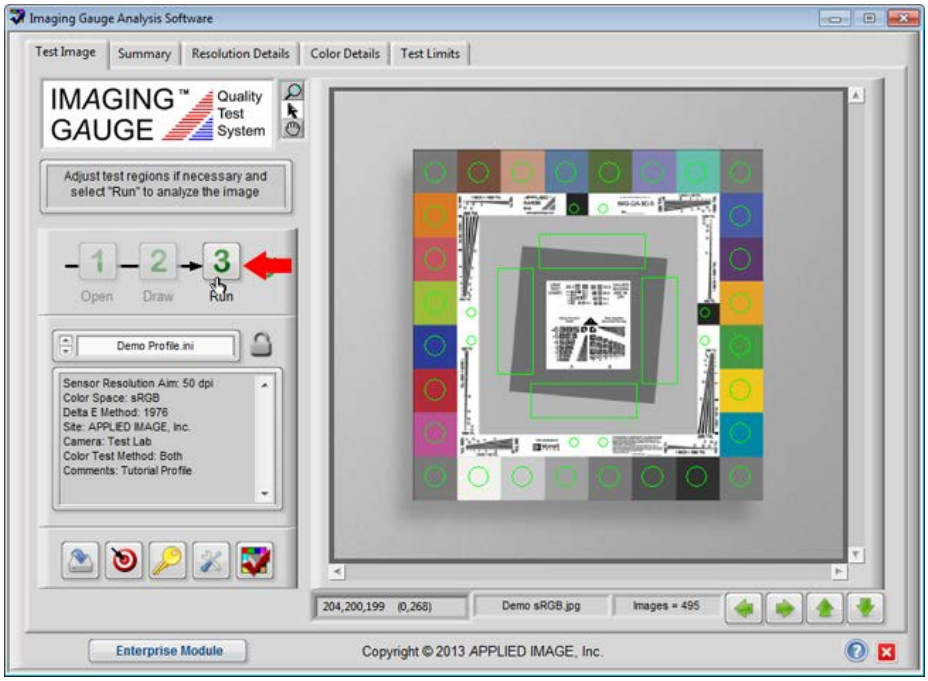
2. Select **Open**  and select **Demo sRGB.jpg** from the **Tutorial Images** folder



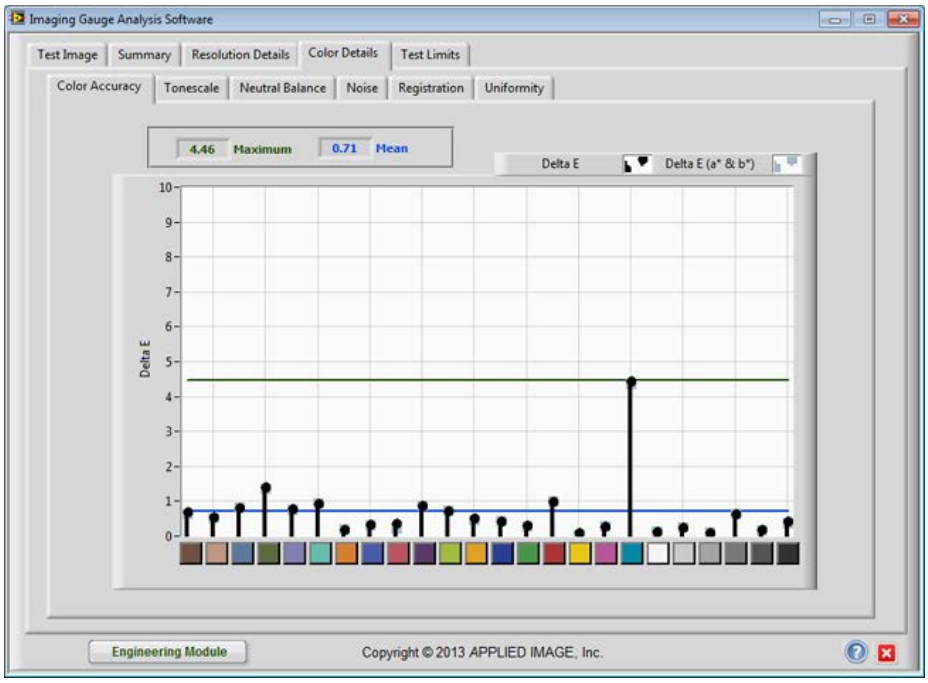
3. Draw a rectangular region around the target as shown and choose **Draw** 2.



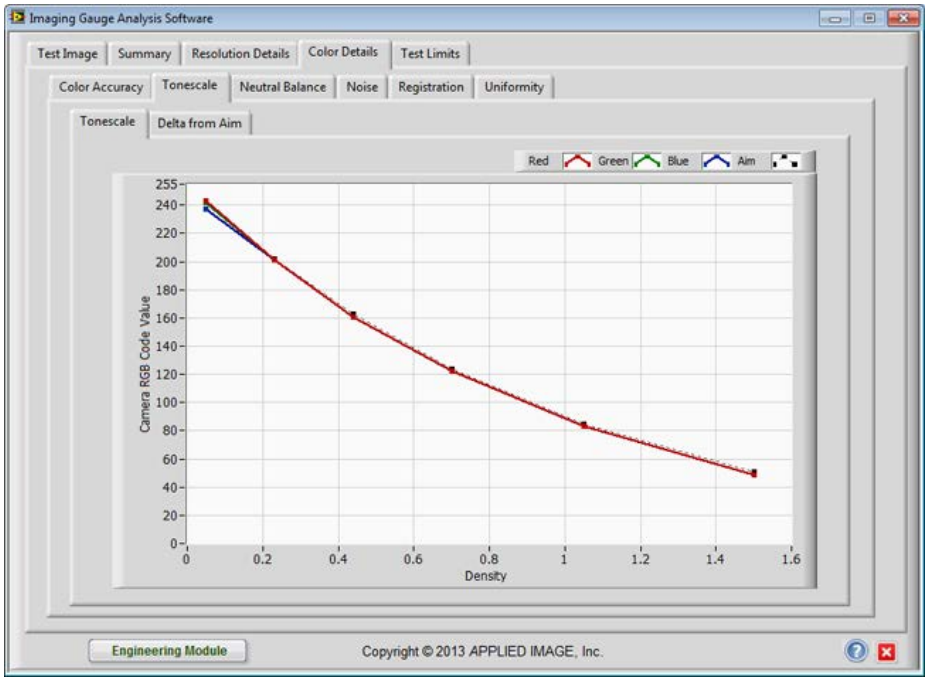
4. Inspect the test regions and select **Run** 3 to continue.

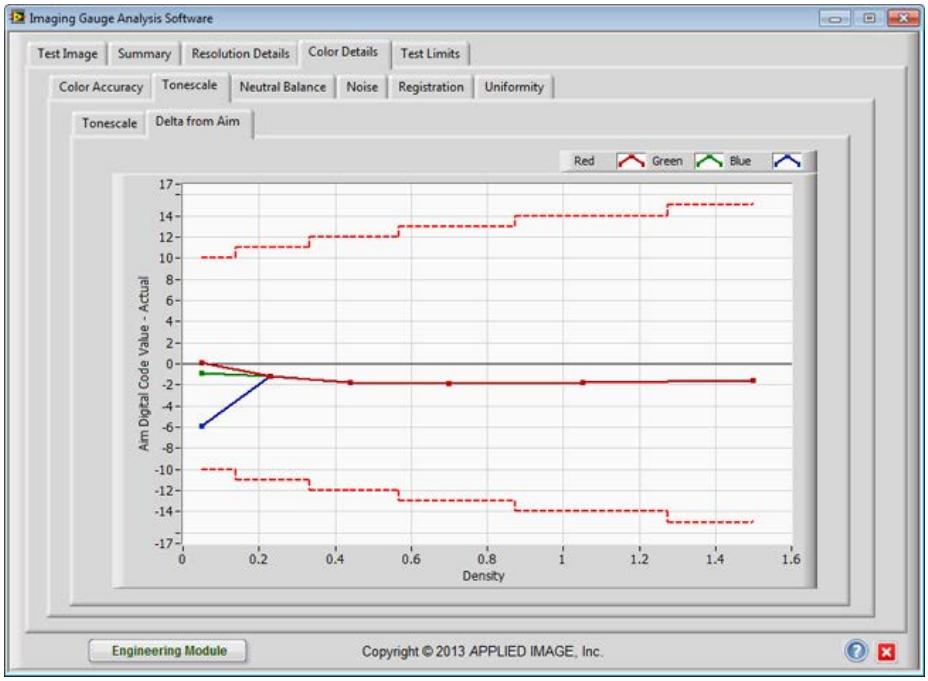


5. Select the **Color Details** tab and note the low **Delta E** value for all color patches. This represents the optimal performance of a camera system using sRGB color space. Note: the cyan patch has an L*a*b* value outside the gamut of sRGB space.

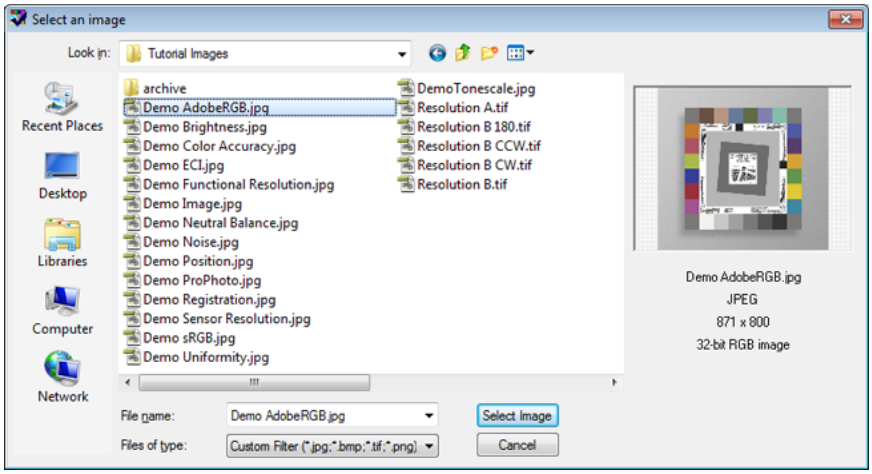


6. Select the **Tonescale** tab and note the agreement between the aim tonescale and the actual tonescale curve.

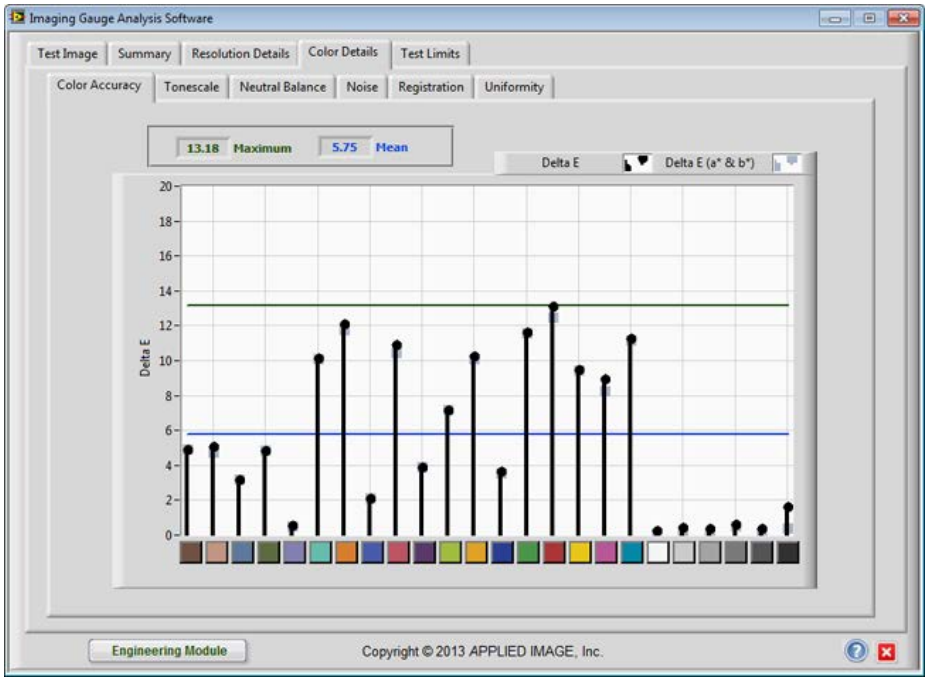




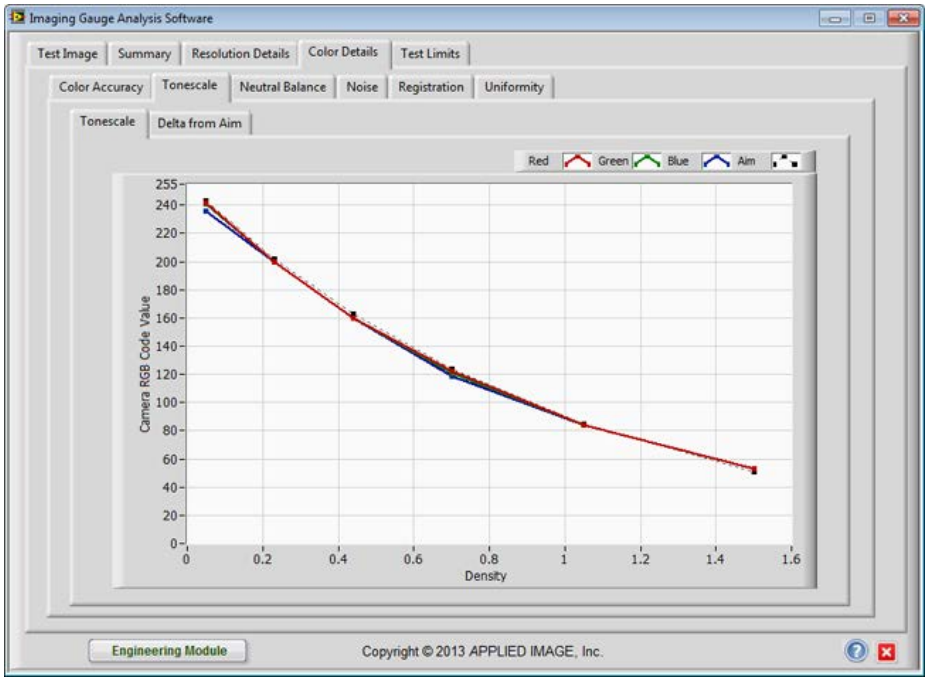
7. Return to the **Test Image** tab and select **Open**  . Open "**Demo AdobeRGB.jpg"** and analyze using the same steps as above.



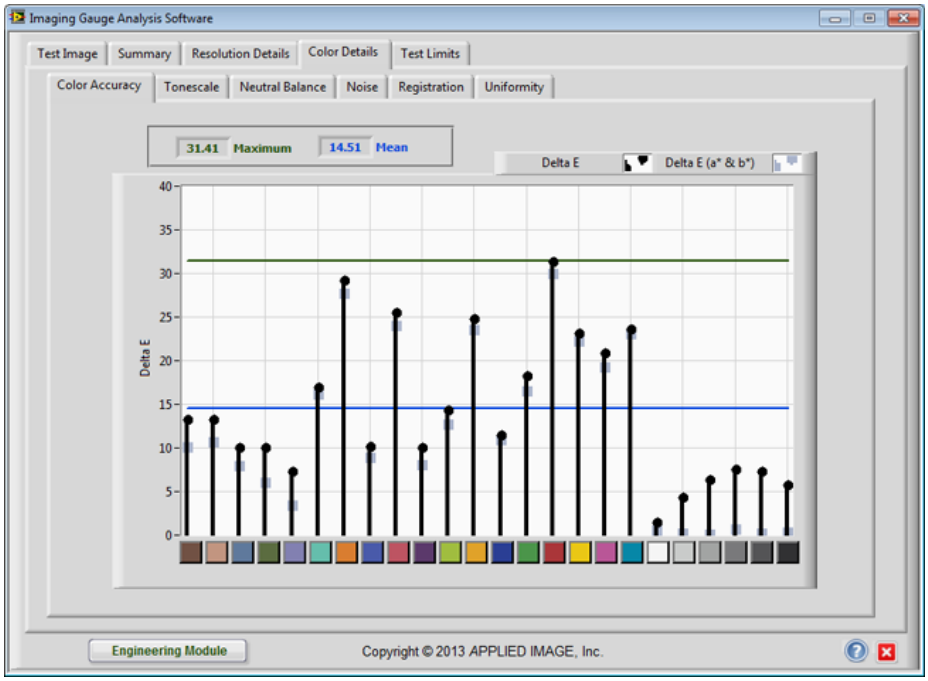
8. When the image is processed, select the **Color Details** tab. Note the increased level of **Delta E** for a number of color patch and the low **Delta E** levels for the neutral patches.

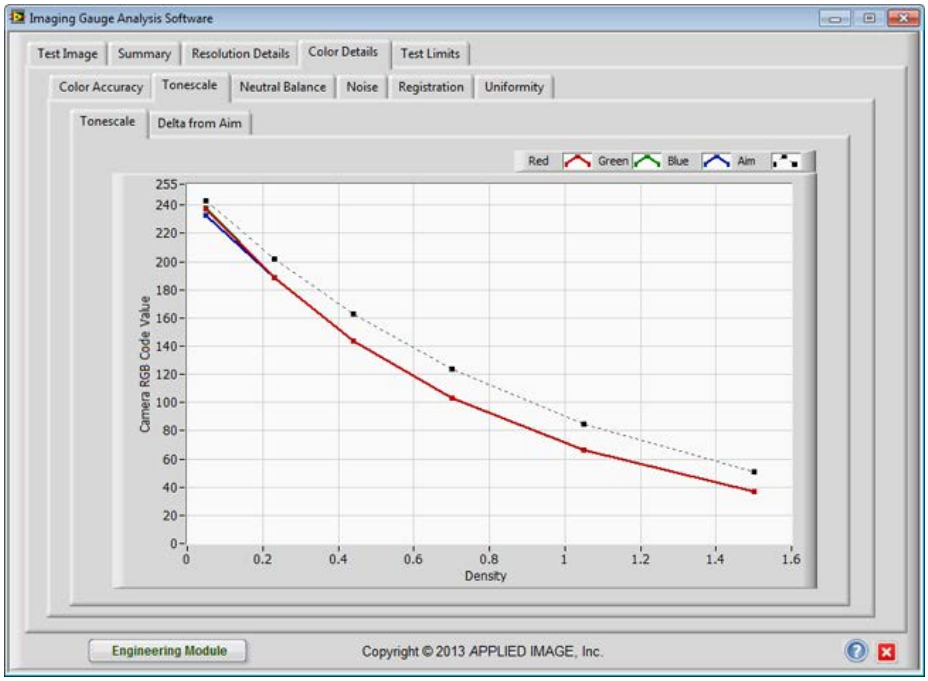


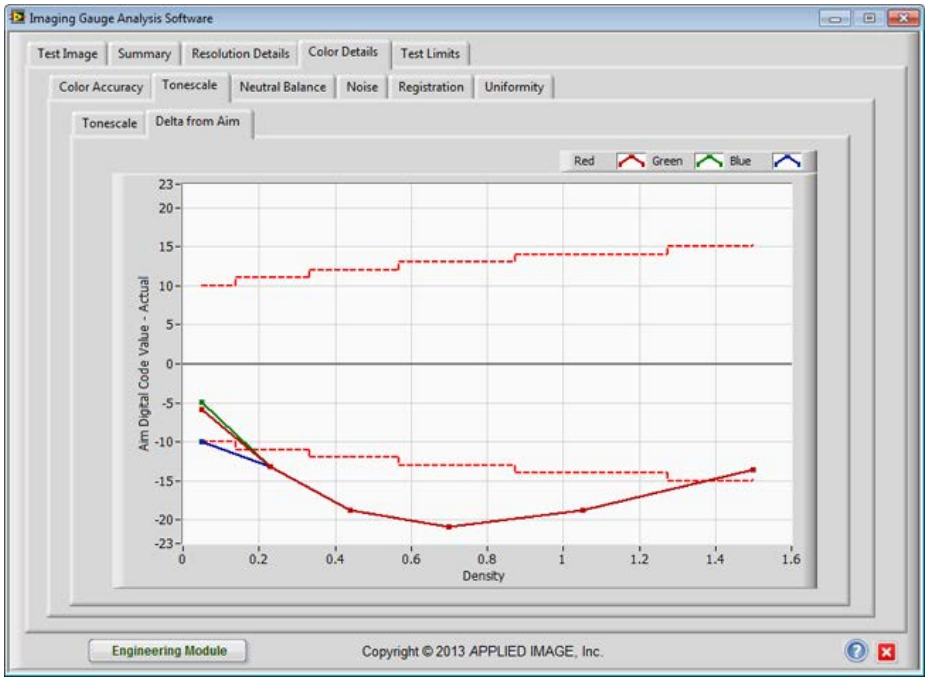
9. Select the **Tonescale** tab and note the agreement with the tonescale aim curve.



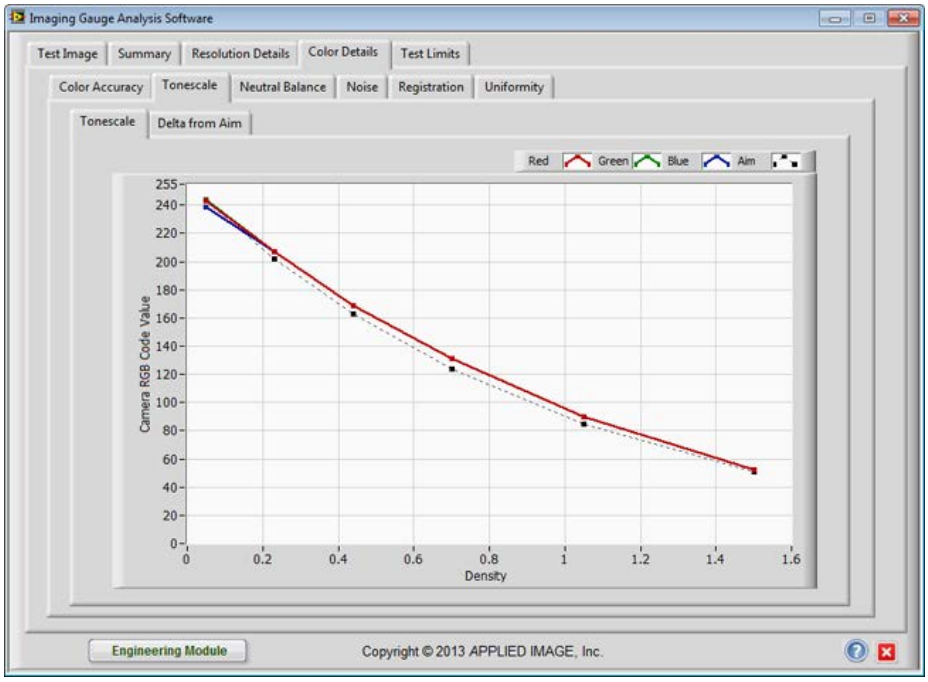
10. Return to the **Test Image** tab and run the "**Demo ProPhoto.jpg"** image. Note the high **Delta E** levels and the lack of agreement with the sRGB tonescale aim curve.



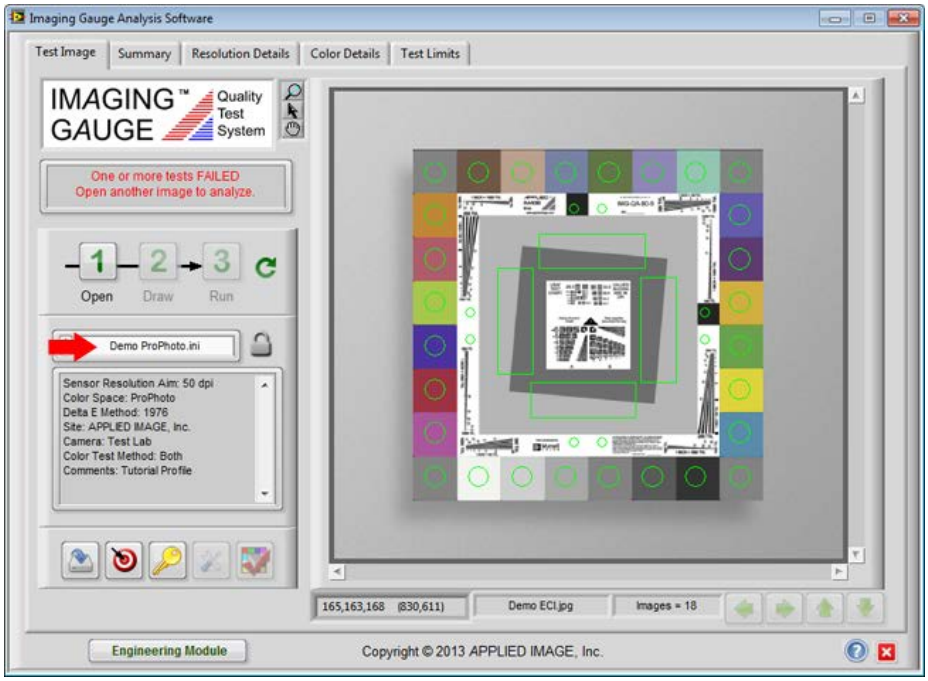




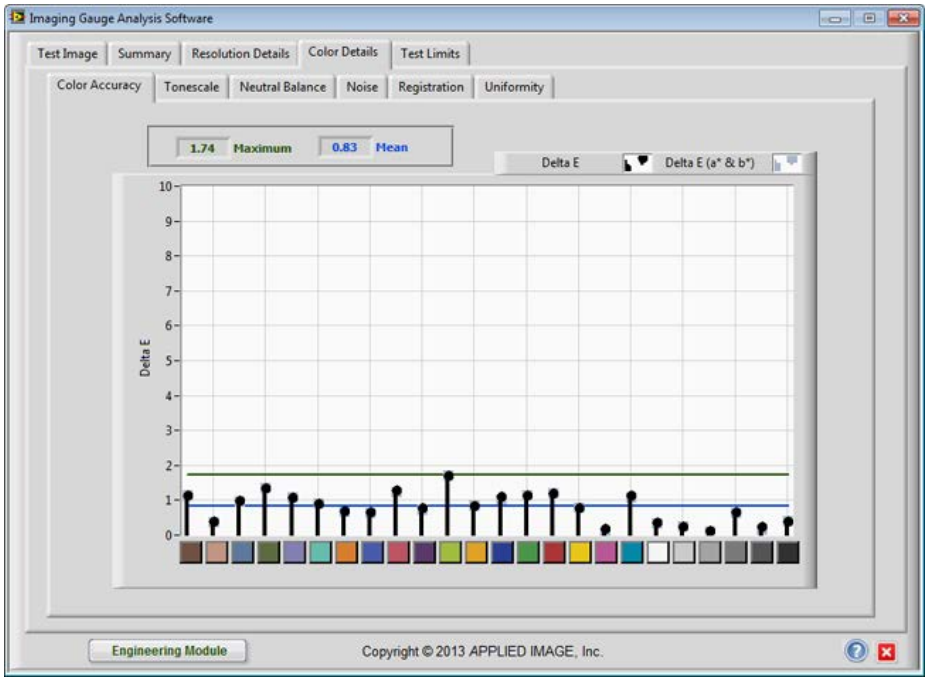
11. Return to the **Test Image** tab and run the "**Demo ECI.jpg"** image. Note the high **Delta E** and **Tonescale** values.

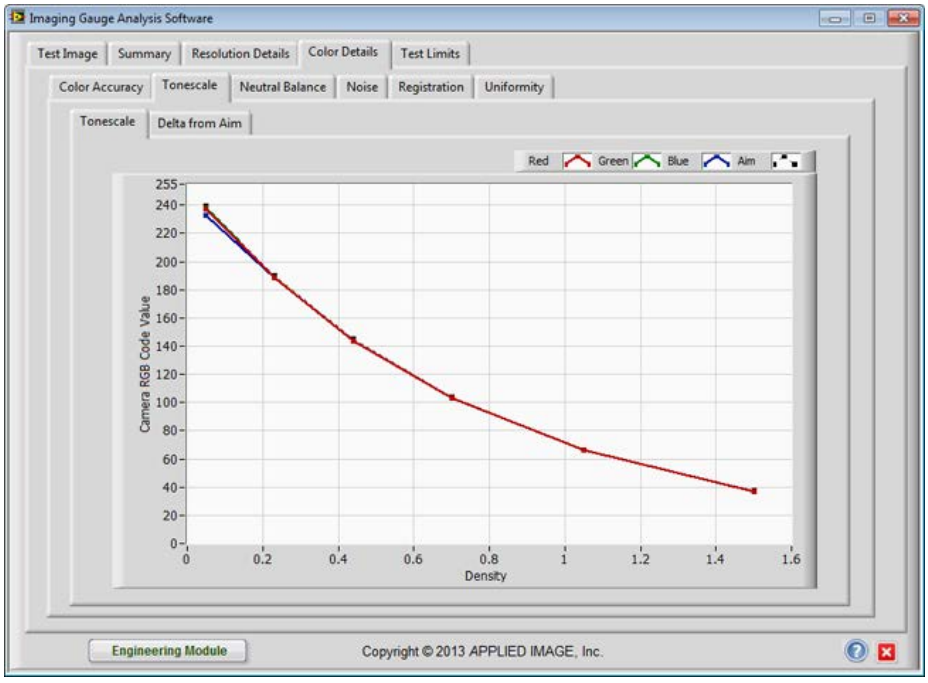


12. Return to the **Test Image** tab and change the test profile to **Demo ProPhoto.ini.**



13. Select **Open**  and re-run the **Demo ProPhoto.jpg** image. Note the low **Delta E** levels and agreement with the **Tonescale Aim** curve.



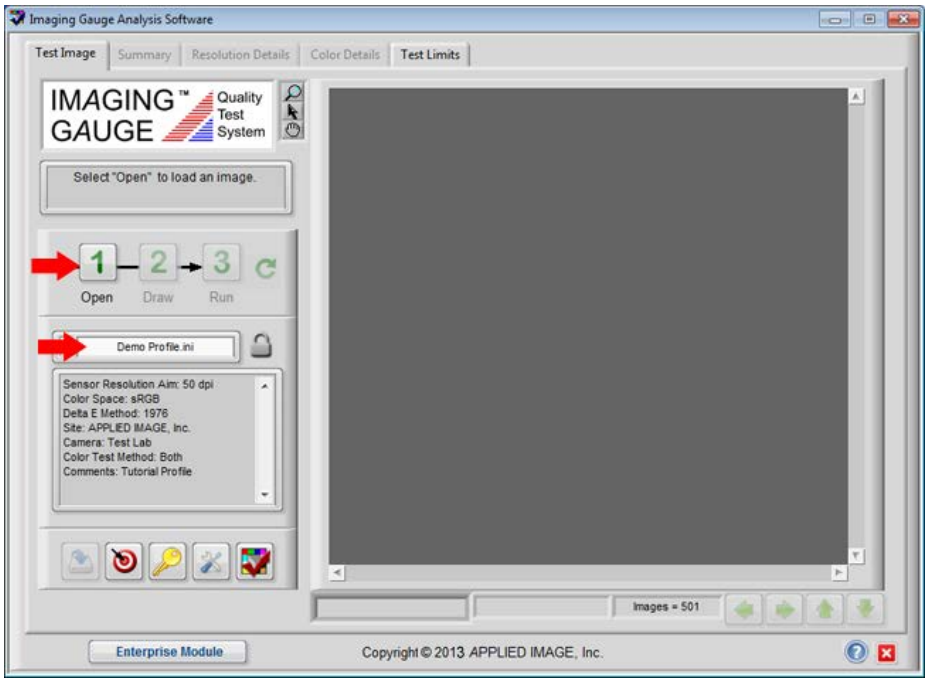


14. Run the other Demo color space images with their profiles to observe their performance.

End of Color Space Tutorial

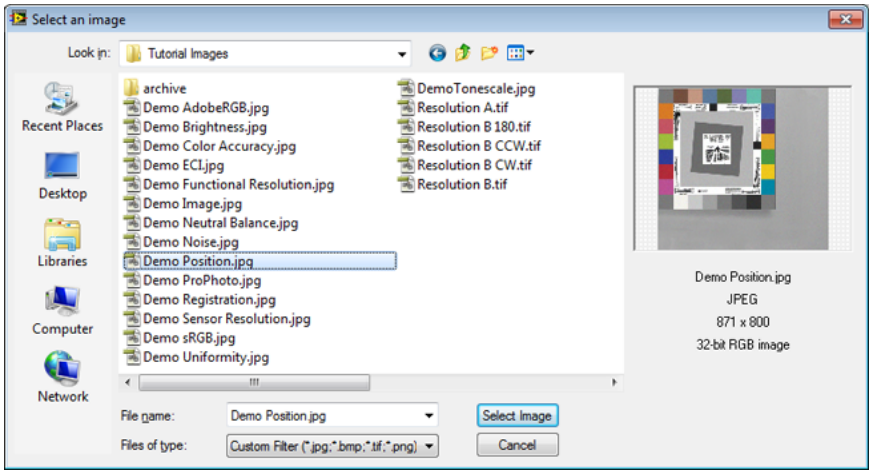
Tutorial 5: Create Test Specification Profile Tutorial

1. Select "**Demo Profile.ini**" from the Profile Drop-Down list.

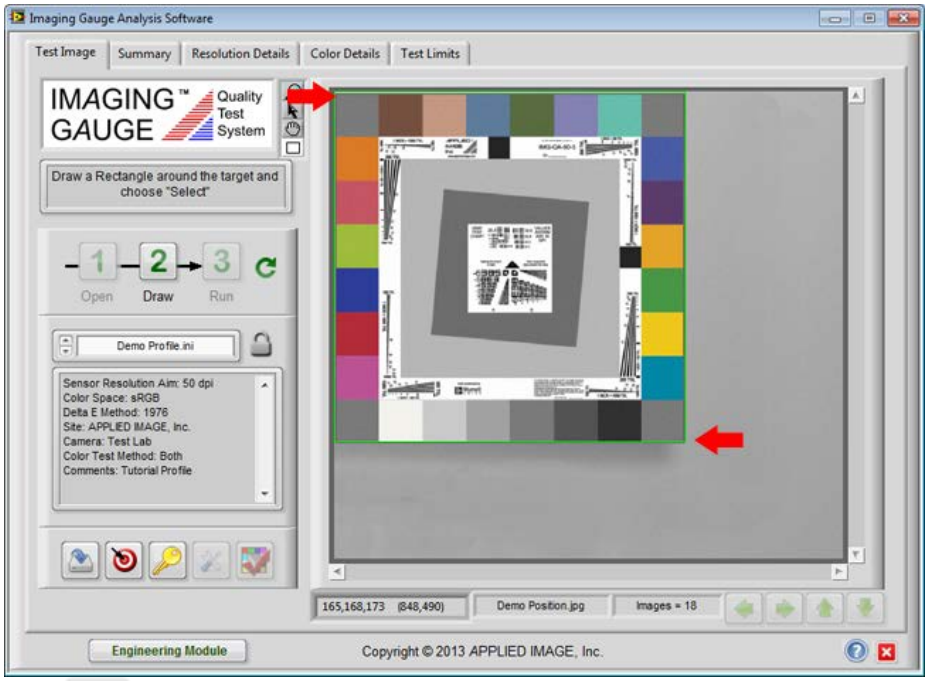


2. Select **Open**  to load a test image.

3. Select "**Demo Position.jpg"** from the dialog box.

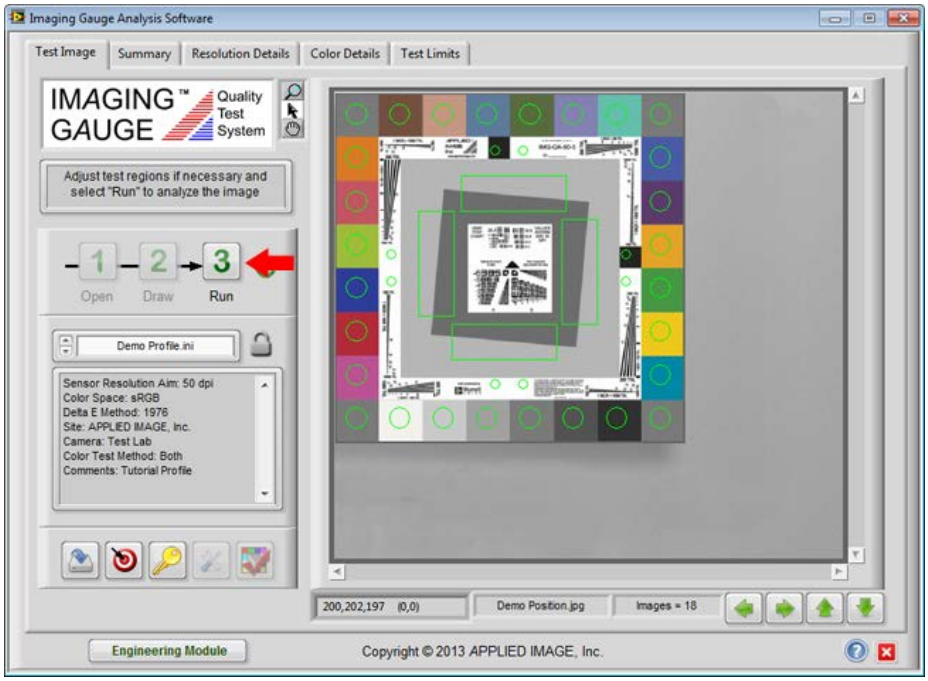


4. Press and hold the mouse from the upper left corner to the lower right corner of the target as shown.

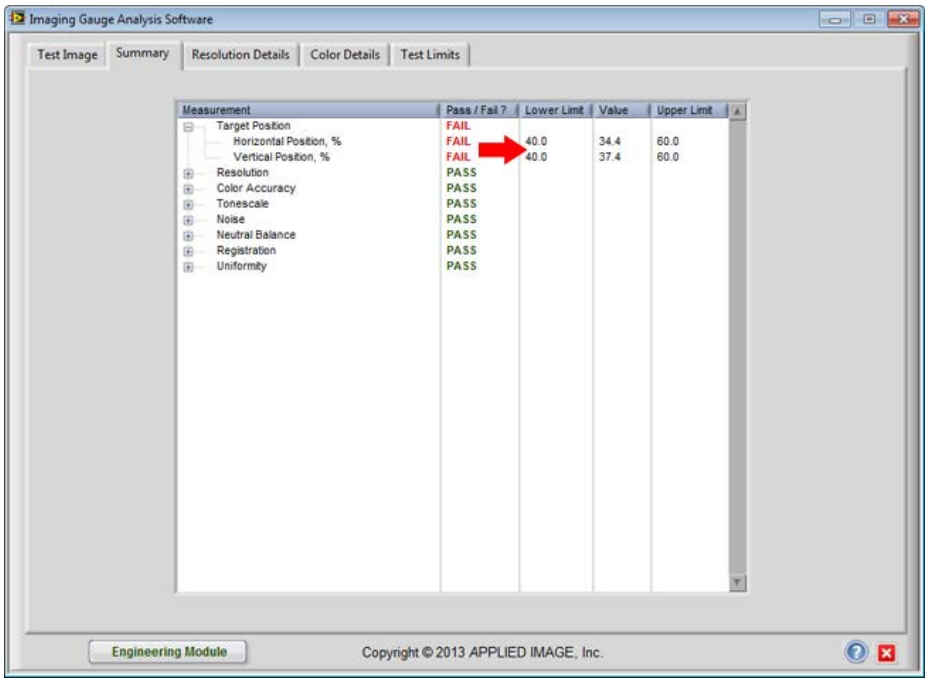


5. Choose **Draw**  to continue.

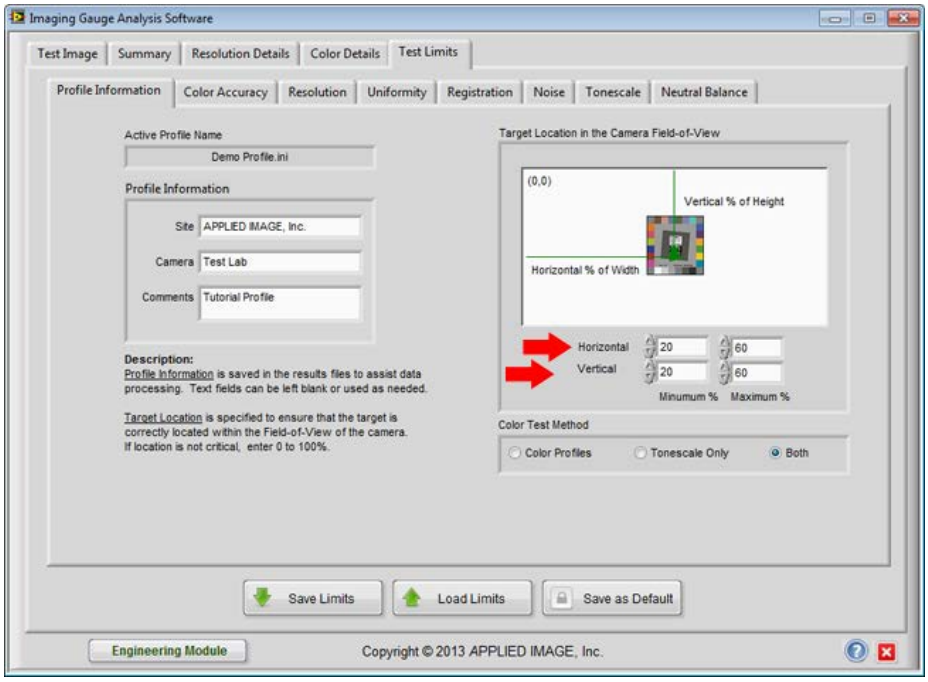
6. Select **Run**  when all regions are positioned properly.

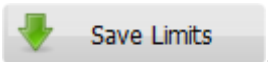


7. Select the **Summary** tab and note that the failed position values are below the lower limit (40%).



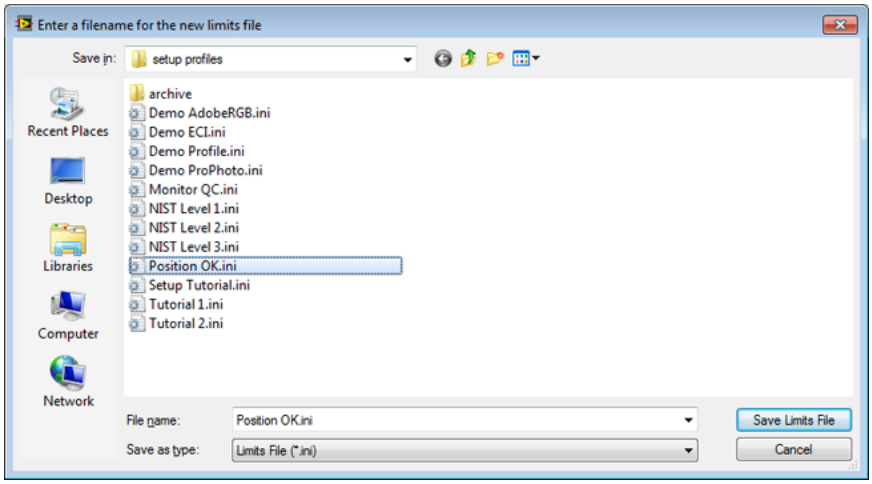
8. Select the **Test Limits** tab. Change the lower limits for both **Horizontal** and **Vertical** positions to 20%.



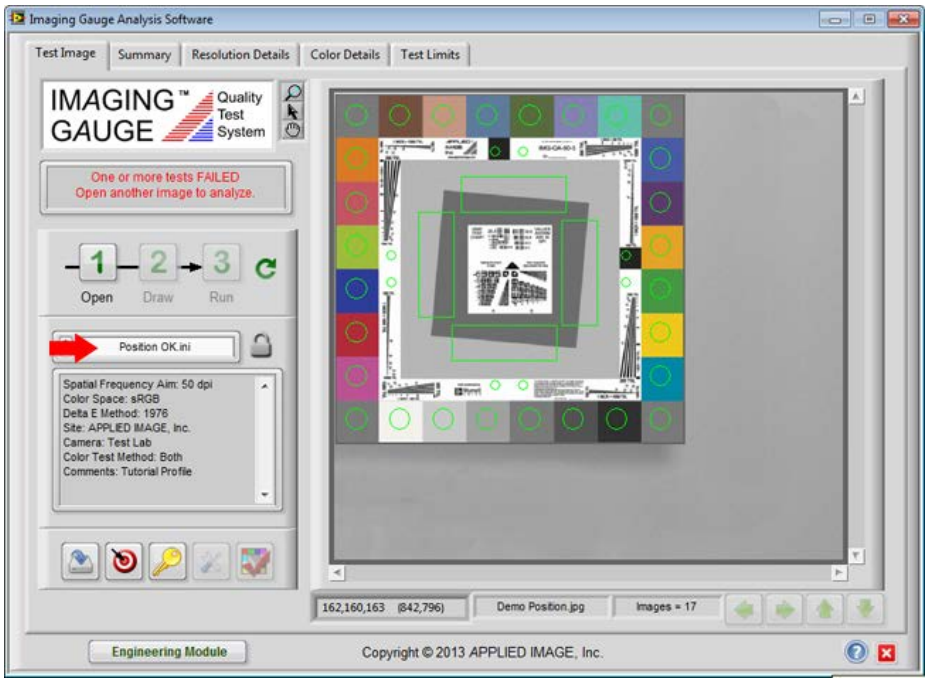
9. Select the **Save Limits** button 

.

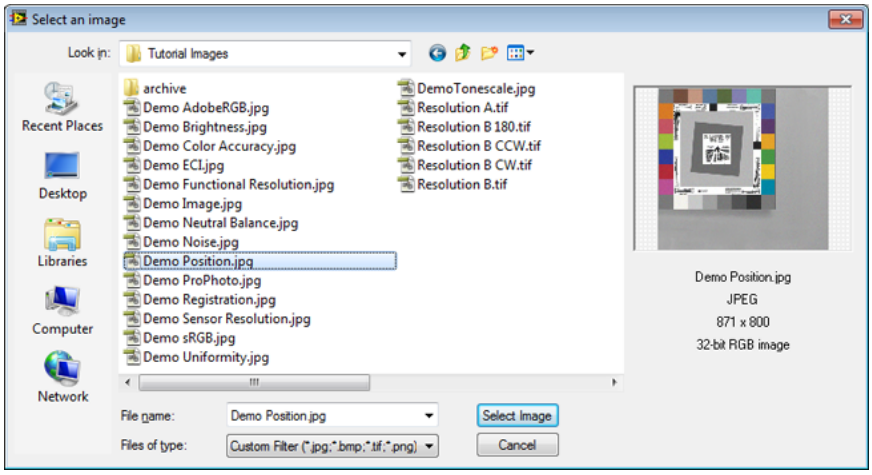
10. Enter the file name: **Position OK.ini** and select the **Save Limits File** button.



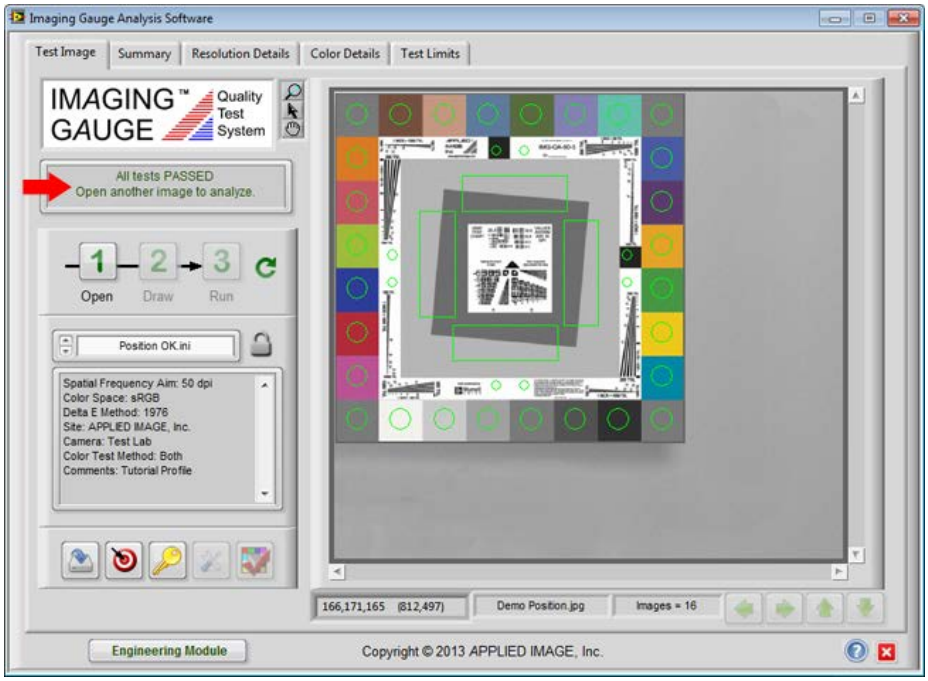
11. Select the **Test Image** tab. Note that the new profile is selected in the drop-down menu.



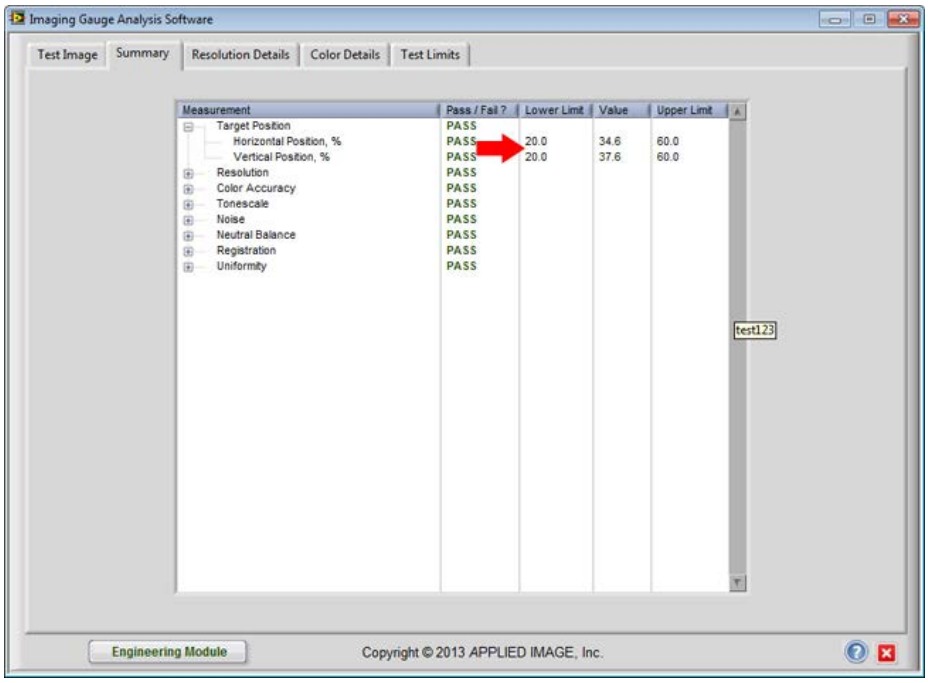
12. Select **Open**  button and re-run the "**Demo Position.jpg"** image.



13. Note that the image now passes the requirements of the new profile.



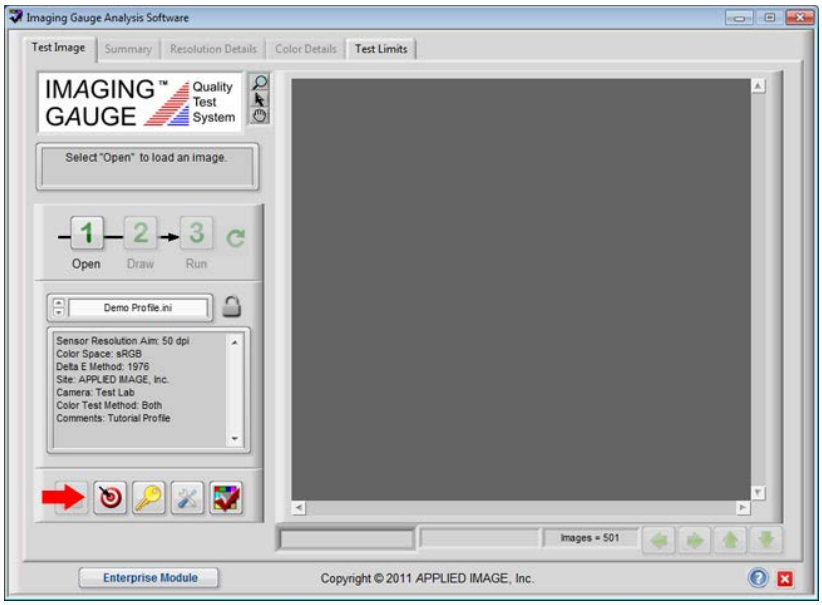
14. Select the **Summary** tab and note that all categories have **PASSED** measurements.



End of Profile Editing Tutorial

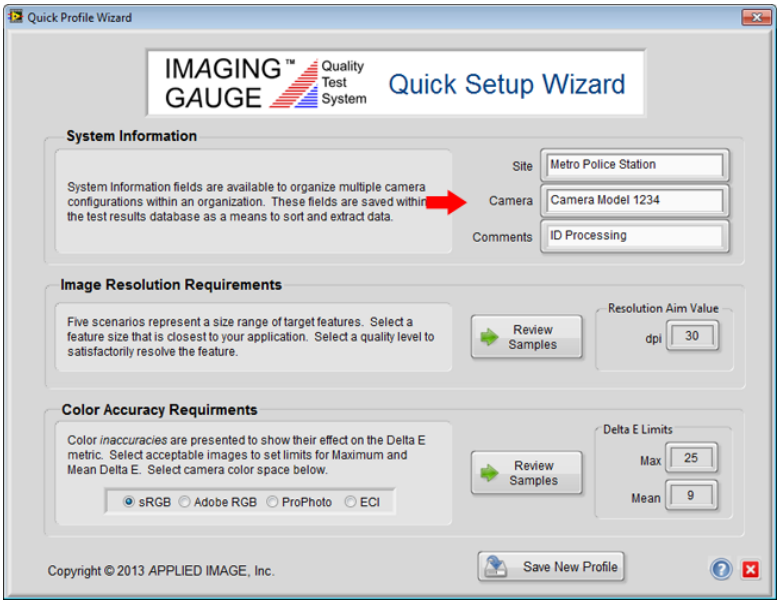
Tutorial 6: Quick Setup Tutorial

1. Launch the Quick Setup application by selecting the **Profile Setup Tool** from the front panel  .

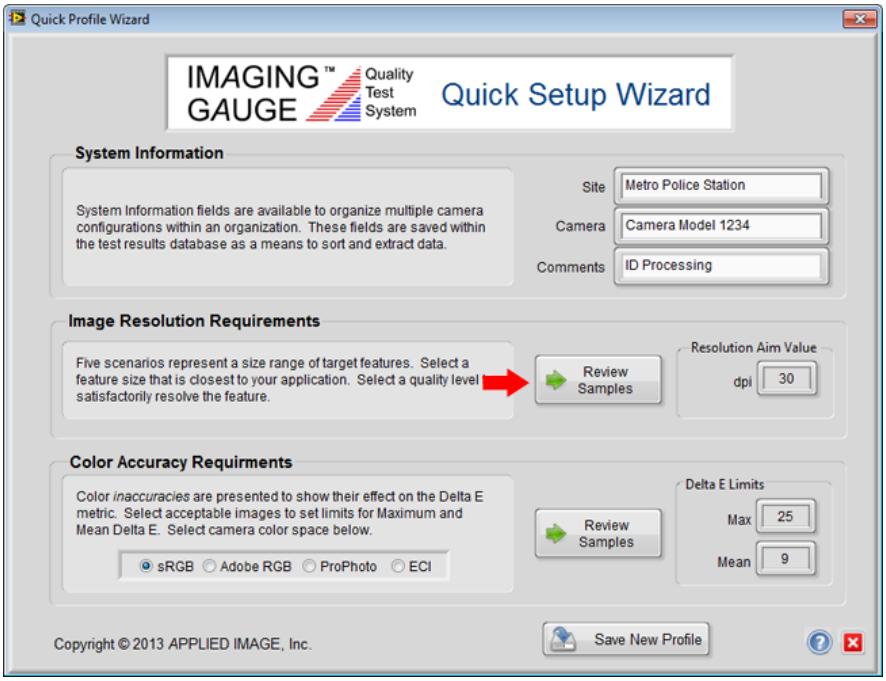


2. Enter the following information on the front panel.
   Site = Metro Police Station
   Camera = Camera Model 1234
   Comments = ID Processing

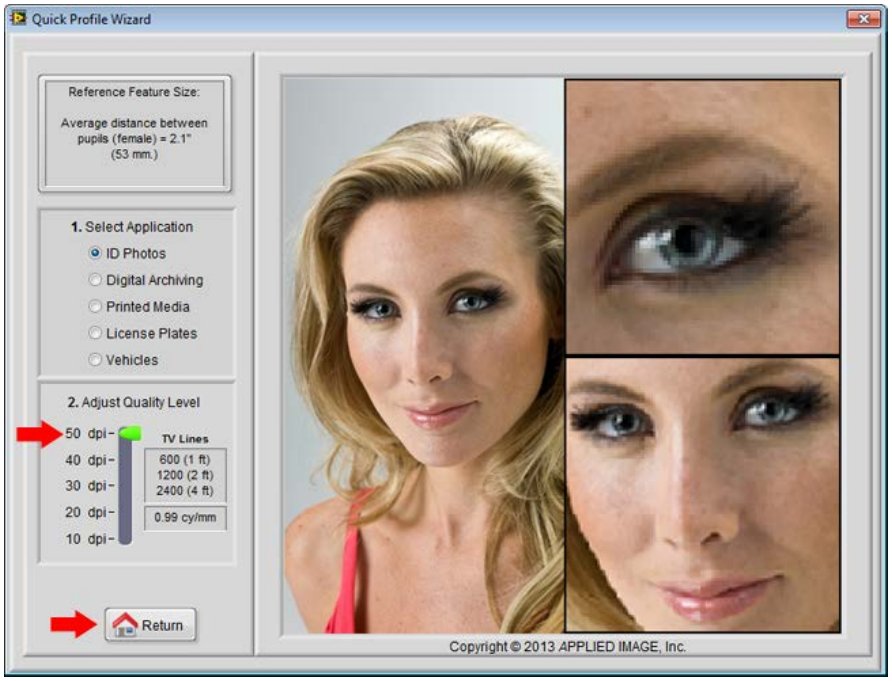
Note that the default **Resolution Aim Value** is 30 and the **Delta E Limits** from Maximum and Mean are 25 and 9, respectively.

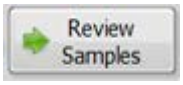


3. Select **Review Samples** in the **Image Resolution Requirements** section.

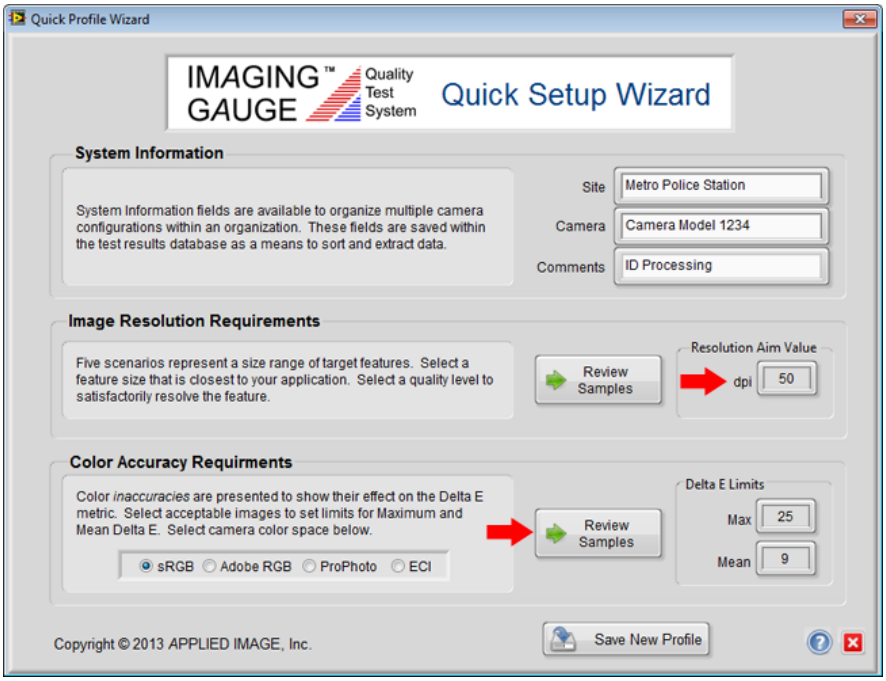


3. Review the five (5) **Application** types by selecting each radio button in the **Select Application** control. After reviewing the different application, select **ID Photos** to continue. Adjust the **Quality Level** from 50 dpi to 10 dpi by sliding the green pointer up and down through the scale. Select 50 dpi when done reviewing the **Quality Levels** and select **Return** 

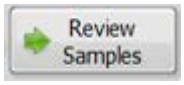


4. Note that the **Resolution Aim Value** has changed to 50 dpi. Select **Review Samples** 

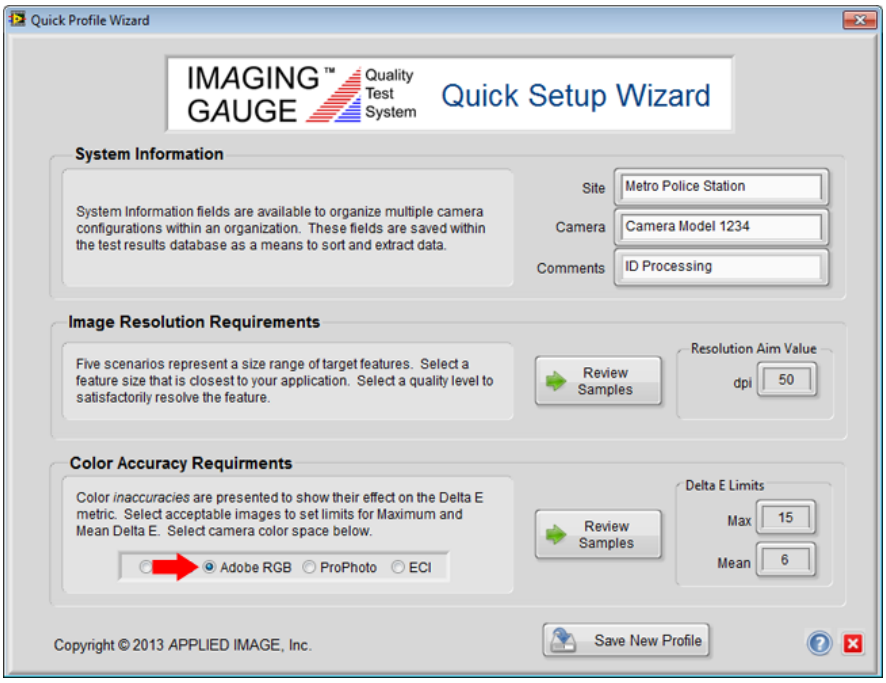
to set Color Accuracy limits.



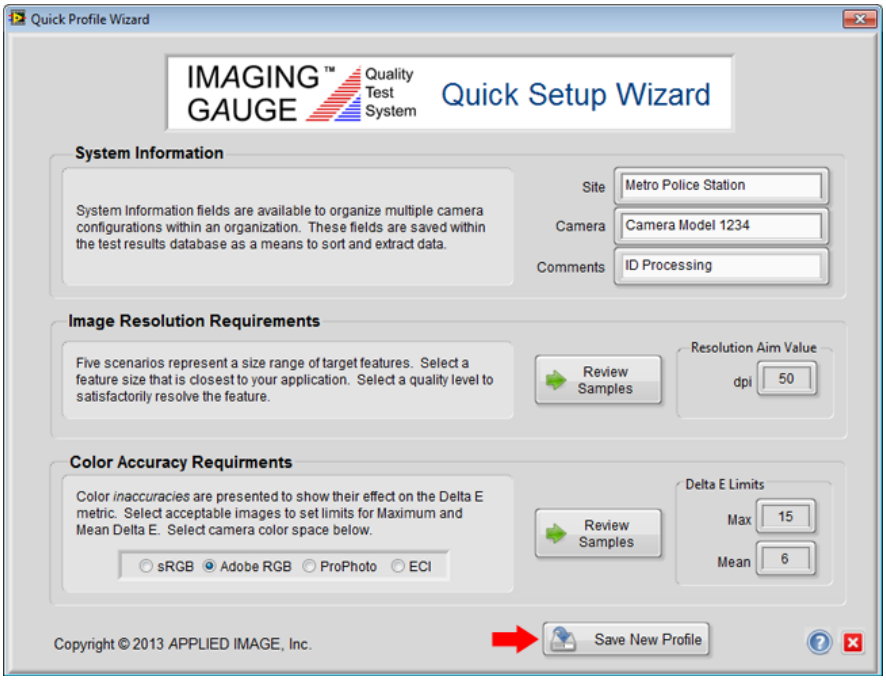
5. Review the different **Application** types. Toggle the **Color Change** type for each **Application** and adjust the quality level for each combination. Select (1) **ID Photos** , (2) **Color Shift (Max)** and (3) **Max < 15** when done reviewing.

6. Select **Brightness (Mean)** and **Mean < 6**, then select **Return** 

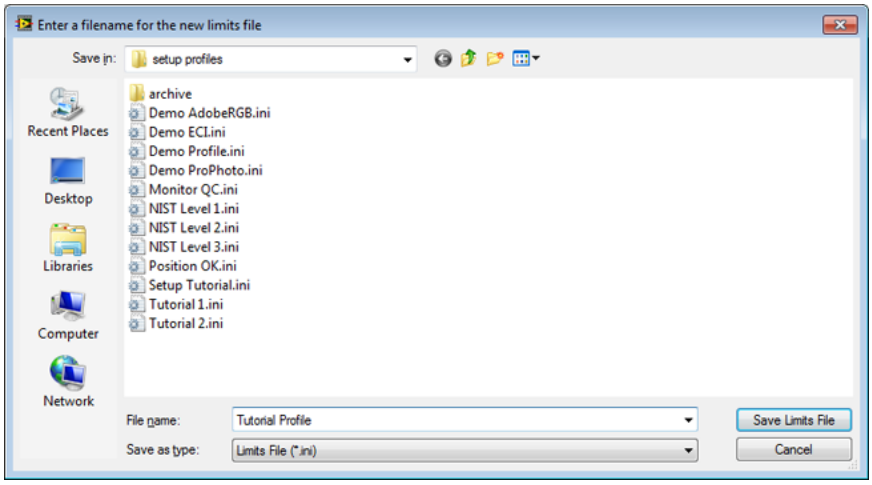
7. Note that the **Max** and **Mean** values have changed to 15 and 6, respectively, and that the **Color Space** is set to **Adobe RGB**.



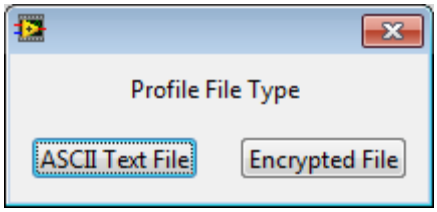
8. Select **Save New Profile** to create a new specifications profile.



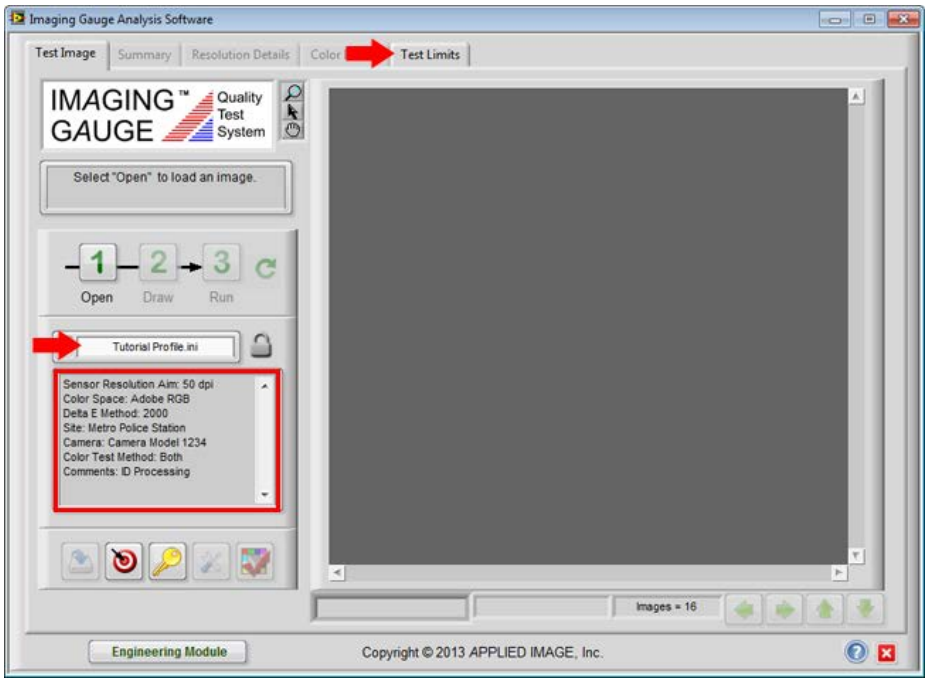
8. Enter the name **"Tutorial Profile"** in the **File name** field and select **Save Limits File**.



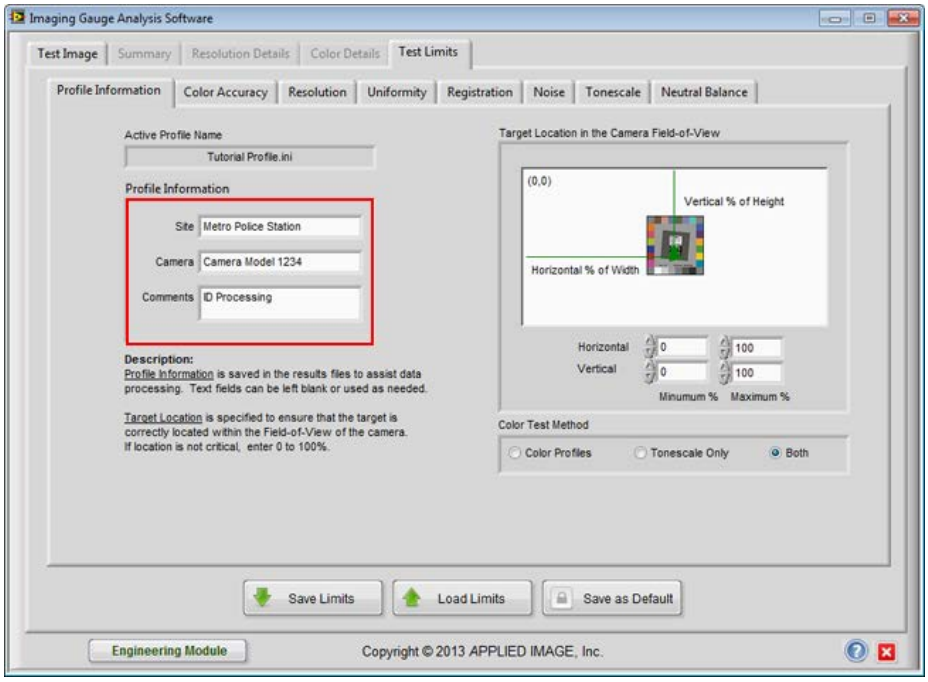
Note: The Enterprise Edition will display a window to save the file as text-based ASCII or encrypted. Select Text-based for this tutorial.



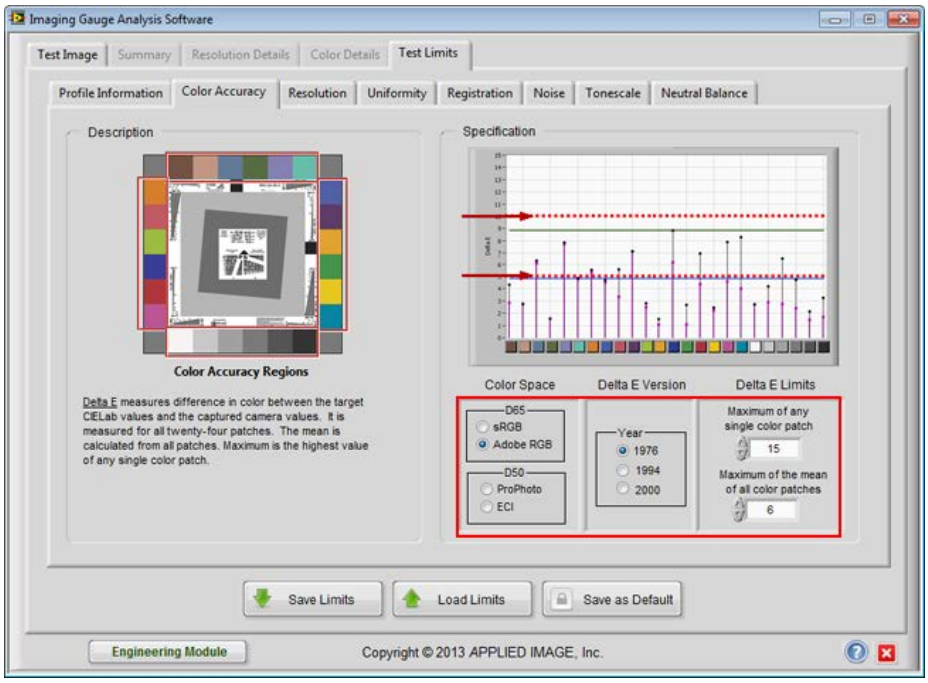
9. Note that the new profile has been added to the profiles drop-menu. Select the **Test Limits** tab.



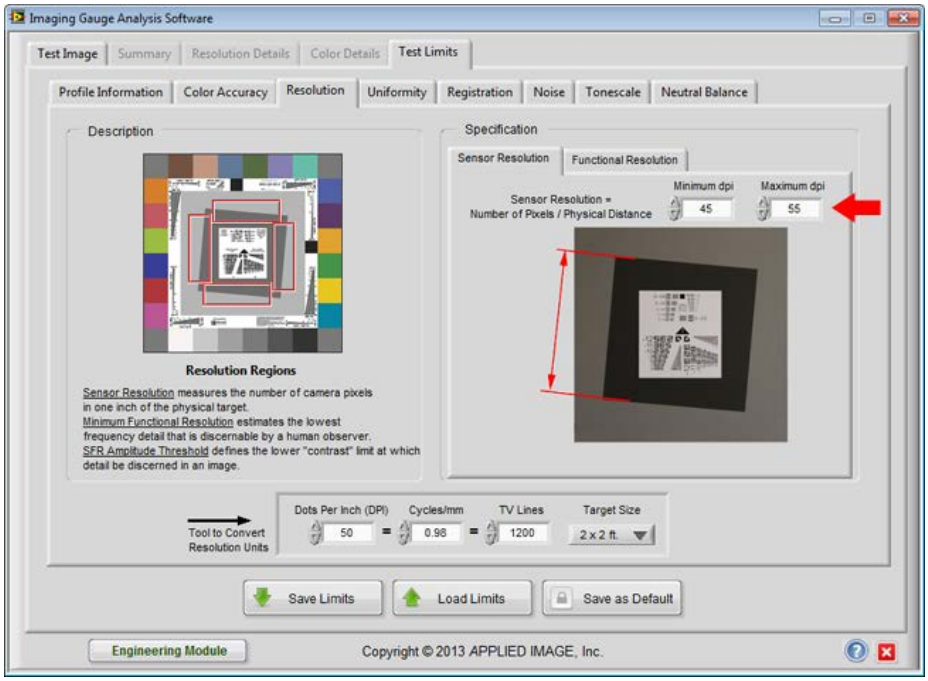
10. Note that the values entered in the **Setup Guide** have been exported to the **Imaging Gauge** front panel.



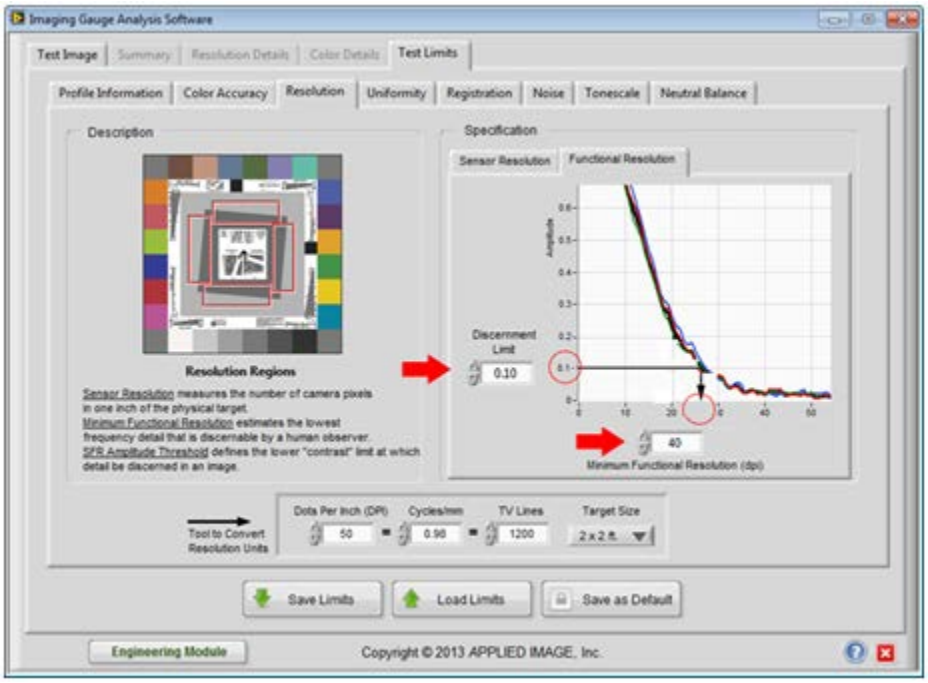
11. Note the **Color Spac**e and **Delta E** limits.



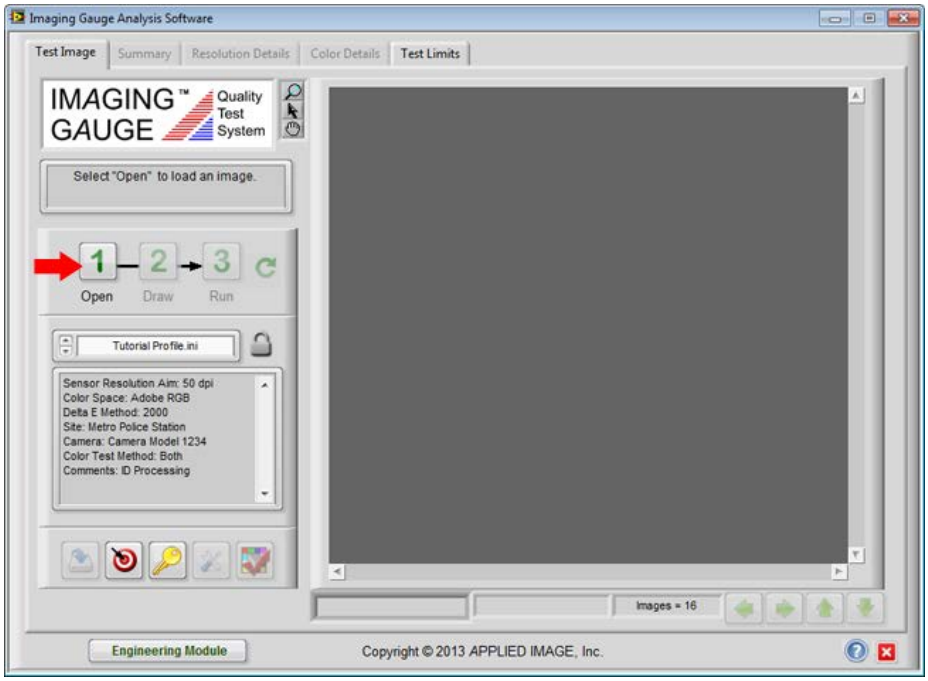
12. The **Minimum** and **Maximum Sensor Resolution** values are calculated using 10% of the aim **Sensor Resolution** selected in the Setup Guide (Aim = 50 dpi >> Minimum =45 dpi, Maximum = 55 dpi)



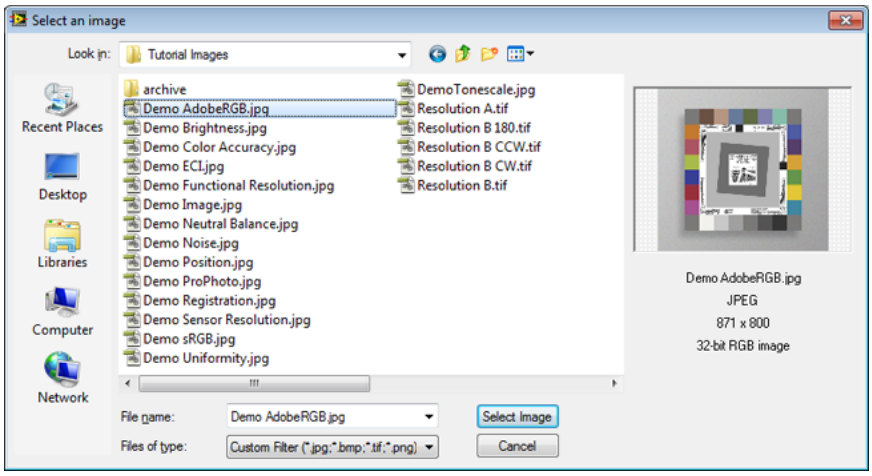
13. **Minimum Functional Resolution** is set at 20% less than the **Sensor Resolution,** i.e. 80% Optical Efficiency.



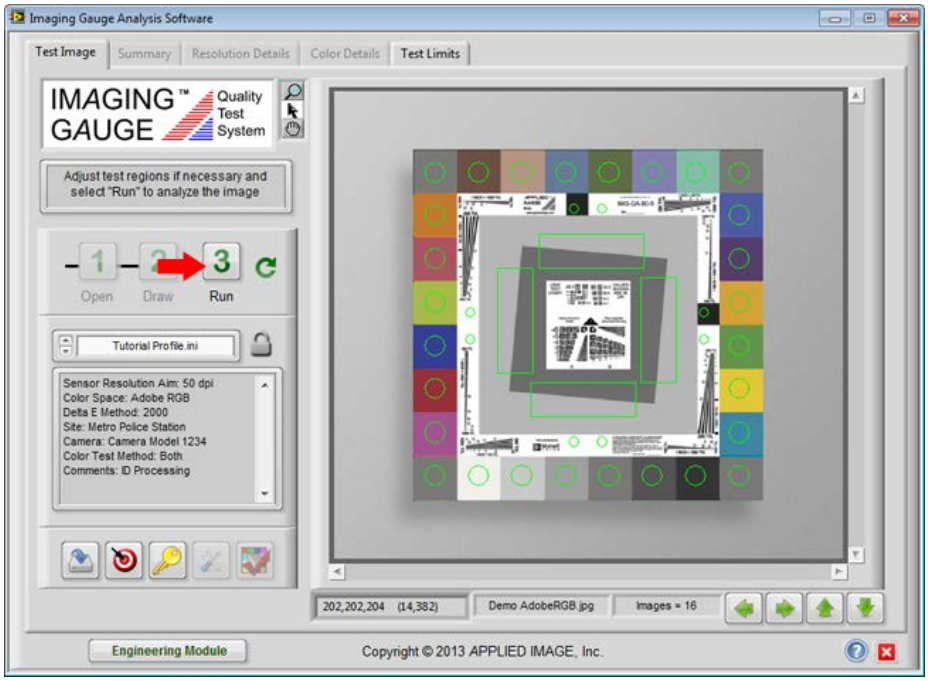
14. Select the **Test Image** tab and select **Open**  to test an image.



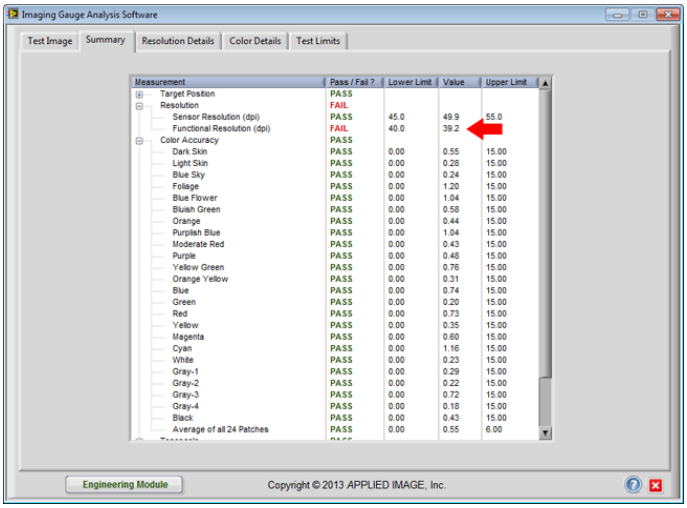
15. Select the **Demo AdobeRGB.jpg** and choose **Select Image**.

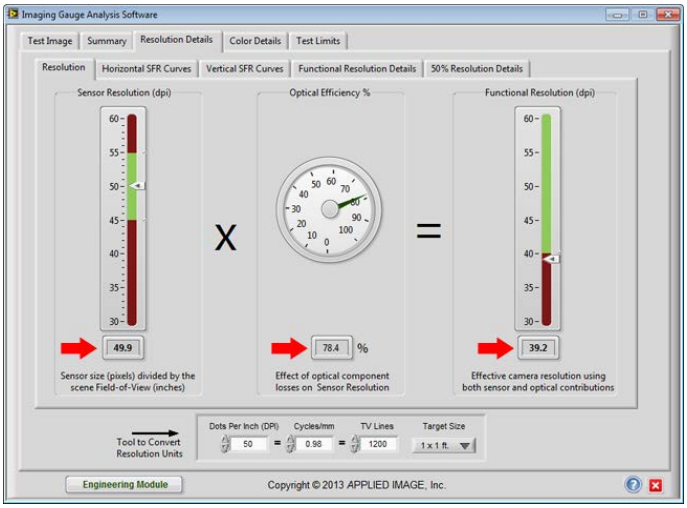


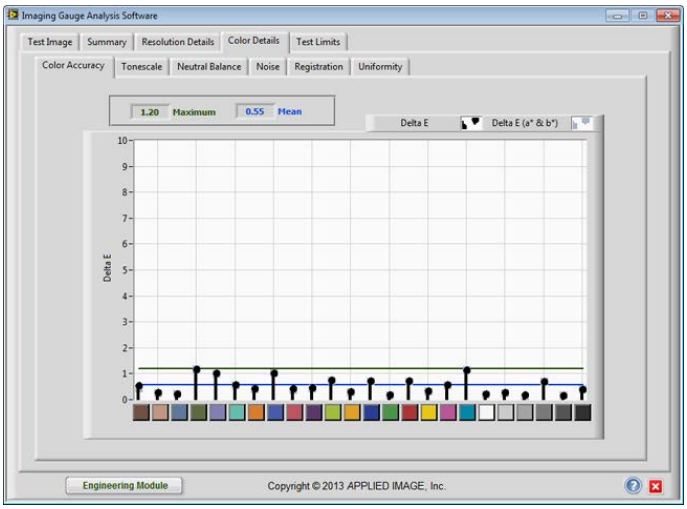
16. Draw a rectangular region around the target, then press 2 **Draw**. Inspect the test regions and select Run 3.



17. Select the **Summary** tab and note that **Sensor Resolution** is in specification but the Functional Resolution is below the lower specification limit.



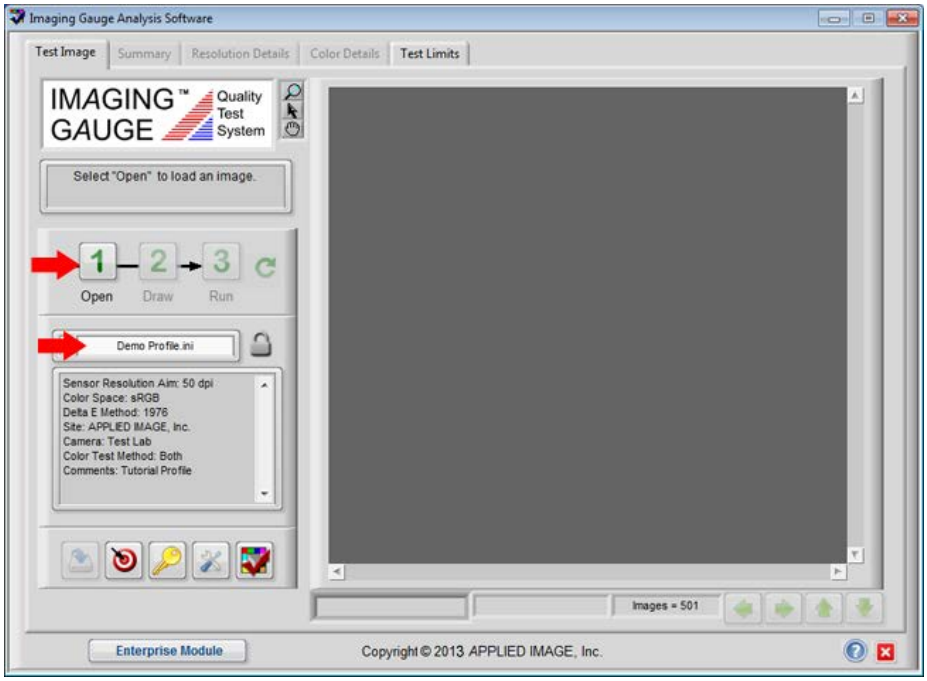




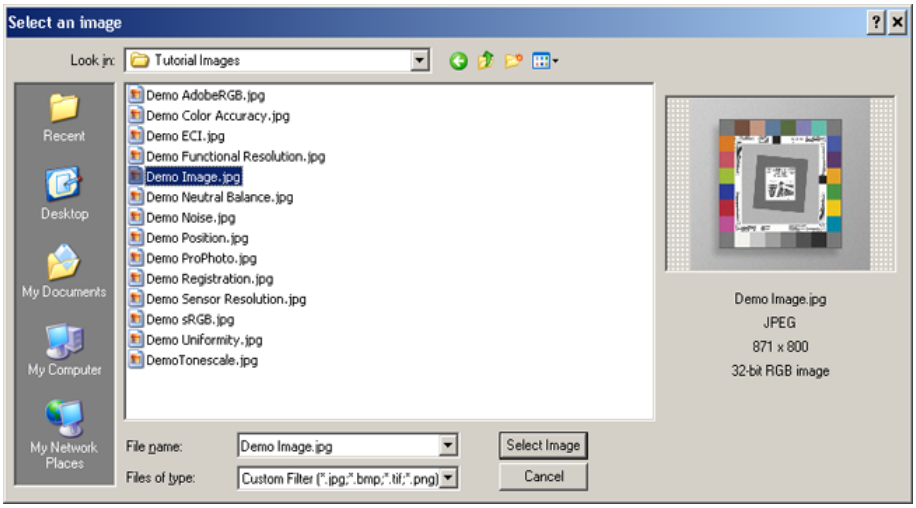
End of Quick Setup Tutorial

Tutorial 7: Results Tutorial

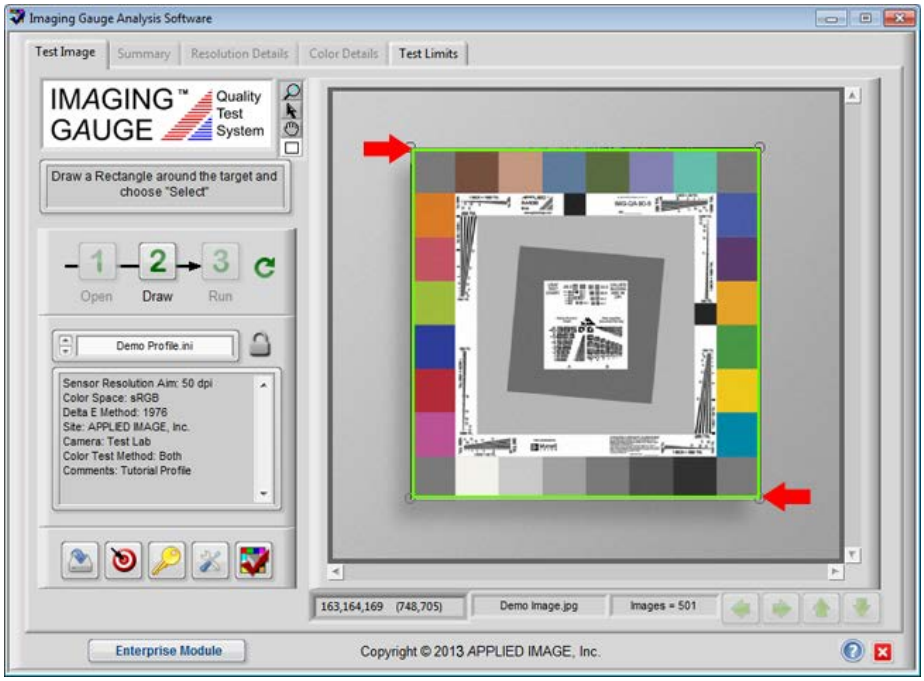
1. Select "**Demo Profile.ini**" from the Profile Drop-Down list.



2. Select **Open**  and choose "**Demo Image.jpg**".

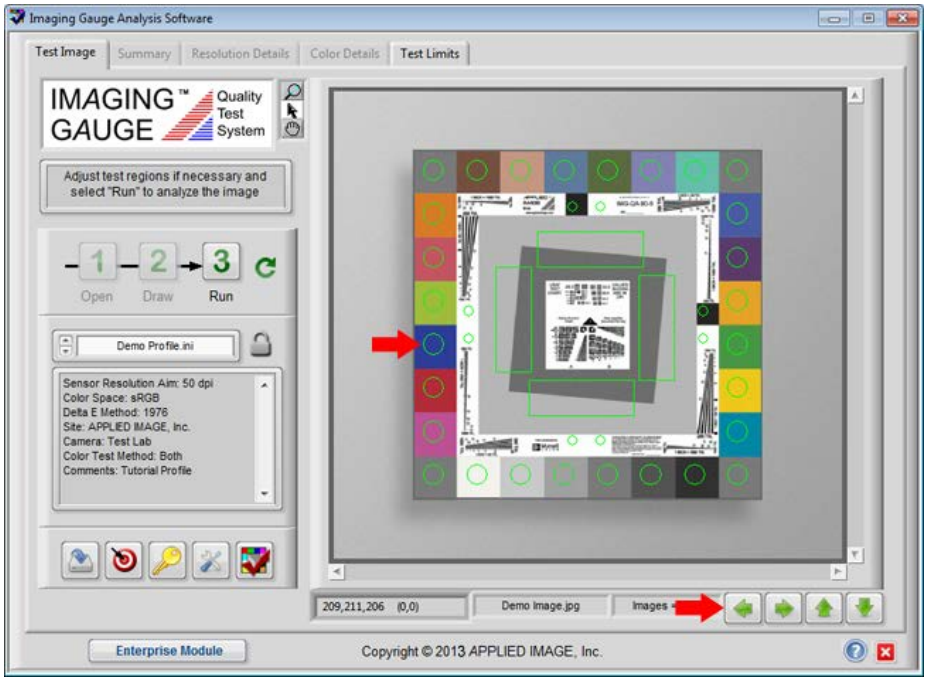


3. Press and hold the mouse from the upper left corner to the lower right corner of the target as shown.



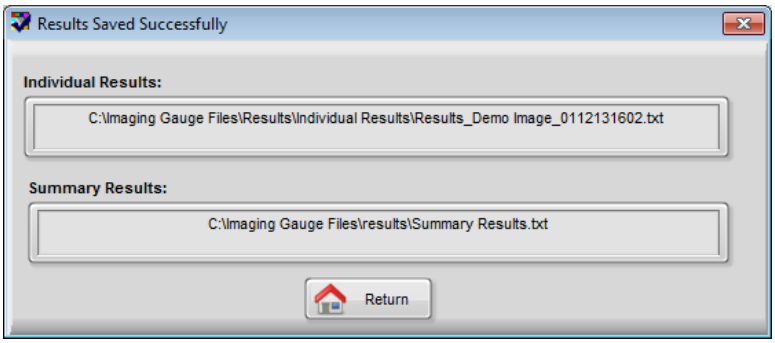
4. Choose **Draw**  to continue.

5. Inspect the location of all inspections regions and use the adjustment buttons, if necessary.

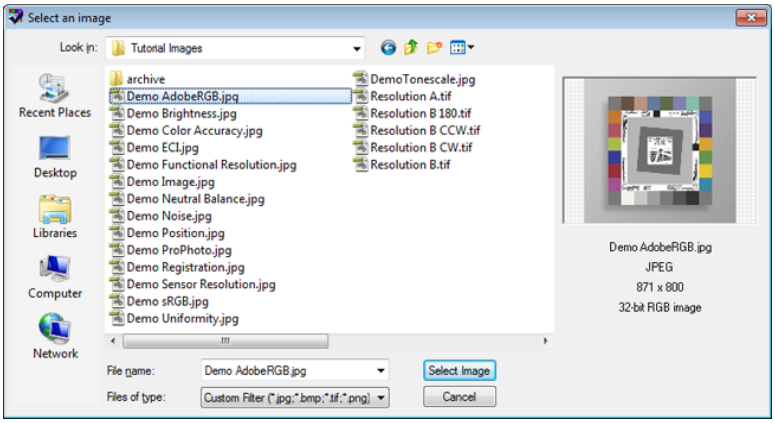


6. Select the **Run** button  when all regions are positioned properly.

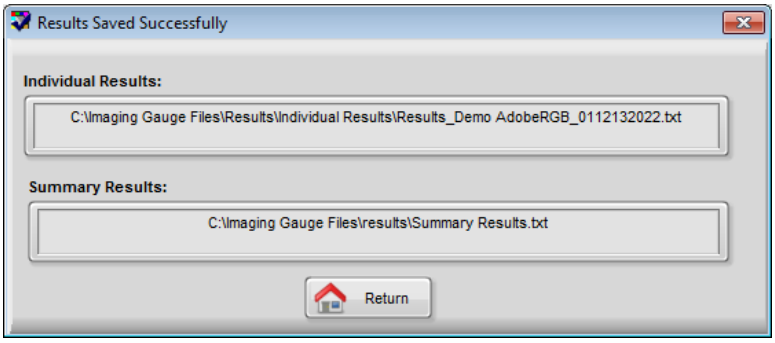
7. Select the "**Save Data**" button  . A dialog displays the name and location of the individual results file and the summary file. Select the "**Return**" button to continue.



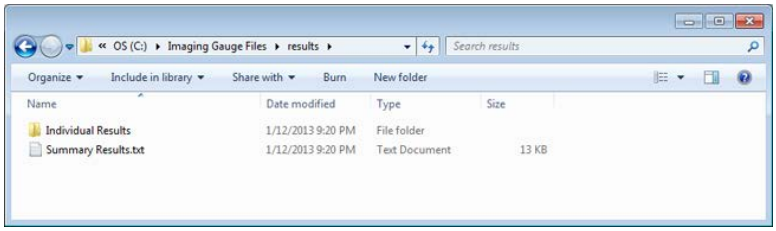
8. Select **Open**  and choose "**Demo AdobeRGB.jpg**" and **Select Image**.



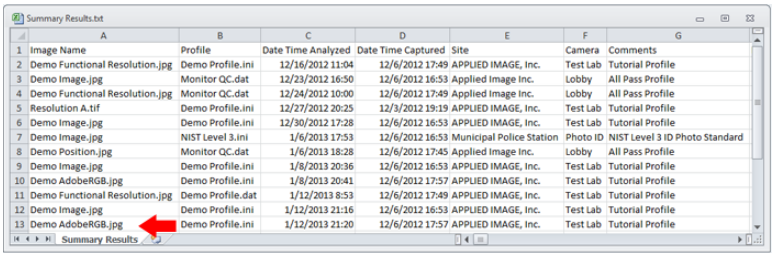
9. Repeat the process to analyze the image and select the **Save Data** button  . Select **Return** to continue.



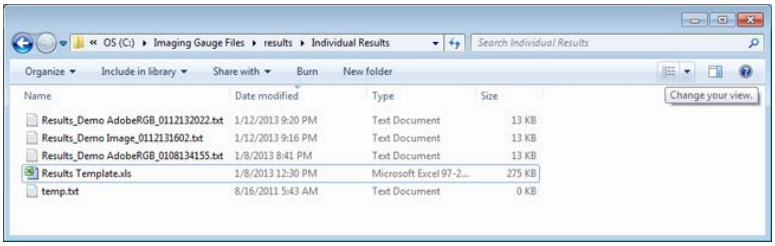
10. Navigate to the installed location of the results folder, typically **C:\Imaging Gauge Files\Results**. Note the **Individual Results** sub-folder and the **Summary Results** file.



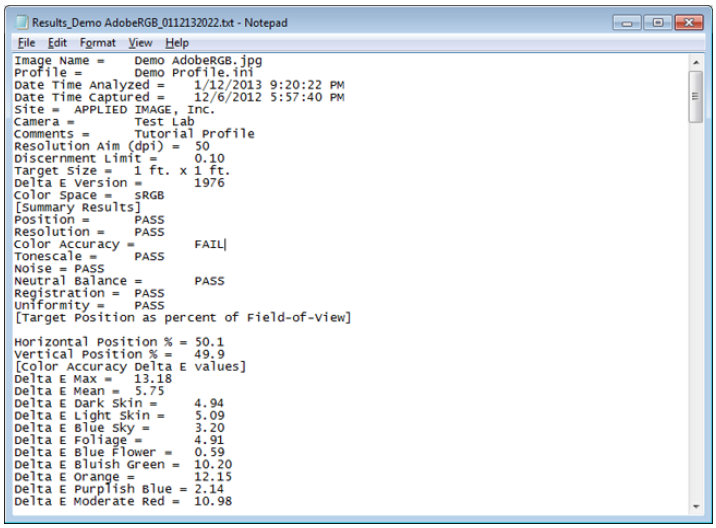
11. Open the **Summary Results.txt** file into a spreadsheet editor such as Microsoft Excel®. Use the scroll bar to view all data saved for both files. Close the **Summary Results.txt** file. Note: this file is formatted as a spreadsheet and is difficult to read with a standard text editor such as Notepad.



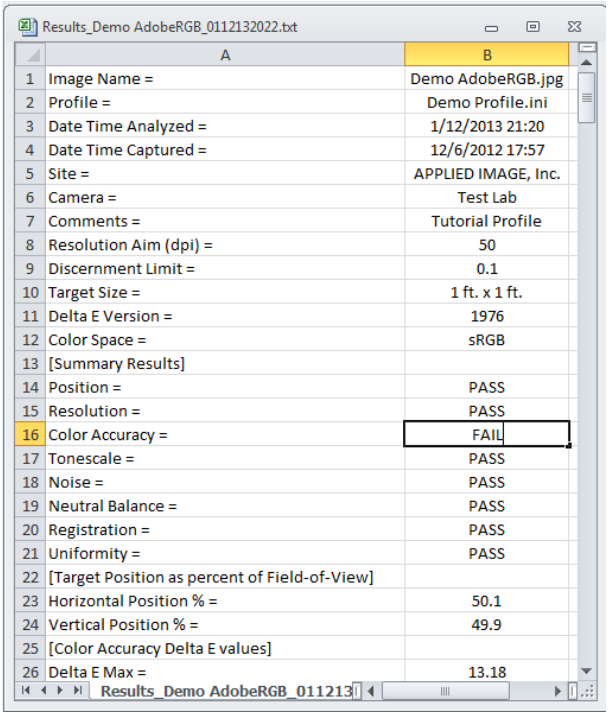
12 Open the Individual Results sub-folder and note the two files saved for the images processed.



13. Open either file into a standard text editor such as Notepad or into a spreadsheet program such as Excel®. Scroll down the file and note that the data is identical to the data saved in the Summary Results file with additional CIELab data and the SFR data. Close the individual results file.



14. If Excel is available, reopen the results file into Excel.

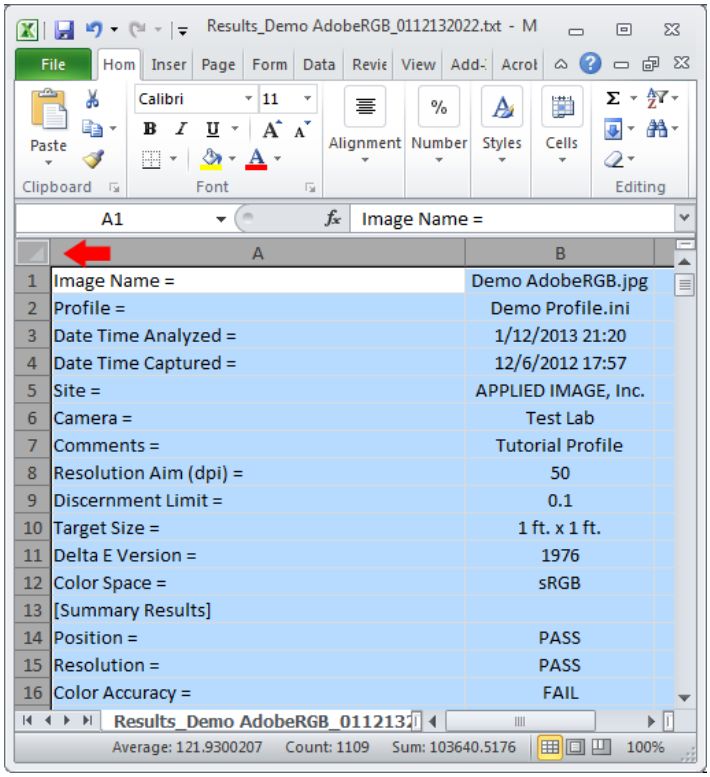


Results_Demo AdobeRGB_0112132022.txt

	A	B
1	Image Name =	Demo AdobeRGB.jpg
2	Profile =	Demo Profile.ini
3	Date Time Analyzed =	1/12/2013 21:20
4	Date Time Captured =	12/6/2012 17:57
5	Site =	APPLIED IMAGE, Inc.
6	Camera =	Test Lab
7	Comments =	Tutorial Profile
8	Resolution Aim (dpi) =	50
9	Discernment Limit =	0.1
10	Target Size =	1 ft. x 1 ft.
11	Delta E Version =	1976
12	Color Space =	sRGB
13	[Summary Results]	
14	Position =	PASS
15	Resolution =	PASS
16	Color Accuracy =	FAIL
17	Tonescale =	PASS
18	Noise =	PASS
19	Neutral Balance =	PASS
20	Registration =	PASS
21	Uniformity =	PASS
22	[Target Position as percent of Field-of-View]	
23	Horizontal Position % =	50.1
24	Vertical Position % =	49.9
25	[Color Accuracy Delta E values]	
26	Delta E Max =	13.18

Results_Demo AdobeRGB_011213

15. Select all data and copy it to the clipboard.



Results_Demo AdobeRGB_0112132022.txt - M

File | Hom | Inser | Page | Form | Data | Revie | View | Add- | Acrol

Paste | Clipboard | Calibri | 11 | Font | Alignment | Number | Styles | Cells | Editing

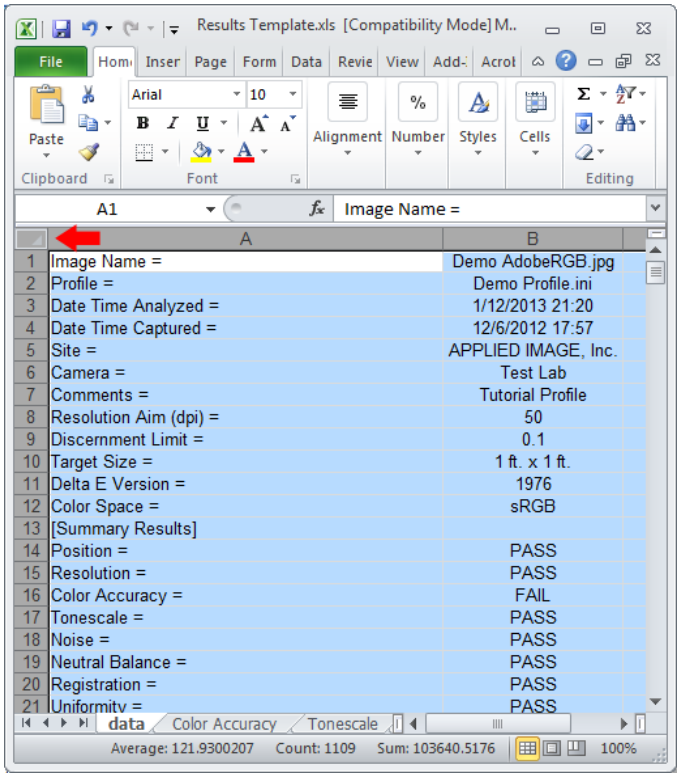
A1 | Image Name =

	A	B
1	Image Name =	Demo AdobeRGB.jpg
2	Profile =	Demo Profile.ini
3	Date Time Analyzed =	1/12/2013 21:20
4	Date Time Captured =	12/6/2012 17:57
5	Site =	APPLIED IMAGE, Inc.
6	Camera =	Test Lab
7	Comments =	Tutorial Profile
8	Resolution Aim (dpi) =	50
9	Discernment Limit =	0.1
10	Target Size =	1 ft. x 1 ft.
11	Delta E Version =	1976
12	Color Space =	sRGB
13	[Summary Results]	
14	Position =	PASS
15	Resolution =	PASS
16	Color Accuracy =	FAIL

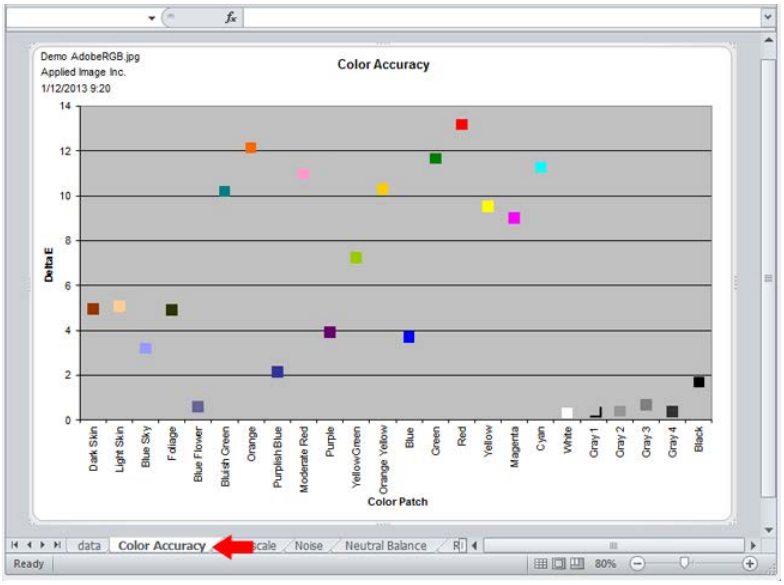
Results_Demo AdobeRGB_011213

Average: 121.9300207 Count: 1109 Sum: 103640.5176 100%

16. Open the **Results Template.xls** file. Select all cells in the ***data*** tab and paste the entire data set from the test file into the ***data*** workbook page.



17. Select the **Color Accuracy** tab and note the Delta E values are identical to those in the User Interface of the main program.



18. Save the file using a new name and close the template file without re-saving.

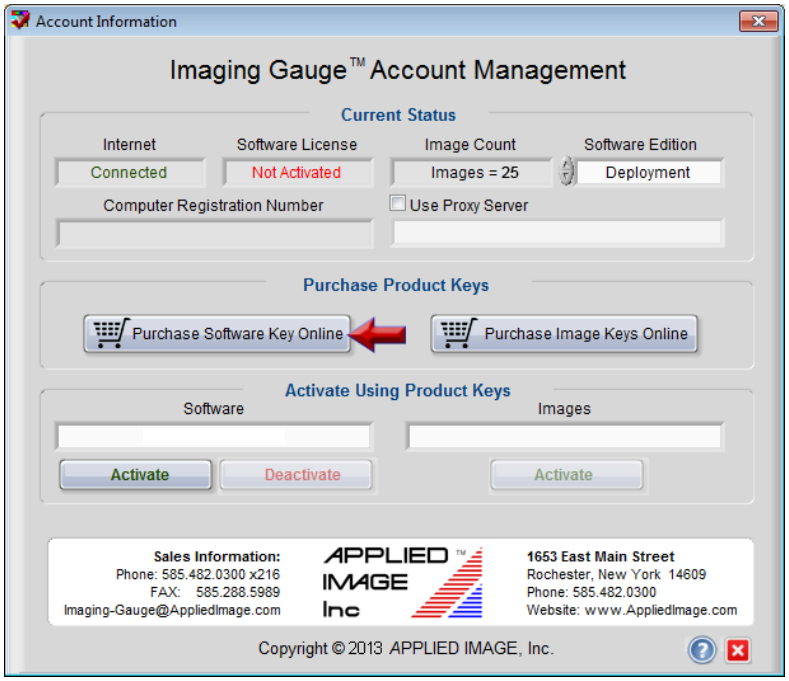
End of Results Tutorial

Tutorial 8: Managing the Account

There are three main functions of the Account Manager interface: Activating the software, Adding Images Actuations and De-Activating the software. These functions are demonstrated sequentially in this tutorial. The tutorial assumes a new installation of the software.

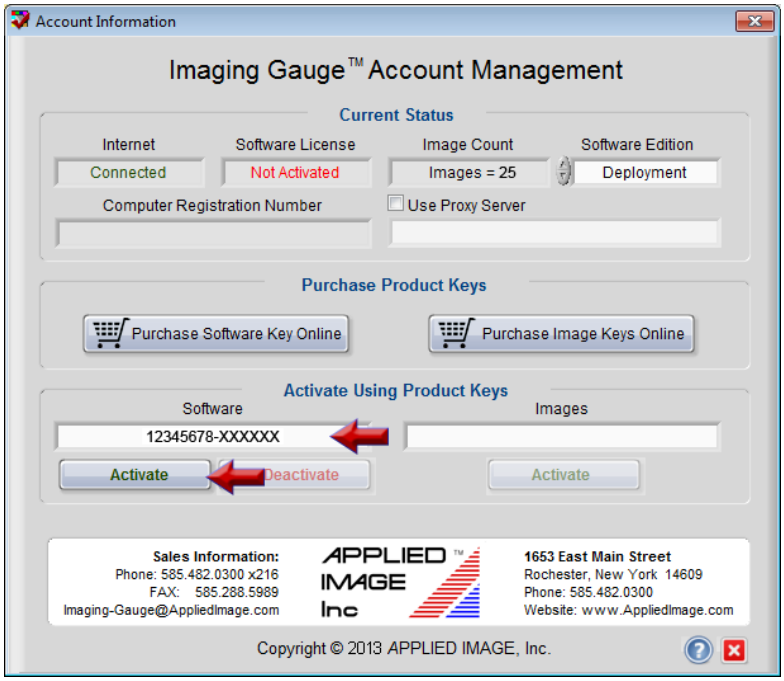
1. Select **Account Information**. Note the same Account Management interface is used for all three software editions. The Deployment Edition is used in this tutorial.

2. Select the **Purchase Software Key Online** button.



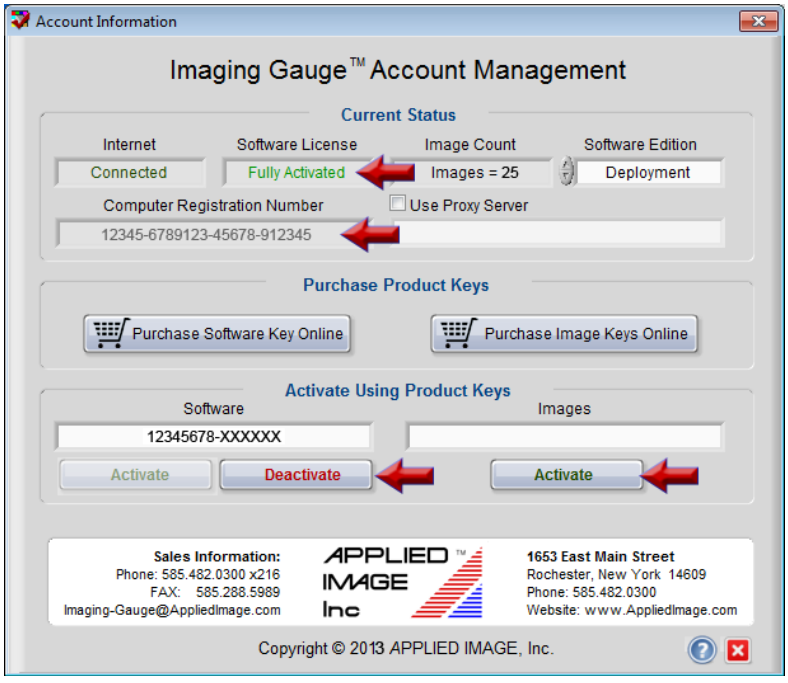
3. Select the **Add** button to purchase an Activation Key for the software. This can be skipped if you already have an activation key.

4. Enter the Activation Key that was sent when the software was purchased. Select **Activate**

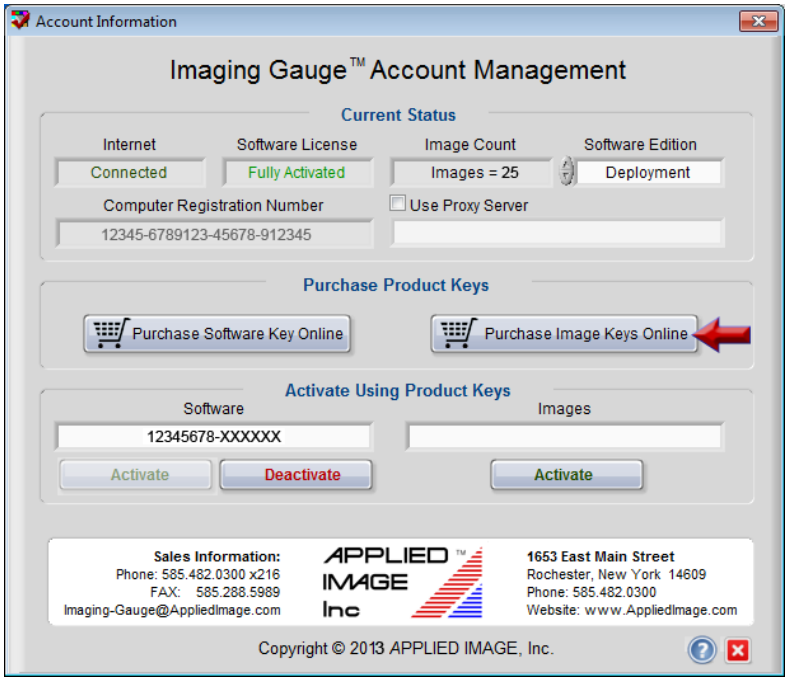


5. Note the following changes:

- Software License changes from "Not Activated" to "Fully Activated"
- Computer Registration Number is assigned
- **Deactivate** button is enabled
- **Activate** button for Image Keys is enabled

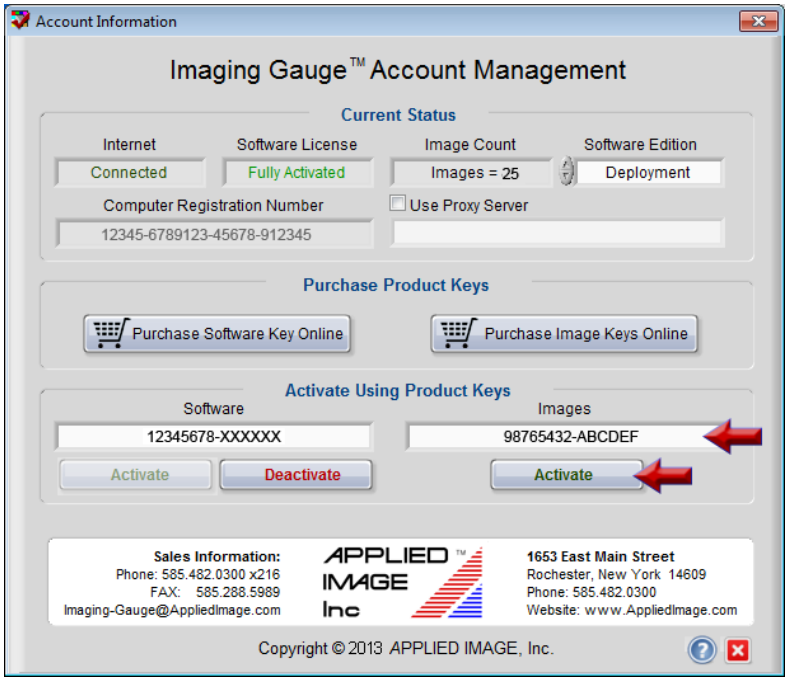


6. Select the **Purchase Image Keys Online** button.



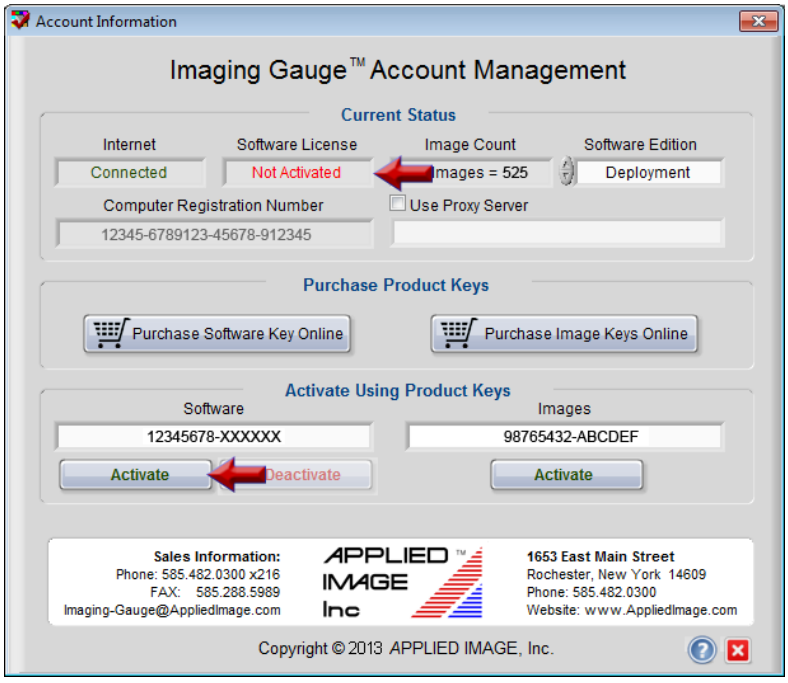
7. Select **Add** to purchase an activation key for images. Note: image activations are also included as part of annual subscriptions. This step can be skipped if you already have image activation keys.

8. Enter the Activation Key to add images and select **Activate**. Note that the Image Count increases from 25 to 525.

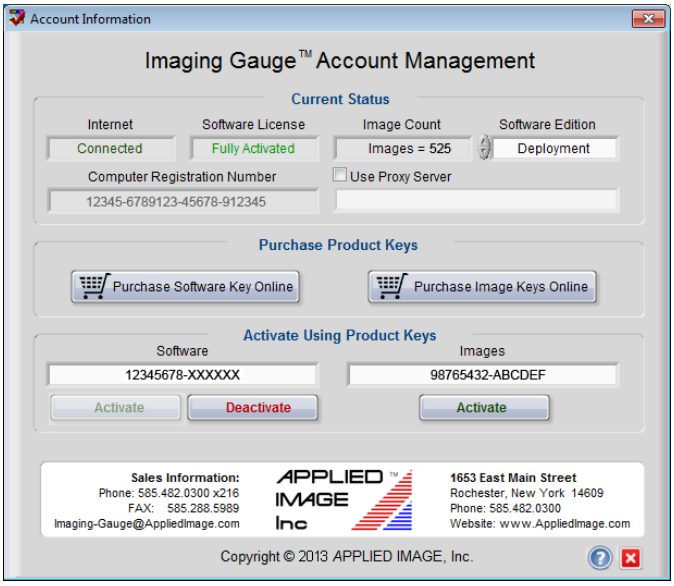


9. To deactivate the software license for use on another computer, select **Deactivate**. Note following changes:

- Software License changes from "Fully Activated" to "Not Activated"
- **Activate** button for software is enabled



10. Select **Activate** to re-activate to software and continue to operate.



End of Account Management Tutorial

Company Information for *A*PPLIED IM*A*GE, Inc.

*A*PPLIED IM*A*GE is a world leader in the field of Custom Opto-Imaged components and Standard Calibration tools. We achieved this distinction because of our wide range of unique capabilities, many years of experience, and our quality assurance & control processes.

At *A*PPLIED IM*A*GE, quality is assured at each stage of the production process from design & engineering through final production. This commitment to engineering excellence, combined with controlled environmental facilities, NIST traceable standards, and a highly qualified staff assures you that our products will meet or exceed your original specifications. And we've gone the extra step, using ISO Certification guidelines and National Laboratory Calibration Standards, to assure that our systems are in compliance with your unique needs.

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