



Agilent QC Chart Tool 3.5

User Guide

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Agilent Technologies

Notices

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Software Revision

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In This Guide...

This guide describes how use the Agilent QC Chart Tool software to query, filter, and evaluate microarray extractions. It also describes how to visualize current and historical batch microarray extraction processes.

1 Getting Started

This chapter gives an overview of how to use the software to evaluate microarray extraction quality. It gives instructions for how to do common tasks.

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

This chapter describes how Queries are applied to extractions, how Metric Sets are built and used to filter and evaluate extractions, and how to visualize batch processes using Charts.

3 QC Chart Tool Reference

This chapter describes the parts of the Agilent QC Chart Tool main window that you use to query and evaluate microarray extractions. It also describes any dialog boxes that appear during quality evaluation of the extractions.

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1 Getting Started

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This chapter provides an overview of how to use Agilent QC Chart Tool to query, evaluate, and chart microarray extraction data. For a list of how-to instructions for the tasks available in the QC Chart Tool software, see [Chapter 2](#), “Building Queries, Metric Sets, and Charts to Evaluate Extractions”. For a description of each part of this software, including all of the dialog boxes that can appear when you click buttons and other elements, see [Chapter 3](#), “QC Chart Tool Reference”.

For more information, see the Agilent Technologies application note, “Enhanced Quality Assessment Using Agilent Feature Extraction QC Metric Sets, Thresholds, and Charting Tools” by G. Delenstarr and C. Troup. To download this application note from the Agilent Technologies literature library, go to <http://chem.agilent.com> and then click **Literature Library**.



What Is the QC Chart Tool Software?

Agilent QC Chart Tool 3.5 is installed when you install the Agilent CytoGenomics version 2.7 software. It analyzes summary statistics from Feature Extraction output files in order to monitor microarray processing performance.

The data is kept in the shared Feature Extraction database, that you can query. Queries enable you to search this data. You can save the queries to allow the display of specific subsets of the data. For instance, queries can select the data found in specific designs, batches, or dates of processing. Using the data, you can create metrics that monitor aspects of the microarray processing workflow.

Additionally, you can create metric sets that combine metrics, and you can set thresholds for metrics within a metric set. Agilent includes default metric sets for each microarray type in the database. These metric sets were optimized for the workflow using the Agilent microarray scanner, Feature Extraction default protocols, and Agilent laboratory protocols. You can change and save a default metric set using a new name, to create one or more custom metric sets; for example, to optimize the thresholds for your custom protocols.

With QC Chart Tool, you can select a query to define which extractions to view and select a metric set to define which metrics to view. You then graphically plot the results from current or historical microarray data, and create thresholds for the metrics that are appropriate for your experimental conditions and processing environment.

The QC Chart Tool software is designed for use in a production environment where:

- Microarray processing protocols are standardized and you want to examine the effect of variables on performance related to:
 - Operators
 - Wet-lab protocols
 - FE parameter protocols
- Monitoring run-to-run consistency is an important goal to:
 - Identify extractions that fall outside the established normal range
 - Identify systematic data trends

For the most recent information and to download QC metric sets, go to the website: <http://www.genomics.agilent.com/article.jsp?pageId=2040>.

Example use cases

Agilent Feature Extraction (FE) for CytoGenomics generates output to assist in quality assessment. A table of array-wide, or global statistics (the “Stats” table in FE), is useful in data quality determination for each extraction. These global statistics capture information from every independent FE step; for example, the numbers of outliers, the averages of negative control signal statistics, and spike-in regression values.

The number of output fields are sometimes cumbersome without a tool for quality assessment of each extraction. QC Chart Tool captures key global statistics to use as metrics and create graphs for easy visual assessment of metrics. Additionally, you can use the metrics that are used for analysis for specific monitoring requirements.

This section provides several common use cases for the software. Although these examples are from an earlier version of the software, the use cases and results are the same in the current software version.

Use Case 1 Analysis of Feature Extraction output

Feature Extraction analysis is a common way to use the QC Chart Tool software with everyday extraction monitoring. An example of this type of analysis was performed using a collection of microarrays from several experiments.

Some of these microarrays were previously annotated by the operator as having issues in the labeling, hybridization, and/or washing steps. These microarrays had poor correlation with their replicate microarray sets, and were chosen because they each had at least one metric flagged as having values outside of the normal range.

This analysis of Feature Extraction consisted of:

- 1 A comparison to all other extractions within the extraction set.
- 2 A comparison to thresholds associated with the default metric set. For information on creating metric sets, see “[Defining Metrics](#)” on page 23.

Example use cases

By default, the chart generated by QC Chart Tool shows extractions in the order they were performed. Because QC Chart Tool has customized sorting, color-by, and shape-by attributes, it is a powerful tool for visualizing and highlighting trends in patterns.

Figure 1 confirms the presence of processing artifacts and replicate microarray outliers. The chart shows that several microarrays have more than one metric out of normal range (represented by red circles). Values in range are also displayed (blue triangles). The inset window zooms in on the “rNegCtrlAveGBSubSig” metric, which is the average of the red-channel negative-control background-subtracted signals. For more information about Feature Extraction statistics used for metrics, see the *Feature Extraction for CytoGenomics User Guide*.

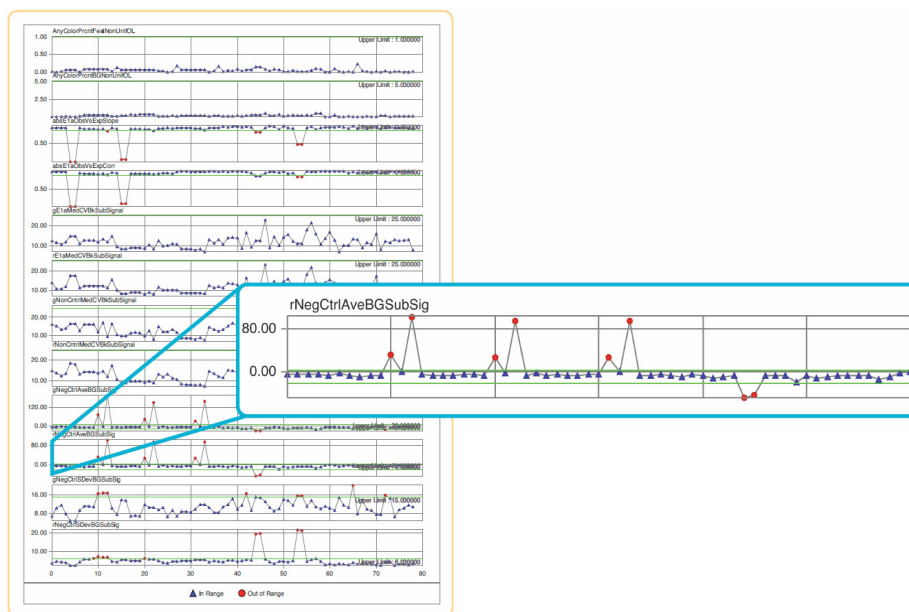


Figure 1 Assessment of extraction statistics used for metrics with QC Chart Tool

Use Case 2 Analysis of the user effect on extraction quality

Often the effects of specific variables on extraction quality are needed in a production setting. One such variable is the effect of the user. A retrospective analysis of different users was generated using the following steps in QC Chart Tool:

- 1 A query was created to select only those extractions of interest and applied to a chart as the X-axis. For information on creating queries, see [“Building and Running Queries”](#) on page 18.
- 2 A two-color gene expression metric set was chosen and applied to the chart as the Y-axis. For information on creating metric sets, see [“Defining Metric Sets and Thresholds”](#) on page 25.
- 3 The extractions were then color-coded to reflect the three different operators who had processed the arrays in those extractions.

[Figure 2](#) on page 12 shows data from microarrays processed by users A (represented by blue squares), B (red circles), and C (green triangles). Threshold limits appear in upper right-hand corners and as green lines within each plot. The inset window zooms in on the “rNegCtrlAveGBSubSig” metric, which is the average of the red-channel negative-control background-subtracted signals. For more information about Extraction statistics used for metrics, see the *Feature Extraction for CytoGenomics User Guide*.

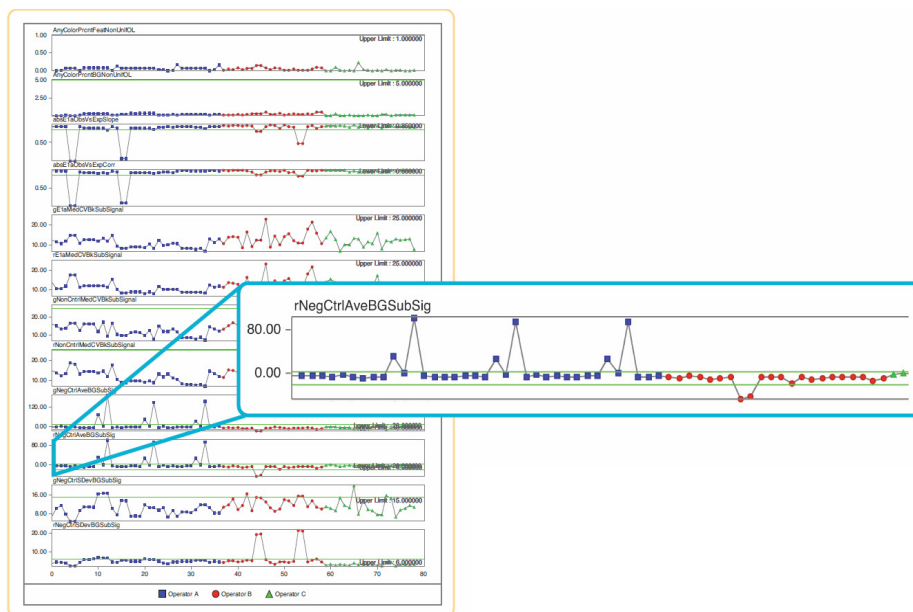


Figure 2 Comparison of the effect of variable users on microarray performance using QC Chart Tool

Use Case 3 Analysis of the effect of changing the FE parameter protocols

Analysis of Extraction statistics used for metrics with the QC Chart Tool software gives an intuitive evaluation of competing protocol methods, such as background processing algorithms. An 18-array set was extracted with either the default FE parameter protocol “Spatial Detrend” background method or an alternative “Minimum Signal” background method. It was then processed using the standard metric set in QC Chart Tool.

Figure 3 on page 13 shows extractions with either the default Spatial Detrend background (represented by blue squares), or the alternate Minimum Signal background data (red circles). For this data set, more favorable metric values were clearly seen with the Spatial Detrend method. This improvement is seen especially with the average negative control background-subtracted signal, which is closer to the expected value of zero. It is therefore a more accurate estimate of background.

Additionally, under subtraction of background, as seen with the Minimum Signal method, results in compression of log ratios. The inset window shows a plot of observed versus expected spike-in ratios (the “absE1aObsVsExpSlope” metric), where Spatial Detrend background yields a slope closer to 1.0. For more information about Feature Extraction statistics used for metrics, see the *Feature Extraction for CytoGenomics User Guide*.

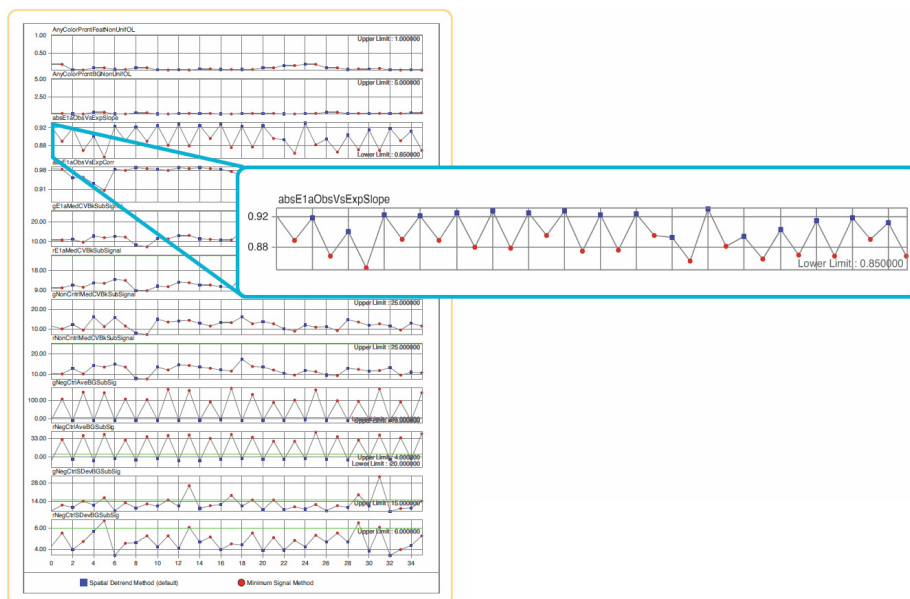


Figure 3 Comparison of the effect of FE parameter protocols on extraction quality

1 Getting Started

Example use cases



2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

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This chapter provides a list of how-to instructions for the tasks available in the QC Chart Tool software. Most functionality in the QC Chart Tool is accessible from either the command ribbon or from the object under consideration in the Navigator.

For a description of each part of this software, including all of the dialog boxes that can appear when you click buttons and other elements, see [Chapter 3](#), “QC Chart Tool Reference”.



Importing Data

This chapter describes how to import data into QC Chart Tool. When you run an analysis workflow in CytoGenomics 2.7, the quality information (the Stats and Parameter tables) from the Feature Extraction output for that sample is automatically imported into QC Chart Tool 3.5. You can also import quality information from an extraction manually using the Import function.

To import FE statistics and parameter information

- 1 On the command ribbon, click **Import** and then click **FE Stats and Parameters**. The Import FE Files dialog box appears.
- 2 Navigate to the Feature Extraction output files.
- 3 Click **Open**.
The Agilent Feature Extraction Importer dialog box appears with the list of selected microarrays.
- 4 For microarrays that are dye flipped, under Dye Flip, click the arrow and select **Flipped**. Otherwise, leave the selection **Normal**.
- 5 Click **OK**.
The FE quality information is added to the available extractions that you can query and evaluate.

NOTE

If you import an extraction whose ArrayID (barcode) and ExtractionName are the same as an extraction in the database, the program prompts you to rename the duplicate extraction, or ignore it and import the remaining extractions.

If you import an extraction that has the same Array ID (barcode) as another extraction in the database, you are notified there are duplicate extractions for that barcode. The extraction is imported as a new row. This can occur if you perform a second feature extraction on the same image file, or if you washed and reused a microarray.

See Also Refer to “Chapter 3” of the *Feature Extraction Reference Guide* for a description of the statistics and parameters that are imported.

To import a query result

- 1 On the command ribbon, click **Import** and then click **Query Result**. The Import Query Result dialog box appears.
- 2 Navigate to a previously exported query result file and click **Open**.
The program imports the extractions from the query result file. Each extraction in the file appears as a row in the extraction table.

NOTE

If there is an extraction in the table that matches an extraction in the query result file, the extraction row in the extraction table is updated. The existing attribute values in the extraction table for that row are overwritten with the values from the file. The values of any attributes that are not present in the query result file will not be updated in the extraction table.

Building and Running Queries

QC Chart Tool has a Query builder where you can create a query for a subset of the extractions from the Agilent QC Chart Tool database, based on criteria that you select.

A query is used to define a subset of extractions for a representative data set, for use in metric and threshold development, and in producing Charts. One example is a query that contains data from similar biological samples processed under identical conditions. Another example is to query for different types of samples or for different processing methods. With the latter example, you then use the different processing attributes to color-code a chart. See “[Chart Configuration dialog box](#)” on page 54 for information about using processing attributes. See “[Example use cases](#)” on page 9 for examples of color-coding a chart based on the processing attributes.

A subset of extractions is defined in a query by specific FEParameter fields, or by user-added attribute fields.

To create a query

- 1 To start the query builder, on the command ribbon, click **Queries** and then click **New**.
- 2 In the Column Name drop-down list, select the parameter to set.
- 3 In the Operator drop-down list, select the appropriate operator.
- 4 In the text box on the right, select the value with which to compare the value of the Column Name parameter.
- 5 Click **Add**.
- 6 In the Query Name area, type a name for the query.
- 7 Click **Save**.

You can now use the query to develop thresholds for metrics or to define a Quality chart. You can run the query, and export and save the results. You can also rename and delete queries.

See Also

- [“To edit a query”](#) on page 20
- [“To run a query”](#) on page 21
- [“To delete a query”](#) on page 21
- [“To rename a query”](#) on page 21
- [“To import a query result”](#) on page 22
- [“To export a query result”](#) on page 22
- [“Query Builder dialog box”](#) on page 66

To create a composite query

- 1 Create a basic query as described in [“To create a query”](#) on page 18.
- 2 Click **AND** or **OR**.
Use AND to find extractions that meet all criteria. Use OR to find extractions that meet at least one criterion.
- 3 Create the next basic query.
- 4 To group composite queries, click a query, then click **“(”** or **“) ”**. Repeat for the query at the other end of the group.
- 5 In the **Query Name** area, enter a name for the query. See [Figure 4](#) on page 20.
- 6 Click **Save**.

These components and attributes are described in [“Query Builder dialog box”](#) on page 66.

[Figure 4](#) shows an example of a query that finds all 1-color gene expression extractions.

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

To edit a query

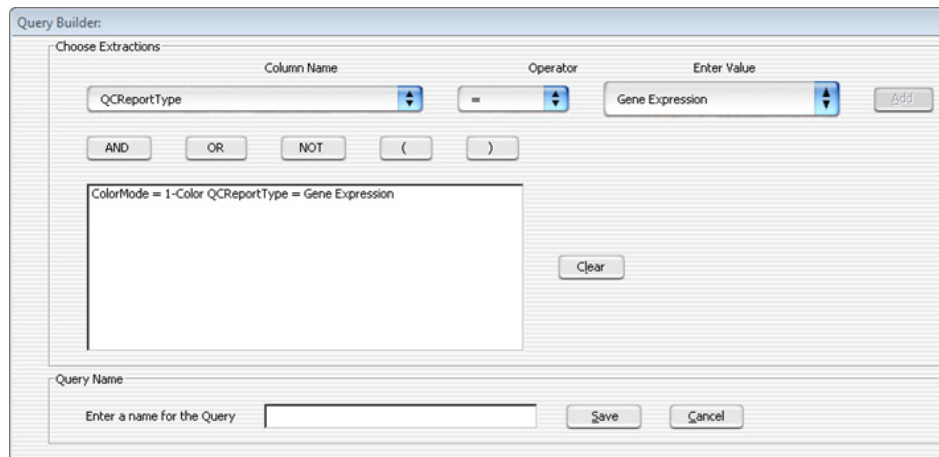


Figure 4 Query Builder showing a composite query.

To edit a query

- 1 In the Navigator, under **Queries** in the Extractions pane, select the query to edit.
- 2 On the command ribbon, click **Queries** and then click **Edit**.
Alternatively, right click on the query of interest and select **Edit Query**.
- 3 In the Query Builder dialog box, make any necessary changes. Click **Clear** to remove all query conditions.
- 4 Click **Save** to save the query with the existing name.
OR
Click **Save As** to type a new name for the query and save it.

To run a query

- 1 In the Navigator, under Queries in the Extractions pane, select the query to run.
- 2 On the command ribbon, click **Queries** and then click **Run**.
Alternatively, right click on the query of interest and select **Run Query**.

To delete a query

- 1 In the Navigator, under Queries in the Extractions pane, select the query to delete.
- 2 On the command ribbon, click **Queries** and then click **Delete**.
Alternatively, right click on the query of interest and select **Delete Query**.
- 3 In the Delete Query dialog box, click **Yes** to confirm the deletion.

NOTE

If a query is used in a chart, you cannot delete the query.

To rename a query

- 1 In the Navigator, under Queries in the Extractions pane, select the query to rename.
- 2 On the command ribbon, click **Queries** and then click **Rename**.
Alternatively, right click on the query of interest and select **Rename Query**.
- 3 In the Enter New Name dialog box, type the new name for the query.
- 4 Click **OK**.

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

To import a query result

To import a query result

- 1 On the command ribbon, click **Import** and then click **Query Result**. The Import Query Result dialog box appears.
- 2 Navigate to the previously exported query result file and click **Open**.

To export a query result

- 1 In the Navigator, in the Extractions pane, under Queries, select the query to export.
- 2 On the command ribbon, click **Queries** and then click **Export**. Alternatively, right click on the query of interest and select **Export Query**.
- 3 In the Export Query Result dialog box, type the path and name of the export query result file.
- 4 Click **OK**.

Defining Metrics

Metrics are defined in order for you to track desired statistical values within a set of extractions. These metrics are associated in a metric set.

To create a new metric

- 1 On the command ribbon, click **Metrics** and then click **New**.
The Create a new Metric dialog box opens.
- 2 Select a metric from the **Choose Metric Column** list and then click **Add**.
- 3 Define a new metric as an expression. Use the operator buttons and type numbers, if needed, in the Numerical Constant text field to create a formula.
- 4 In the **Metric Name** text box, type a name to save the new metric.
- 5 Click **Save**.
The new metric is saved to the database.

See Also These components and attributes are described in “[Create a new Metric dialog box](#)” on page 55.

Example

Feature Extraction calculates a slope for the eQC spike-ins (observed versus expected Log Ratio). Depending upon the hybridization, this spike-in mixture is present as “+1” or “-1” polarity. If it is “-1”, then any threshold that is set (for example, Slope > 0.85), does not pass. Therefore you can make a derivative metric by taking the absolute of the slope.

To create this metric:

- 1 Click **New** from the Metric area of the command ribbon to open the Create a new Metric dialog box.
- 2 Click **Abs**. The term **Abs(** appears in the Metric Calculation box.
- 3 From the Choose Metric Column list, select the statistic **eQCObvsVsExpLRSlope**, click **Add**, then select “)” to finish the expression.
- 4 Save the metric as Abs_eQCSlope.

To delete a metric

- 1 On the command ribbon, click **Metrics** and then click **Delete**.

The Delete Metrics dialog box appears. Metrics that can be removed from the database appear in the table. Default metrics cannot be removed from the database.

- 2 Select one or more metrics you want to delete.

- 3 Click **Delete**.

If the delete button is gray, the metric is associated with one or more metric sets. You must remove the metric from all metric sets with which it is associated before you can remove the metric globally.

Defining Metric Sets and Thresholds

Metric Sets are combinations of existing metrics applied with optional user-defined thresholds. You can save and export metric sets for future use.

To create a metric set

- 1 On the command ribbon, click **Metric Sets** and then click **New**.
- 2 When the Metric Set Configuration dialog box appears, select the **Add Metrics to Metric Set** tab.
- 3 Select the metrics from the Existing Metrics checklist that you want to associate with the selected metric set.
- 4 Set the appropriate thresholds for the Metric. See [“To set metric thresholds in metric sets”](#) on page 27.
- 5 Optional: assign an Extraction Query to the metric set.
This option is available in Standard, Robust, and Percentage Threshold Calculation modes. An Extraction Query filters the appropriate extractions from the database. Therefore, just the data from the queried extractions are used in the calculation of the statistical summary values used to set the thresholds.
- 6 In the Metric Set Name area, type the name for the Metric Set.
- 7 Click **Save**.

You can now display, export, and save the Metric Set. You can also delete and rename Metric Sets.

Tip You can also create a metric set by editing an existing metric set, then saving it with a new name as described in [“To edit a metric set”](#) on page 26.

See Also [“To view a metric set”](#) on page 26
[“To set metric thresholds in metric sets”](#) on page 27
[“To export metric sets”](#) on page 30
[“To import metric sets”](#) on page 31

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

To edit a metric set

[“To delete a metric set” on page 31](#)

[“To remove a metric from a metric set” on page 31](#)

[“To rename a metric set” on page 32](#)

[“Metric Set Configuration dialog box: Add Metrics to Metric Set tab” on page 60](#)

To edit a metric set

- 1 Select the Metric Set of interest in the Metric Sets pane of the Navigator.
- 2 Click **Metric Sets** on the command ribbon and click **Edit**.
- 3 When the Metric Set Configuration dialog box appears, select the **Add Metrics to Metric Set** tab.
- 4 Select or clear the metrics from the Existing Metrics checklist to add or remove from the selected metric set.
- 5 Set the appropriate thresholds for the Metric. See [“To set metric thresholds in metric sets” on page 27](#).
- 6 Optional: assign an Extraction Query to the metric set.
This option is available in Standard, Robust, and Percentage Threshold Calculation modes. An Extraction Query filters the appropriate extractions from the database. Therefore, just the data from the queried extractions are used in the calculation of the statistical summary values used to set the thresholds.
- 7 Change the name of the Metric Set if necessary in the Metric Set Name area. Typing a new name creates a new custom Metric Set.
- 8 Click **Save**.

To view a metric set

- 1 In the Navigator, in the Metric Sets panel, select the metric set to view.
- 2 On the command ribbon, click **Metric Sets** and then click **View**.
Alternatively, double-click the metric set in the Navigator.
- 3 The metric set is displayed in the window.

To set metric thresholds in metric sets

You can associate a threshold with a given metric at the same time that the metric is associated with a metric set, or after the association.

- 1 Open the Metric Set Configuration dialog box. See [“To create a metric set”](#) on page 25 or [“To edit a metric set”](#) on page 26.
- 2 Select the **Add Metrics to Metric Set** tab.
- 3 Select the metric from the Existing Metrics checklist.
- 4 In the Threshold Type area, select the type of threshold to associate with the metric:
 - Upper Limit
 - Upper Warning Limit
 - Lower Warning Limit
 - Lower Limit
- 5 In the Threshold Calculation area, select the limit calculation type:
 - Manual
 - Standard
 - Robust
 - Percentage

The relevant calculations and their limits are displayed.

- 6 Optional: assign an Extraction Query to the metric set.
This option is available in Standard, Robust, and Percentage Threshold Calculation modes. An Extraction Query filters the appropriate extractions from the database. Therefore, just the data from the queried extractions are used in the calculation of the statistical summary values used to set the thresholds.
- 7 Edit the limits as appropriate. The text boxes accept floating point constants.
- 8 If necessary, type or change the name for the metric set in the Metric Set Name area.
- 9 In the Edit Thresholds dialog box, click **Save Threshold** to save the threshold values for the selected metric.
- 10 In the Metric Set Name area at the bottom of the dialog box, click **Save**.
The chosen metric is saved in the metric set, along with its limits.

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

To set metric thresholds in metric sets

If the metric is already present, then it is updated with the new limits.

These components and parameters are described in “[Metric Set Configuration dialog box: Add Metrics to Metric Set tab](#)” on page 60.

Threshold example

To flag extractions with a high standard deviation of background subtracted signals:

- 1 Select the metric ‘gNegCtrlSDevBGSubSig’ from the Existing Metrics checklist to associate to the selected metric set.
- 2 In the Threshold Type area, select **Upper Limit**.
- 3 In the Threshold Calculation area, select **Standard** as the limit calculation type.
- 4 In the Calculations area, enter the value of 3 for the Upper Limit: Mean + SD* field (this number is the SD multiplier value).
- 5 Click **Save Threshold**.
- 6 In the Metric Set Name area, enter the name for the metric set.
- 7 Click **Save**.

The statistics of the gNegCtrlSDevBGSubSig values of all extractions are calculated. For this example, calculations include the mean and the standard deviation. An upper limit is then set as Mean + SD* 3, which is shown to be the value 5.6552 in [Figure 5](#):

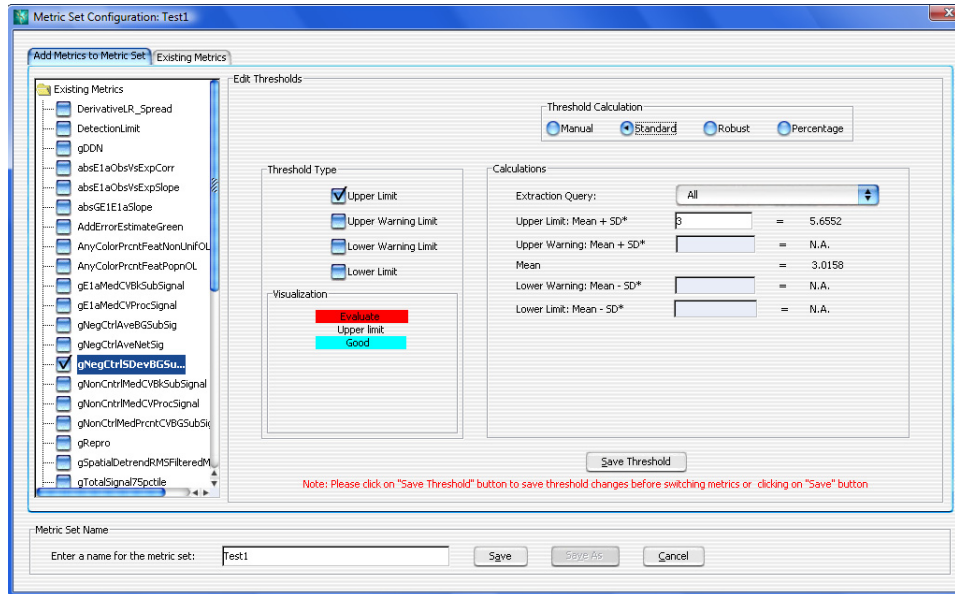


Figure 5 Metric Set Configuration dialog box with settings for the threshold example

If you select the **Robust** type of calculation, then the median and IQR (interquartile range) is calculated. Using the IQR, the robust equivalent of SD is also calculated.

If you select **Percentage** type of calculation, then the percentiles that you choose are calculated for an upper limit (for example, 99%), lower limit (for example, 1%), or range (for example, 99%, 1%).

To export metric sets

Custom metric sets that you create in QC Chart Tool 3.5 are automatically exported to CytoGenomics 2.7.

You can also manually export a metric set as an XML file and reimport it in QC Chart Tool.

- On the command ribbon, click **Metric Sets** and then click **Export**. The Export Metric Set dialog box appears. Browse to the location where you want to save the file, type a name for the file, and then click **Export**.

The following is an example of an XML Metric Set file:

```
<MetricSetFile>
  <MetricSet
    Name = "GE1_QCMT_Oct08"
    IsNotRemovable = "false"
    CreatedOn = "13-Mar-2009 15:47">
    <Metric
      Name = "DetectionLimit"
      StatisticType = "0"
      UpperLimitConst = "-10000.00000"
      UpperWarningLimitConst = "-10000.00000"
      LowerWarningLimitConst = "-10000.00000"
      LowerLimitConst = "-10000.00000"
      UpperLimitValue = "2.0"
      UpperWarningLimitValue = "-10000.00000"
      LowerWarningLimitValue = "-10000.00000"
      LowerLimitValue = "0.01"
      Owner = "dgd"
      CreatedOn = "13-Mar-2009 15:47"
      LastUpdated = "13-Mar-2009 15:47">
    </Metric>
  </MetricSet>
</MetricSetFile>
```

To import metric sets

You can import metric sets that were exported, or that were downloaded to your computer from the Agilent website at <http://www.agilent.com/chem/feqcmetrics>.

- 1 From the command ribbon, click **Metric Sets** and then select **Import**. The Import Metric Set dialog box appears.
- 2 Browse to a location, select the metric set file, and then click **Open**.
- 3 If a warning appears that asks if you want to overwrite Threshold settings for the matching metrics, click **Yes**.

You can also edit metric sets, for example, add or remove thresholds, or edit thresholds.

You can also copy (using “Save As”) or remove Metric Sets. Once you have copied a metric set, you can assign different metrics, and thresholds.

To delete a metric set

- 1 In the Metric Sets panel of the Navigator, select the metric set to remove.
- 2 On the command ribbon, select **Metric Sets** and then click **Delete**. Alternatively, right-click the metric set in the Navigator and select **Delete Metric set**.

NOTE

You cannot delete a metric set that is used in a chart, and you cannot delete any of the default metric sets.

To remove a metric from a metric set

- 1 Open the Metric Set Configuration dialog box. See “[To create a metric set](#)” on page 25.
- 2 Select the **Add Metrics to Metric Set** tab.
- 3 Clear the box next to the metrics in the Existing Metrics list you want removed from the selected metric set.

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

To rename a metric set

- 4 Click **Save**.

NOTE

You cannot change any of the default metric sets. To change a default metric set, save it using a new name.

To rename a metric set

- 1 In the Metric Sets pane of the Navigator, right-click a metric set and then select **Rename**.
- 2 In the Enter new name dialog box, type the new name for the metric set.
- 3 Click **Ok**.
OR
- 1 Open the Metric Set Configuration dialog box. See [“To create a metric set”](#) on page 25.
- 2 Select the **Add Metrics to Metric Set** tab.
- 3 In the Metric Set Name area, enter a new name for the metric set.
- 4 Click **Save**.

NOTE

You cannot rename a default metric set.

Producing and Displaying Charts

You can chart a metric set for a chosen query. The chart is defined in the Chart Configuration dialog box. See “[Chart Configuration dialog box](#)” on page 54 for more information.

To create a chart

- 1 On the command ribbon, click **Chart** and then select **New**. The Chart Configuration dialog box appears.
- 2 Select the metric set use for the chart from the Metric Set drop-down list.
- 3 Optional: Select the Extraction Query from the drop-down list to apply to the metric set.

If the metric set already includes an extraction query as part of the threshold operations, then this extraction query can further reduce the extractions displayed in the chart.
- 4 Optional: In the Sort by Columns area, select any ordering of the metrics to be displayed in the chart.
- 5 Optional: Select the **Color and shape by in/out of the threshold range** check box. This selection sets the color and shape of all points by whether the value is in or out of range.

Otherwise, *clear* the **Color and shape by in/out of the threshold range** check box and set the color and shape for the chart as follows:

- In the Color By area, select any color for one of the metrics to be displayed in the chart.
 - In the Shape By area, select any shape for one of the metrics to be displayed in the chart.
- 6 In the Chart Name area, enter a name for the chart.
 - 7 Click **Save**.

The chart can now be run. Charts can also be edited, renamed, and deleted.

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

To view the chart

See Also

- “To view the chart” on page 34
- “To edit a chart” on page 34
- “To delete a chart” on page 34
- “To rename a chart” on page 35
- “Chart Configuration dialog box” on page 54

To view the chart

- 1 In the Navigator, in the Charts panel, select the chart to view.
- 2 In the command ribbon, click **Chart** and then click **View**. Alternatively, double-click the chart in the Navigator.
- 3 The selected chart is displayed.
To return the view to another metric set, chart, or query result, click the appropriate entity in the Navigator.

See Also “Disassociate Metric” on page 48

To edit a chart

- 1 In the Navigator, in the Charts panel, select the chart to edit.
- 2 In the command ribbon, click **Chart** and then click **Edit**. Alternatively, right-click the chart in the Navigator and select **Edit Chart**. The Chart Configuration dialog box appears.
- 3 Configure the dialog box according to your needs. See “To create a chart” on page 33.
- 4 If necessary, change the name of the chart in the Chart Name area.
- 5 Click **Save**.

To delete a chart

- 1 In the Navigator, in the Charts panel, select the chart to delete.
- 2 In the command ribbon, click **Chart** and then click **Delete**. Alternatively, right-click the chart in the Navigator and select **Delete Chart**.
- 3 When the Delete Chart dialog box appears, click **Yes**.

To rename a chart

- 1 In the Navigator, in the Charts panel, select the chart to rename.
- 2 In the command ribbon, click **Chart** and then click **Rename**.
Alternatively, right-click the chart in the Navigator and select **Rename Chart**. The Enter New Name dialog box appears.
- 3 Enter the new name for the chart, then click **Ok**.

2 Building Queries, Metric Sets, and Charts to Evaluate Extractions

To rename a chart



3 QC Chart Tool Reference

The QC Chart Tool Window 38
Dialog Boxes 52

This chapter provides a description of each part of this software, including all of the dialog boxes that appear when you click buttons and other elements.



The QC Chart Tool Window

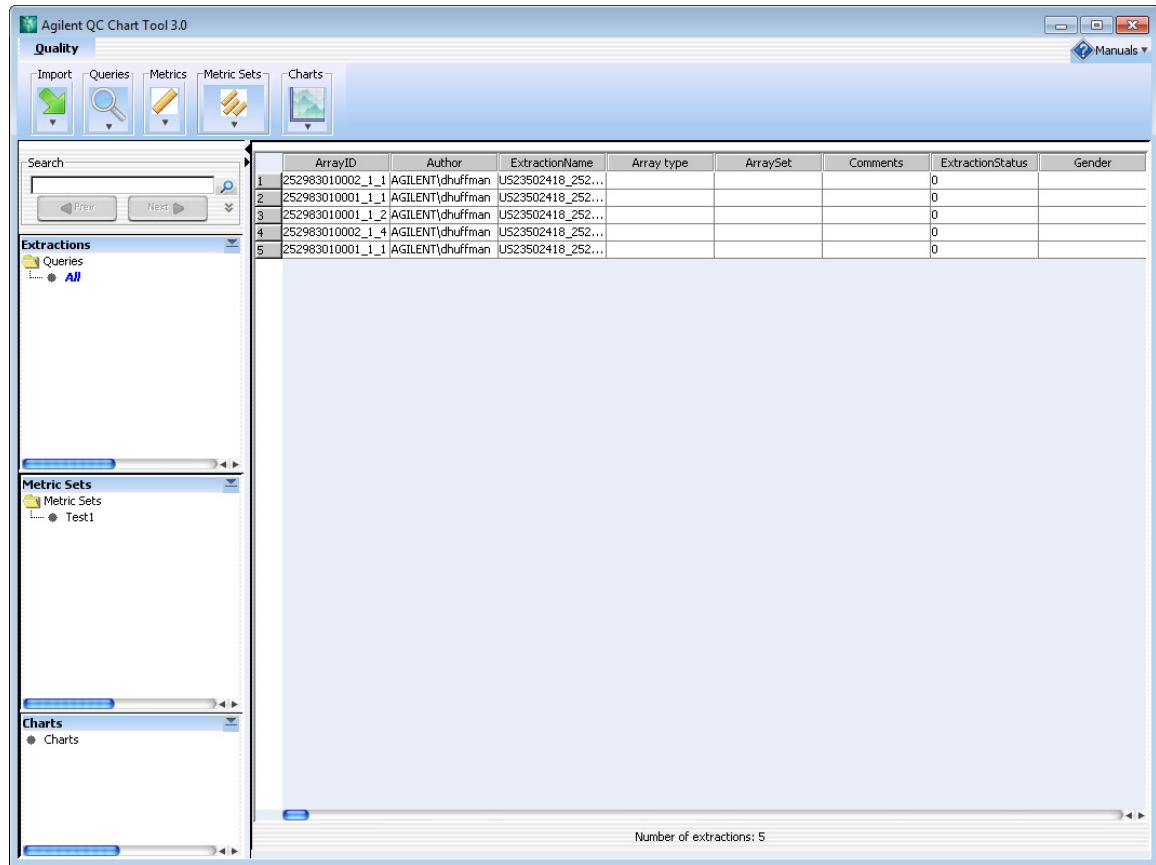


Figure 6 QC Chart Tool window

The QC Chart Tool software is divided into the following functional areas.

- “Command ribbon” on page 39
- “Navigator” on page 42
- “Data window” on page 47

Command ribbon

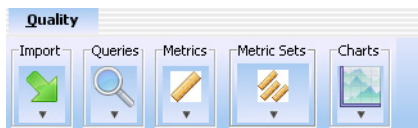


Figure 7 Command ribbon

The command ribbon has the following functions:

Import

The QC Chart Tool software uses microarray extractions imported into the Agilent QC Chart Tool database to create meaningful metrics and thresholds.

The following submenu options are available for Import:

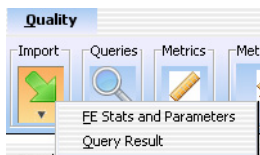


Figure 8 Import submenu

FE Stats and Parameters

Imports file output from Feature Extraction, specifically importing the Stats and Parameter table information. Refer to “Chapter 3” of the *Feature Extraction Reference Guide* for a description of the statistics and parameters that are imported.

Query Results

Imports results of a query previously exported using the QC Chart Tool software.

Queries

The Agilent QC Chart Tool database captures quality columns from microarray extractions. The software lets you query using any combination of those quality columns.

The following submenu options are available for Queries:

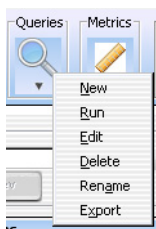


Figure 9 Queries submenu

- New** Launches the Query Builder dialog box to create a query.
- Run** Executes the selected query on the database and displays the extractions from that query in the window.
- Edit** Opens the Query Builder dialog box to allow the query to be changed.
- Delete** Permanently removes the selected query from Agilent QC Chart Tool software.
- Rename** Opens the Enter New Name dialog box to change the name of the selected query.
- Export** Opens the Export Query dialog box to save the results of a query to an external tab-delimited text file.

Metrics

Metrics are defined as any combination of existing metrics. They are created and deleted as necessary.

The following submenu options are available for Metrics:

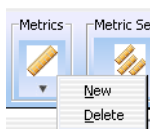


Figure 10 Metrics submenu

- New** Opens the Create a new Metric dialog box to allow definition of a new metric.
- Delete** Permanently removes the selected metric from Agilent QC Chart Tool.

Metric Sets

Metric Sets are a set of metrics with optional thresholds. You can create, delete, import, or export metric sets as necessary. You cannot delete the default Agilent metric sets

The following submenu options are available for Metric Sets:

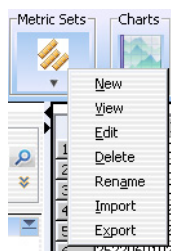


Figure 11 Metric Sets submenu

- New** Opens the Metric Set Configuration dialog box to allow the creation of a Metric Set.
- View** Displays the currently selected metric set in tabular form in.
- Edit** Opens the Metric Set Configuration dialog box to allow you to change the selected metric set.
- Delete** Permanently removes the selected metric set from Agilent QC Chart Tool.
- Rename** Opens the Enter New Name dialog box to change the name of the selected metric set.
- Import** Opens the Import Metric Set dialog box to import a previously exported metric set.
- Export** Opens the Export Metric Set dialog box to export the selected metric set to a tab-delimited text file.

Charts

Chart functions graphically present the software of the query and metric functions and allow further segmentation of the data by color and shape coding.

The following submenu options are available for Charts:

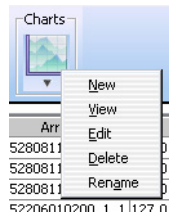


Figure 12 Charts submenu

- New** Opens the Chart Configuration dialog box to create a visualization of the extraction metrics, metric sets, and thresholds.
- View** Opens the selected chart.
- Edit** Opens the Chart Configuration dialog box so that you can change the chart.
- Delete** Permanently removes the selected chart from Agilent QC Chart Tool.
- Rename** Opens the Enter New Name dialog box to change the name of the selected chart.

Navigator

The Navigator consists of the **Search** pane, the **Extractions** pane, the **Metric Sets** pane, and the **Charts** panes. These panes are described in this section.

Search pane

The Search pane lets you find all occurrences of an entire name or specific search string in the Navigator. It also contains several buttons that you can use to move, hide, show, or resize the Navigator.

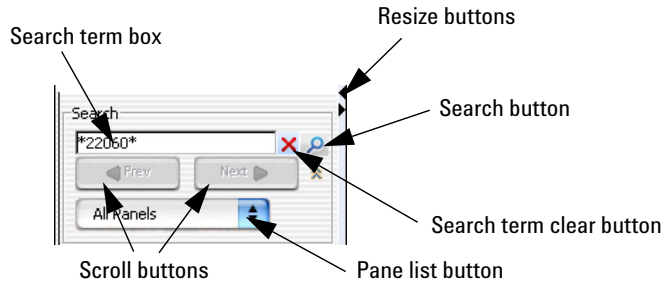


Figure 13 Navigator Search pane

Resize buttons Click to hide, show, or expand the Navigator.

Search term box The place where you type your desired search term. Search terms are not case-sensitive, but they must reflect the entire name of an array or other content item that you want to find. You can use asterisks (*) as wildcards to represent groups of unspecified characters. For example, a search term *25887* searches for any content that contains the string “25887”.

Pane list Lets you limit a search to a specific pane. Select the name of the desired pane from the list. To select all panes, select **All Panels**. By default, the software searches all panes.

Extractions Pane

This pane displays a list of query views of extractions in the database. The query named “All” is a permanent, unchangeable query and consists of no query parameters; it displays all extractions in the database.

Right-click to see the following options in the Extractions pane:

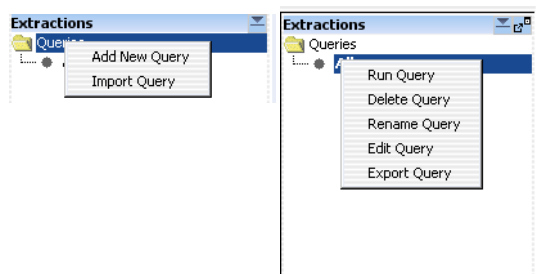


Figure 14 Extractions Navigator options

Command	Description
Add New Query	Opens the Query Builder dialog box, where you define and save a new Quality query. See “ Query Builder dialog box ” on page 66.
Import Query	Opens the Import Query Result dialog box, where you browse to and select a query file to import.
Run Query	Runs the selected query on the database and displays the extractions from that query in the data window.
Delete Query	Permanently removes the selected query.
Rename Query	Opens the Enter New Name dialog box to change the name of the selected query.
Edit Query	Opens the Query Builder dialog box, identical to clicking Query in the command ribbon and then selecting Edit.
Export Query	Opens the Export Query dialog box, identical to clicking Query in the command ribbon and then selecting Export.

Metric Sets Pane

This pane displays a list of metric sets that were created in or imported into the software.

Right-click to see the following options in the Metric Sets pane:

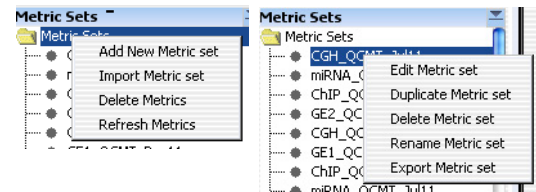


Figure 15 Metric Sets Navigator options

Command	Description
Add New Metric set	Opens the Metric Set Configuration dialog box, where you define and save a new metric set. See “Metric Set Configuration dialog box: Add Metrics to Metric Set tab” on page 60.
Import Metric set	Opens the Import Metric Set dialog box, where you browse to and select a metric set file to import.
Delete Metrics	Opens the Delete Metrics dialog box, where you select metrics you want to remove from the database. See “Delete Metrics” on page 58.
Edit Metric set	Opens the Metric Set Configuration dialog box, identical to when you click Metric Sets in the command ribbon and then select Edit . See “Metric Set Configuration dialog box: Add Metrics to Metric Set tab” on page 60.
Duplicate Metric set	Opens the Duplicate Metric Set dialog box, which lets you enter a name for the duplicate metric set.
Delete Metric set	Permanently removes the selected metric set from the software.
Refresh Metrics	Updates the list of displayed metrics.
Rename Metric set	Opens the Enter New Name dialog box to change the name of the selected metric set.
Export Metric set	Opens the Export Metric Set dialog box, identical to when you click Metric Sets in the command ribbon and then select Export .

Charts Pane

This pane displays a list of charts that were created in or imported into the software.

Right-click to see the following options in the Metric Sets pane:

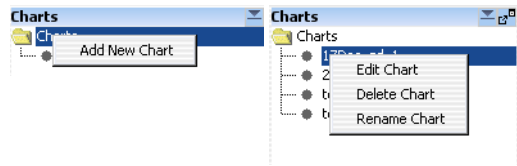


Figure 16 Metric Sets Navigator options

Command	Description
Add New Chart	Appears when you right-click Charts folder. Opens the Chart Configuration dialog box where you set up and name a new chart. See “Chart Configuration dialog box” on page 54.
Edit Chart	Opens the Chart Configuration dialog box, identical to clicking Charts in the command ribbon and then selecting Edit. See “Chart Configuration dialog box” on page 54.
Delete Chart	Permanently removes the selected chart.
Rename Chart	Opens the Enter new name dialog box to change the name of the selected chart.

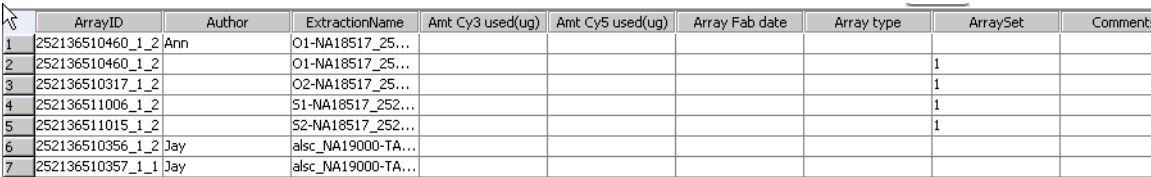
Data window

The data window displays the results of a selection from any pane in the Navigator (Query, Metric set, or Chart) in the Navigator. Examples of each pane are shown in this section.

Tip When you click a row heading in the table, the results are sorted by the values in that column.

Data window- Extractions Table

The extractions loaded into the Agilent QC Chart Tool database are displayed in the form of a grid-view. See [Figure 17](#):



	ArrayID	Author	ExtractionName	Amt Cy3 used(ug)	Amt Cy5 used(ug)	Array Fab date	Array type	ArraySet	Comment
1	252136510460_1_2	Ann	O1-NA18517_25...						
2	252136510460_1_2		O1-NA18517_25...					1	
3	252136510317_1_2		O2-NA18517_25...					1	
4	252136511006_1_2		S1-NA18517_252...					1	
5	252136511015_1_2		S2-NA18517_252...					1	
6	252136510356_1_2	Jay	alsc_NA19000-TA...						
7	252136510357_1_1	Jay	alsc_NA19000-TA...						

Figure 17 Data window - Extractions Table

To change the order of the columns in the table, drag the column headings to the desired positions.

Data window - Metric Sets

The Metric Sets created in or imported into the software are displayed in the form of a grid-view. See the following figure:

3 QC Chart Tool Reference

Data window

	Metric Name	Expression	Upper Limit	Upper Warning Limit	Lower Warning Limit	Lower Limit	Calculation Type	De
1	IsGoodGrid	IsGoodGrid	NA	NA	1.0	1.0	Manual	
2	AnyColorPrntFe...	AnyColorPrntFe...	5.0	1.0	NA	NA	Manual	
3	DerivativeLR_Spr...	DerivativeOfLogR...	0.3	0.2	NA	NA	Manual	
4	gRepro	gNonCtrlMedPrn...	0.2	0.05	NA	0.0	Manual	
5	g_BGNoise	gNegCtrl5DevBG...	15.0	5.0	NA	NA	Manual	
6	g_Signal2Noise	gNonCtrl50PrntB...	NA	NA	100.0	30.0	Manual	
7	g_SignalIntensity	gNonCtrl50PrntB...	NA	NA	150.0	50.0	Manual	
8	rRepro	rNonCtrlMedPrnt...	0.2	0.05	NA	0.0	Manual	
9	r_BGNoise	rNegCtrl5DevBGS...	15.0	5.0	NA	NA	Manual	
10	r_Signal2Noise	rNonCtrl50PrntB...	NA	NA	100.0	30.0	Manual	
11	r_SignalIntensity	rNonCtrl50PrntB...	NA	NA	150.0	50.0	Manual	
12	RestrictionControl	RestrictionControl	1.0	NA	NA	0.8	Manual	

Disassociate Metric

Figure 18 Data Window - Metric Sets

Disassociate Metric A button on the far right that lets you quickly remove a metric from a custom Metric Set.

Data window - Charts

This pane has both a table and graphical view of the data. In the graphical view, you can zoom in on a chart by using the mouse to drag and release on the area to zoom. Double-click the chart to return to normal view.

The charts view supports the operations shown in [Figure 19](#):

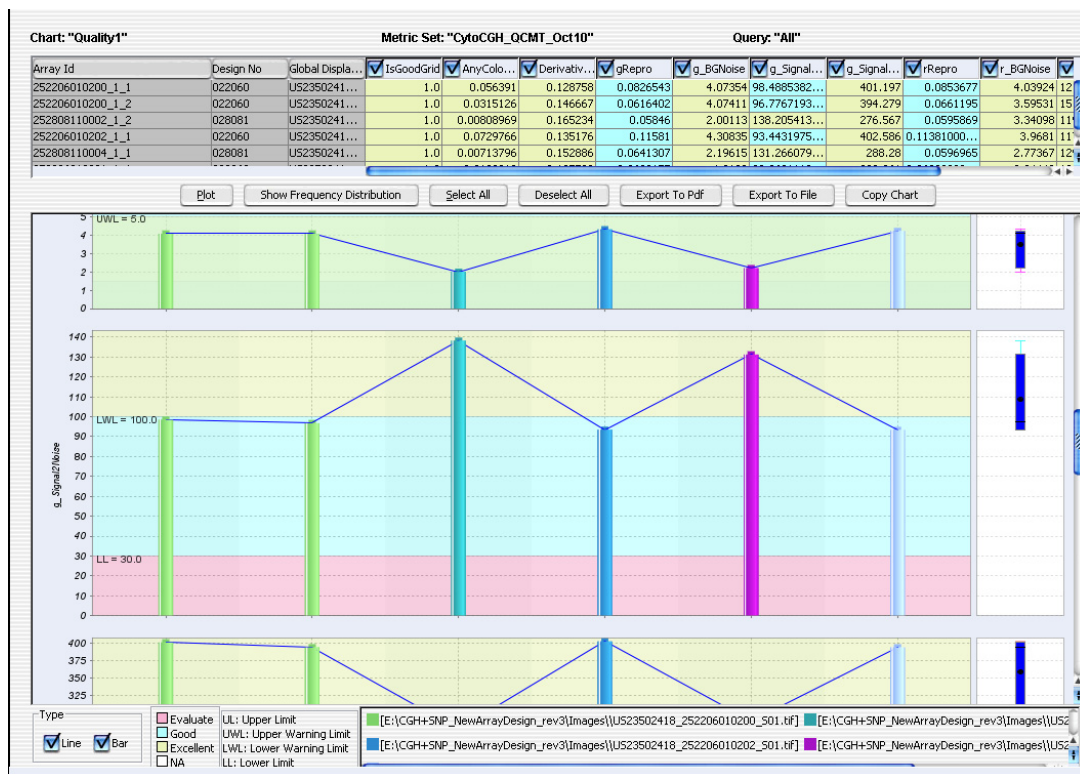


Figure 19 Data Window - Charts

Plot Draws the chart according to the data selected in the view.

Show Frequency Distribution Displays a binned vertical bar chart (a histogram) of each metric selected in the table view.

Select All/Deselect All Selects all or none of the available metrics to include in the chart.

Export to PDF Saves the chart in PDF format.

Export to File Exports the data from the chart to a tab-delimited text file.

Copy Chart Copies the chart to the Clipboard as a bitmap that you can paste in MS Word and MS Paint, or in any other appropriate software.

The plots in this dialog box represent the selected columns in the QC Metrics Table. Each plot shows the value of a given metric for all arrays.

These plots have several additional features:

- The background colors in each plot correspond to quality guidelines developed by Agilent. These guidelines are based on normal ranges observed for analyses of well-established cell lines using standard Agilent protocols. See the descriptions of each of these metrics in the *Feature Extraction Reference Guide*.
- A “Box & Whisker” plot appears to the right of the main plot for each metric. See the following description of “Box & Whisker’ Plot”.
- You can right-click any bar to open a shortcut menu for the corresponding array.

“Box & Whisker” Plots

A small plot appears to the right of each of the main plots. It represents the overall distribution of values for the metric. Two examples appear in [Figure 20](#). The symbols have the following meanings:

- The lower and upper edges of the box represent the 25th and 75th percentiles, respectively.
- The black horizontal line in the box is the median.
- The black dot is the mean.
- The “whiskers” represent the range of values that are not outliers. An outlier is a point that is out of the 25th to 75th percentile range by more than 150%.
- Open circles represent outliers, and an open triangle represents outliers that plot beyond the available space on the graph.

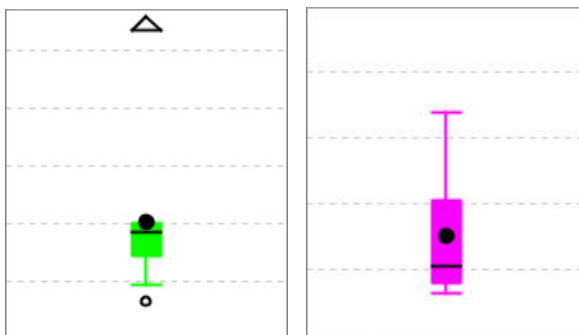


Figure 20 Two “Box & Whisker” plots

Dialog Boxes

The following dialog boxes appear when using QC Chart Tool. This section describes the components of the dialog boxes and the functions of each component. The dialog boxes are shown in alphabetical order by title.

Agilent Feature Extraction Importer

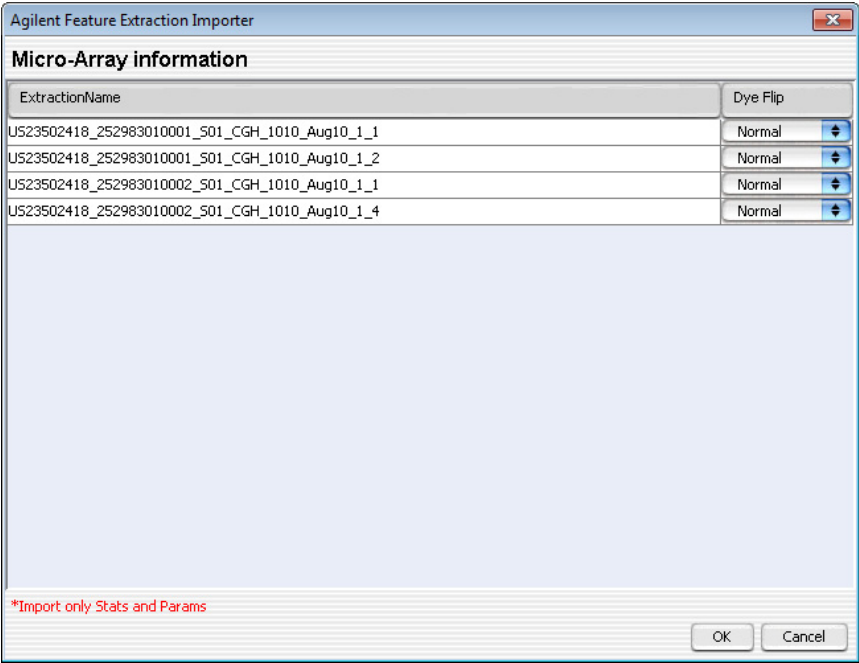


Figure 21 Agilent Feature Extraction Importer dialog box

Purpose: Lets you edit the name of the FE data file you intend to import. Also, lets you select to flip the red/green ratio for the data.

To open: In the command ribbon, click **Import**, and then click **FE Stats and Parameters**. In the Import FE Files dialog box, select the desired FE data files, then click **Open**.

Extraction Name	Shows the name of each microarray to import. You can change the names of the files to names that you are more likely to recognize or remember.
Dye Flip	<p>For each array:</p> <p>Select Normal if:</p> <ul style="list-style-type: none">• The test samples were labeled with cyanine-5 (red).• The control samples were labeled with cyanine-3 (green).• The imported ratio (test/control) must be reported directly. <p>Select Flipped if:</p> <ul style="list-style-type: none">• The test samples were labeled with cyanine-3 (green).• The control samples were labeled with cyanine-5 (red).• The imported ratio (control/test) must be reported with the ratio inverted (test/control). <p>The software does not combine dye-flip pairs.</p>
OK	Imports the files in the foreground. You cannot use your computer for other purposes while the import occurs.
Cancel	Cancels the entire import process without importing anything.

Chart Configuration dialog box

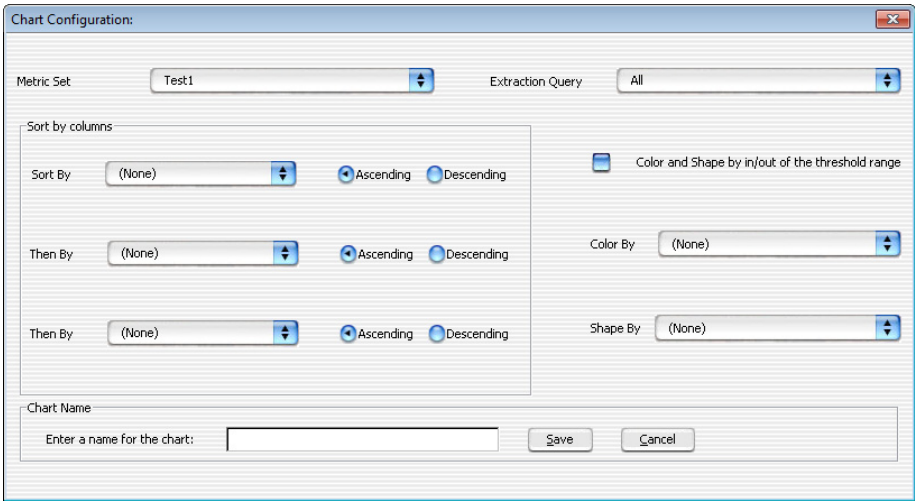


Figure 22 Chart Configuration dialog box

Purpose: To configure the appearance of a Quality chart.

To open: On the Quality ribbon, click **Chart** and then select **New**.

The Chart Configuration dialog box has the following components and functionality:

- | | |
|---|---|
| Metric Set | Select the metric set to use with the chart. |
| Extraction Query | Select the extraction query to evaluate for a chart. |
| Sort by Columns | Select how you want to order the extractions in the chart. You can select three conditions, and select whether to sort them in Ascending or Descending order. |
| Color and shape by in/out of the threshold range | When this check box is selected, the color and shape of all points are set by whether the value is in or out of range. The Color By and Shape By settings are ignored. |
| Color By | Indicates whether to color-code extraction data points depending on whether they fall inside or outside the threshold level. Points that are outside the limits are color-coded in red and the ones within the limits |

are color-coded in blue. All the points are connected by a *light-gray* line. If this check box is selected, the ShapeBy and ColorBy columns are disabled.

Shape By Indicates what groups are used to differentiate the data points by shape. For example, selecting Username causes all the extractions that are from a particular user to have the same shape.

Chart Name Lets you enter a name to be associated with the chart.

Save Saves the chart using the name you entered.

Cancel Closes the Chart Configuration dialog box without saving any changes.

Create a new Metric dialog box

The dialog box is titled "Create a new Metric". It contains the following elements:

- Choose Metric Column:** A dropdown menu currently showing "AbsAvgLogRatio" and an "Add" button.
- Operators:** A row of buttons for mathematical operations: "+", "-", "*", "/", "(", ")", ",", "Min", "Max", and "Abs".
- Numerical Constant:** A text input field for entering a constant value, with an "Add Constant" button.
- Metric Calculations:** A large text area for building the metric expression, with a "Clear" button to its right.
- Save Metric:** A section at the bottom with a "Metric Name:" label and a text input field, followed by a "Save" button.

Figure 23 Create a new Metric dialog box

Purpose: Lets you create a metric in the command ribbon to track selected statistical values for a set of extractions.

To open: On the command ribbon, click Metrics, and then select New.

The Create a new Metric dialog box has the following components and functionality:

Choose Metric Column	A list of metrics that are used to create a calculation as a new metric.
Add	Selects the chosen metric and adds it to the Metric Calculations text area for review.
Operations	<p>The following mathematical operators are available for any metric or collection of metrics that are selected using the Choose Metric Column.</p> <ul style="list-style-type: none">• Precedence of operations is left to right, except when interrupted by parentheses.• Operations proceed left to right inside any set of parentheses, and inside out in terms of stacked parentheses. <p>+ Adds any two metrics or collection of metrics grouped by matched parentheses.</p> <p>- Subtracts any two metrics or collection of metrics grouped by matched parentheses.</p> <p>* Multiplies any two metrics or collection of metrics grouped by matched parentheses.</p> <p>/ Divides any two metrics or collection of metrics grouped by matched parentheses.</p> <p>() Let you subset and prioritize the mathematical operations.</p> <p>, Lets you list any two metrics or collection of metrics grouped by parenthetical operators for the evaluative operations listed.</p> <p>Min Returns the smallest value from a list of metrics (or collection of metrics grouped by matching parenthesis). The list elements are separated by the ‘,’ operator.</p> <p>Max Returns the largest value from a list of metrics (or collection of metrics grouped by matching parenthesis). The list elements are separated by the ‘,’ operator.</p>

Abs	Returns the absolute value of a metric or a collection of metrics grouped by matching parenthesis.
Numerical Constant	Lets you enter a value to add to the metric calculation formula.
Add Constant button	Accepts the value entered in the Numerical Constant field and adds it to the metric calculation formula.

Metric Calculations

The area in which the metric calculation formula is displayed for review.

Clear	Removes all metrics, mathematical operators, and constants from the formula in the Metric Calculations area.
Save Metric	Lets you type a name to be associated with the metric.
Save	Saves the metric using the name you entered.

Delete Metrics

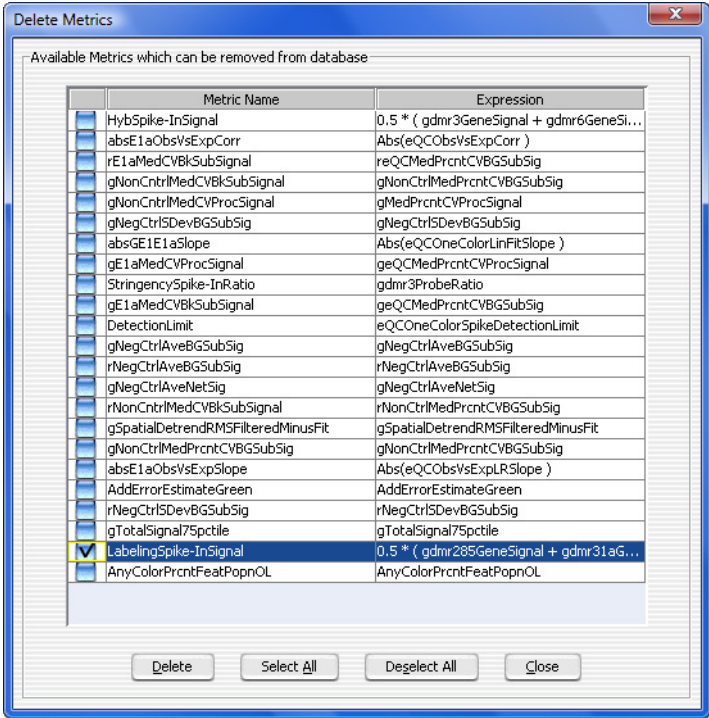


Figure 24 Delete Metrics dialog box

Purpose: Used to select unnecessary metrics from the database. When you delete a metric, it is permanently removed from the database.

To open: In the command ribbon, in the Metric Sets Navigator, right-click the Metric Sets folder and select **Delete Metrics**.

- Delete** Deletes the selected metrics from the database.
- Select All** Selects all metrics.
- Deselect All** Removes the selection from all metrics.
- Close** Closes the dialog box.

Frequency Distribution

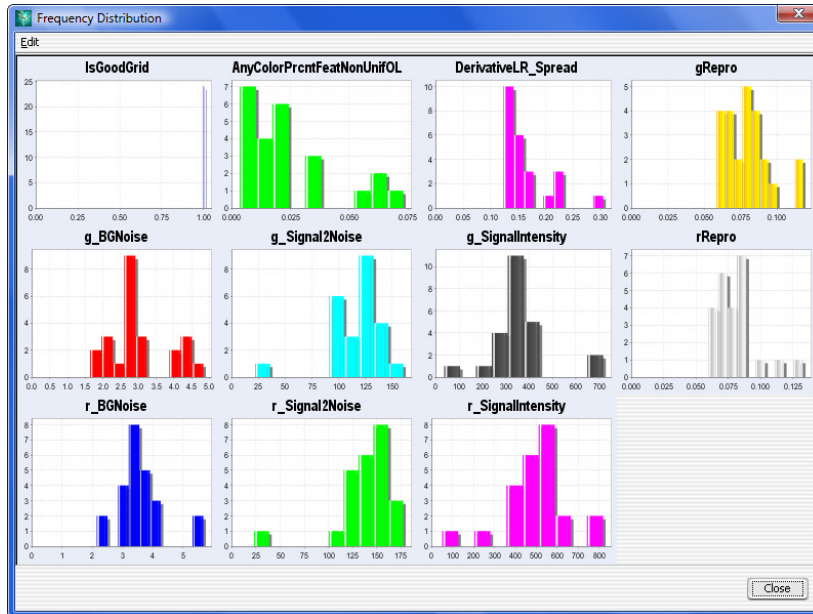


Figure 25 Frequency Distribution dialog box

Purpose: The plots in this dialog box represent the selected columns in a Quality chart. Each plot shows the number of arrays within each value range for a metric.

To open: Click **Show Frequency Distribution** in the quality charts window.

Edit Opens a menu with a Copy command that copies the plots in the dialog box to the Clipboard. You can then paste the image into a document.

Close Closes the dialog box.

Metric Set Configuration dialog box: Add Metrics to Metric Set tab

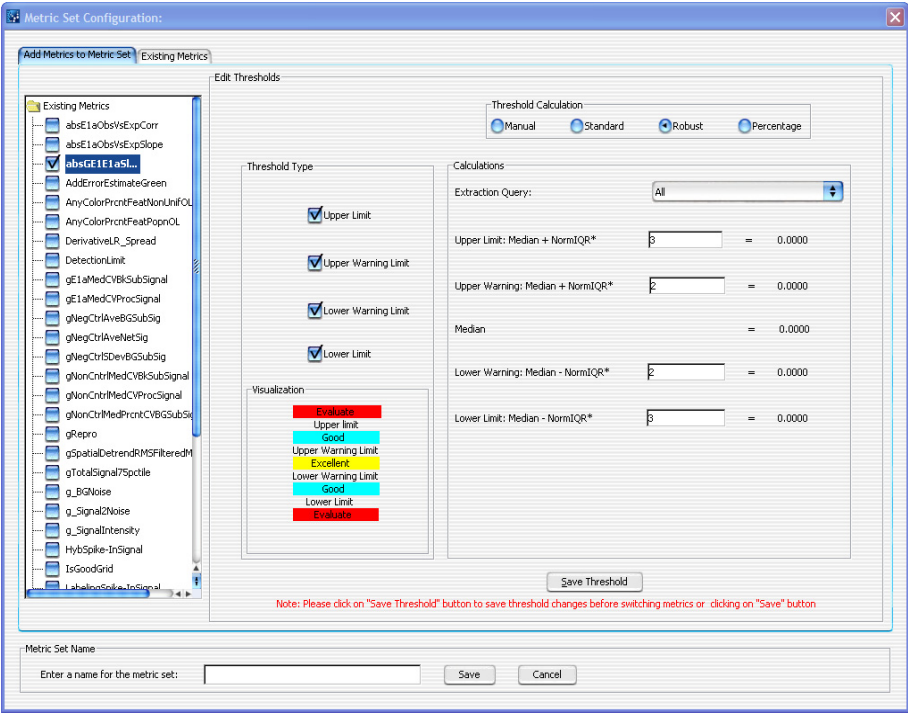


Figure 26 Metric Set Configuration dialog box - Add Metrics to Metric Set tab

Purpose: Used to define a metric set that consists of existing metrics and user-defined thresholds.

To open: On the command ribbon, click Metric Sets, and then click New.

The Add Metrics to Metric Set tab of the Metric Set Configuration dialog box has the following components and functionality:

Existing Metrics Displays a list of the metrics that you can use in the metric set.

Threshold Type

The following fields are threshold types, which are used to select which thresholds to apply and display.

Upper Limit	Sets a limit where extraction values that are greater than the limit calculation are displayed in the color red and flagged as “Evaluate”. Extractions with metric values lower than this limit are displayed in the color blue and flagged as “Good”, unless there are additional limits selected that further separate the extractions.
Upper Warning Limit	Sets a limit where extraction values that are greater than the limit calculation are displayed in the color blue and flagged as “Good”. Extractions with metric values lower than this limit are displayed in the color yellow and flagged as “Excellent”, unless there are additional limits selected that further separate the extractions.
Lower Warning Limit	Sets a limit where extraction values for the appropriate metric that are less than the limit calculation are displayed in the color blue and flagged as “Good”. Extractions with metric values higher than this limit are displayed in the color yellow and flagged as “Excellent”, unless there are additional limits selected that further separate the extractions.
LowerLimit	Sets a limit where extraction values for the appropriate metric that are less than the limit calculation are displayed in the color red and flagged as “Evaluate”. Extractions with metric values higher than this limit are displayed in the color blue and flagged as “Good”, unless there are additional limits selected that further separate the extractions.

Threshold Calculation

Manual	Applies a constant value for Upper Limit, Upper Warning Limit, Lower Warning Limit, and LowerLimit.
Standard	Takes a constant value as the number of standard deviations of the data beyond the mean to calculate the limit. For detailed information, see “Standard Threshold Calculations” on page 62.
Robust	Takes a constant value as the number of inter-quartile ranges (IQR) of the data beyond the mean to calculate the limit. For detailed information, see “Robust Threshold Calculations” on page 62.
Percentage	Takes a percentage range of the data to calculate the limit. For detailed information, see “Percentage Threshold Calculations” on page 63.

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Metric Set Configuration dialog box: Add Metrics to Metric Set tab

Extraction Query Optional: Lets you assign an Extraction Query to the metric set for Standard, Robust, and Percentage Threshold Calculation modes. This query filters the appropriate extractions from the database, so that just the data from the queried extractions are used in the calculation of the statistical summary values used to set the thresholds.

Standard Threshold Calculations

Take a constant value as the number of standard deviations of the data beyond the mean to calculate the limits.

- Upper Limit** Lets you define a multiplier for the number of standard deviations to add to the mean to create the Upper Limit. For example, to apply an upper limit of two standard deviations, enter the number 2 in the text field. The Upper Limit is defined as the mean + constant*SD.
- Upper Warning Limit** Lets you define a multiplier for the number of standard deviations to add to the mean to create the Upper Warning Limit. The Upper Warning Limit is defined as the mean + constant*SD.
- Lower Warning Limit** Lets you define a multiplier for the number of standard deviations to subtract from the mean to create the Lower Warning Limit. The Lower Warning Limit is defined as the mean - constant*SD.
- LowerLimit** Lets you define a multiplier for the number of standard deviations to subtract from the mean to create the Lower Limit. The Lower Limit is defined as the mean - constant*SD.

Robust Threshold Calculations

Take a constant value as the number of inter-quartile ranges (IQR) of the data beyond the mean to calculate the limits.

- Upper Limit** Lets you define a multiplier for the number of IQRs to add to the mean to create the Upper Limit. For example, to apply an upper limit of 2 IQR, enter the number 2 in the text field. The Upper Limit is defined as the Median + constant*IQR.
- Upper Warning Limit** Lets you define a multiplier for the number of IQRs to add to the mean to create the Upper Warning Limit. The Upper Warning Limit is defined as the Median + constant*IQR.

Metric Set Configuration dialog box: Add Metrics to Metric Set tab

- Lower Warning Limit** Lets you define a multiplier for the number of IQRs to subtract from the mean to create the Lower Warning Limit. The Lower Warning Limit is defined as the Median - constant*IQR.
- LowerLimit** Lets you define a multiplier for the number of IQRs to subtract from the mean to create the Lower Limit. The Lower Limit is defined as the Median - constant*IQR.

Percentage Threshold Calculations

Take a percentage range of the data to calculate the limits.

- Upper Limit** Lets you define percentage from the uppermost values of the data to calculate the Upper Limit. For example, to set an Upper Limit that is equal to the best 1% of the extractions for a particular metric, set the Upper Limit text box to 99%.
- Upper Warning Limit** Lets you define a multiplier for the percentage from the uppermost values of the data to calculate the Upper Warning Limit. For example, to set an Upper Warning Limit that is equal to the best 25% of the extractions for a particular metric, set the Upper Warning Limit text box to 75%.
- Lower Warning Limit** Lets you define percentage from the bottommost values of the data to calculate the Lower Warning Limit. For example, to set a Lower Warning Limit that is equal to the lower 25% of the extractions for a particular metric, set the Lower Warning Limit text box to 25%.
- Lower Limit** Lets you define percentage from the bottommost values of the data to calculate the Lower Limit. For example, to set a Lower Limit that is equal to the lower 1% of the extractions for a particular metric, set the Lower Limit text box to 1%.
- Save Threshold** Saves the threshold settings for the selected metrics. These metrics with their associated thresholds become available in the “[Metric Set Configuration dialog box: Selected/Existing Metrics tab](#)” on page 64.
- Metric Set Name** Lets you enter a name for the new metric set.
- Save** Saves the metric set.
- Cancel** Closes the Metric Set Configuration dialog box without saving any changes.

Metric Set Configuration dialog box: Selected/Existing Metrics tab

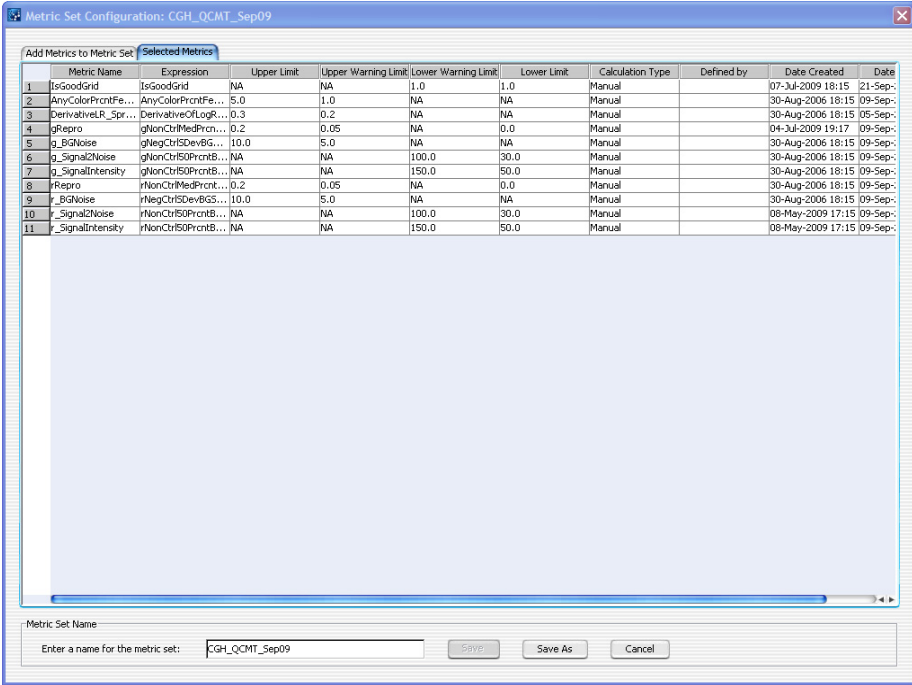


Figure 27 Metric Set Configuration dialog box - Selected/Existing Metrics tab.

Purpose: Used to display existing/selected metrics in a metric set.

To open: In the Metric Set Configuration dialog box, click the **Existing Metrics** or **Selected Metrics** tab.

The Selected/Existing Metrics tab of the Metric Set Configuration dialog box has the following components and functionality:

Table

The Metric Sets created in or imported into the software are displayed in the form of a table, or grid-view.

The column headers appear in this order:

- Metric Name

Metric Set Configuration dialog box: Selected/Existing Metrics tab

- Expression
- Upper Limit
- Upper Warning Limit
- Lower Warning Limit
- Lower Limit
- Calculation Type
- Defined By
- Date Created
- Date Modified

Metric Set Name	Lets you enter a name to save the metric set.
Save	Saves the existing metric set with the previously defined name.
Save As	Saves the metric set with a newly defined name.
Cancel	Closes the Metric Set Configuration dialog box without saving any changes.

Query Builder dialog box

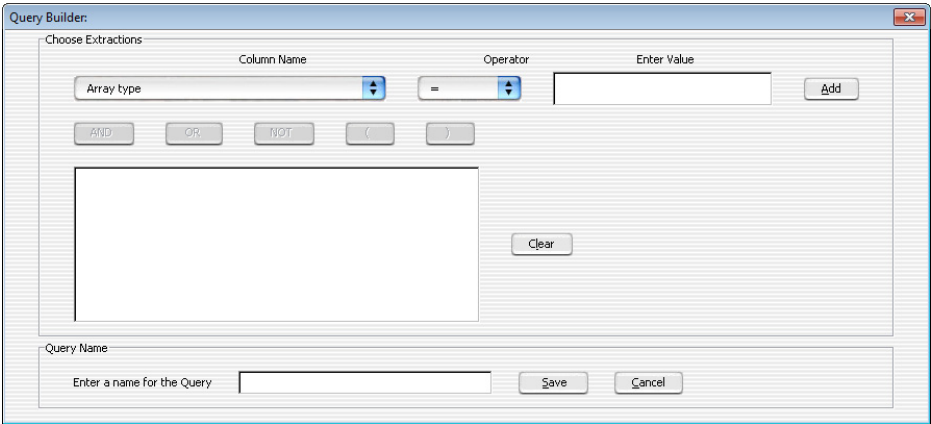


Figure 28 The Query Builder dialog box

Purpose: Used to define a subset of extractions for a representative data set, for use in metric and threshold development, and in producing Charts.

To open: In the command ribbon, click **Queries** and then click **New**.

The Query Builder dialog box has the following components and functionality:

- Column Name** Displays a list of the metrics that you can use to create an expression with which to query the database.
- Operator** Displays a list of the relational operators that you can use with the selected metric.
- Enter Value** A text area where a value is typed that is compared to the metric for each extraction. If the chosen relation between the metric and value is valid, the query produces extractions that pass that condition (for which the relation between the metric and value is true).
- Operations** The following buttons are logical operations used to link two or more metric-value relations built using the functions listed previously. Each logical operation can link two metric-value relations at a time.

AND Produces a complex query which is true only if *both* metric-value relations are true.

OR Produces a complex query which is true if *either* metric-value relations are true.

NOT Produces a complex query which is true only if both metric-value relations are *not* true.

() Lets you create a subset for and prioritize the complex query.

Text area The area in which complex relations using the logical operations are listed for review.

Query Name A text area for entering a name under which to save the query.

Save Saves the query using the name specified in the Query Name field.

Cancel Cancels all query operations and closes the Query Builder dialog box.

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In This Book

This book contains
information to set up and
use the QC Chart Tool
software with Agilent
Feature Extraction 11.0.

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