

LabSolutions RF

Instruction Manual

Basic Operation Guide

Read this manual thoroughly before you use the product. Keep this manual for future reference. This page is intentionally left blank.

Introduction

Read this Instruction Manual thoroughly before using the product.

Thank you for purchasing this product.

This manual describes the operation and options for this product. Read this manual thoroughly before using the product and operate the product in accordance with the instructions in this manual.

Keep this manual for future reference.

IMPORTANT

- If the user or usage location changes, ensure that this Instruction Manual is always kept together with the product.
- If this manual is lost or damaged, immediately contact your Shimadzu representative to request a replacement.
- To ensure safe operation, contact your Shimadzu representative if product installation, adjustment, re-installation (after the product is moved), or repair is required.

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Indications Used in This Manual

The following symbols are used in this manual:

Indication	Meaning
	Emphasizes additional information that is provided to ensure the proper use of this product.
Hint	Indicates information provided to improve product performance.
Reference	Indicates the location of related reference information.

Mouse and On-Screen Operations

Indication	Meaning
Click	Indicates placing the mouse pointer over a target and pressing the left button on the mouse once.
Right-click	Indicates placing the mouse pointer over a target and pressing the right button on the mouse once.
Double-click	Indicates placing the mouse pointer over a target and pressing the left button on the mouse twice.
Drag	Indicates placing the mouse pointer over a target and holding down the left button on the mouse while moving the mouse pointer.
Drag and drop	Indicates dragging to the intended location and releasing the left button on the mouse.
Text enclosed in []	Names of buttons and windows displayed on screen are described enclosed in square brackets. E.g.: Click [OK].
Text enclosed in " "	Input values, text, and the keys on the keyboard are described enclosed in double quotation marks. E.g.: Press the "N" key while holding down the "Ctrl" key.

Using This Manual

The instruction manuals for the LabSolutions RF software (hereafter "LabSolutions RF") comprise the following manuals including this manual.

Refer to the corresponding instruction manual for details on the operation of LabSolutions RF.

Document Name	Document No.	Description
LabSolutions RF Setup Procedure	207-90012	This manual explains installation and environment settings for the LabSolutions RF software.
LabSolutions RF Instruction Manual [Basic Operation Manual] (this manual)	206-97926	This manual explains specifically how to perform basic operations using the LabSolutions RF software.

The basic operation manual is aimed at new users of LabSolutions RF and describes the basic functions and operating procedures of the software. For details on each command of LabSolutions RF and execution method, refer to the help file provided with LabSolutions RF.

Explanations in this manual are structured as follows.

Structure	Description
Chapter 1 Basic Software Operation	Provides an outline of LabSolutions RF.
Chapter 2 Starting and Shutting Down the System	Describes the startup procedures from turning on the system to software startup.
Chapter 3 Launcher	Describes how to use the LabSolutions RF launcher.
Chapter 4 Spectrum	Describes how to measure a spectrum.
Chapter 5 3D Spectrum	Describes how to measure a 3D spectrum.
Chapter 6 Quantitation	Describes how to perform quantitative measurement that employs the multi-point calibration curve method.
Chapter 7 Photometric	Describes how to perform photometric measurement.
Chapter 8 Time Course	Describes how to perform time-course measurement.
Chapter 9 Data Processing	Describes how to use the data processing functions.
Chapter 10 Printing	Describes how to use the printing function.
Chapter 11 Quantum Yield	Describes how to perform quantum yield measurement.
Chapter 12 Quantum Efficiency	Describes how to perform quantum efficiency measurement.
Chapter 13 Management Tools	Describes how to operate the management tools used for instrument management, registration, and performance checks.

While this manual describes examples of operation that are considered to be the most frequently performed, these examples may not always match your specific operational requirements. In this case, an understanding of basic methodology and operating procedures can be attained by performing operations based on the actual examples provided in this manual.

Shimadzu recommends performing the examples in this manual in order to become accustomed with software operations.

For explanations on items not covered in the above chapters, refer to the help file provided with LabSolutions RF.

Warranty

Shimadzu provides the following warranty for this product.

1. Period:

Please contact your Shimadzu representative for information about the period of this warranty.

2. Description:

If a product/part failure occurs for reasons attributable to Shimadzu during the warranty period, Shimadzu will repair or replace the product/part free of charge. However, in the case of products which are usually available on the market only for a short time, such as personal computers and their peripherals/parts, Shimadzu may not be able to provide identical replacement products.

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- (4) Computer viruses leading to device failures and damage to data and software, including the product's basic software
- (5) Power failures, including power outages and sudden voltage drops, leading to device failures and damage to data and software, including the product's basic software
- (6) Turning off the product without following the proper shutdown procedure leading to device failures and damage to data and software, including the product's basic software
- (7) Reasons unrelated to the product itself
- (8) Product use in harsh environments, such as those subject to high temperatures or humidity levels, corrosive gases, or strong vibrations
- (9) Fires, earthquakes, or any other act of nature, contamination by radioactive or hazardous substances, or any other force majeure event, including wars, riots, and crimes
- (10) Product movement or transportation after installation
- (11) Consumable items

Recording media such as CD-ROMs are considered consumable items.

* If there is a document such as a warranty provided with the product, or there is a separate contract agreed upon that includes warranty conditions, the provisions of those documents shall apply.

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- (4) The invalidity or unenforceability of any provision of this Agreement shall not affect the validity or enforceability of any other provision.

Precautions for Use

Latest Information

The latest information on LabSolutions RF is described in the "ReleaseNotes" file that is

displayed by clicking 🚰 (Start) - [All Programs] - [Shimadzu] - [LabSolutions RF] -

[Release Notes]. Read this information thoroughly before operating the product.

Compatible OS

LabSolutions RF is only compatible with the 32- and 64-bit versions of Windows 7 Professional.

Screensaver

If the screensaver activates during time-course measurement, consecutive measurements, or other types of measurements, the software may stop operating. Turn off the Windows screensaver function.

■ Resident Programs Including Anti-Virus Software

Resident programs, such as anti-virus software, running on the PC used for LabSolutions RF may cause the LabSolutions RF software to start up and exit slowly. Do not allow such software to run when using LabSolutions RF.

■ Text Input

LabSolutions RF does not support environment-dependant characters (Unicode). Do not enter text using environment-dependant characters (Unicode).

Numerical Value Input

Always enter numerical values into LabSolutions RF using one-byte characters.

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Basic Software Operation

This chapter provides an outline of the LabSolutions RF software (hereafter "LabSolutions RF") and explains basic operation.

▶ Reference For cases not covered in this chapter and detailed descriptions and information on LabSolutions RF functions, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter provides an overview of LabSolutions RF specifications and applications.

1.1 Overview

LabSolutions RF comprises various applications for performing instrument control and data analysis using the Shimadzu Spectrofluorophotometer series as well as software and tools used for instrument management.

Application	Specifications
Spectrum	Scan the fluorescence (excitation) spectrophotometer using any excitation (fluorescence) wavelength to capture a fluorescence (excitation) Spectrum. Synchronized scanning, which captures data by scanning excitation and the spectrofluorophotometer at the same time while keeping the interval between the excitation wavelength and fluorescence wavelength constant, is also supported.
3D Spectrum	Repeatedly measure fluorescence spectra at any excitation wavelength interval and draw the results in 3D. Repeated measurement of fluorescence spectra at any time interval and capturing fluorescence spectra in 3D is also supported. Reference "5 3D Spectrum" P.49
Quantitation	Create a calibration curve from the fluorescence intensity captured from the standard sample to determine the concentration of unknown samples. Quantitation using peak values and areas within a specified wavelength range is also supported. Reference "6 Quantitation" P.63

• Applications for performing basic measurement and related data analysis (hereafter "Basic Analysis")

Application	Specifications
Photometric	Capture fluorescence intensity at any fixed wavelength (multiple wavelengths can be set). Calculation results and pass/fail judgments can be obtained in conjunction with measurement by using captured data to create/register arithmetic expressions with the four basic arithmetic operations and judgment criteria.
Time course	Capture changes in fluorescence intensity over time at any fixed wavelength. Calculation of enzyme reaction activity values based on the gradient of the change in fluorescence intensity over time is also supported. Reference "8 Time Course" P.99

• Applications for performing specific analysis (hereafter "Special Analysis")

Application	Specifications
Quantum Yield	Determine the Quantum Yield of an unknown sample by using the fluorescence Spectrum of a standard sample (with a known Quantum Efficiency) and the fluorescence Spectrum of the unknown sample.
Quantum Efficiency	Use an integrating sphere to determine the Quantum Eficiency from the fluorescence Spectrum in the blank state and the fluorescence Spectrum of the sample. Reference "12 Quantum Efficiency" P.176

• Tools used in instrument management (hereafter "management tools")

Tool	Specifications
RF Performance Validation Software	Check instrument performance (such as wavelength accuracy and S/N ratios).
	▶ Reference "13.5 Checking RF-6000 Performance" P.208
Register Device	Register instruments (spectrofluorophotometer and integrating sphere) that connect to LabSolutions RF.
	Reference "13.1 Registering an Instrument" P.193
Spectrum Correction Function Measurement	Create correction functions used in Spectrum correction when an integrating sphere is installed.
Tool	Reference "13.2 Registering an Integrating Sphere" P.196

1.1.1 Specifications

ltem	Specification		
Operating system	Microsoft Windows 7 Professional 32/64-bit version		
Required hard disk space	40 GB min.		
Required memory	4 GB min.		
Controllable devices	 RF-5300PC/5301PC (RF-5300 series) RF-6000 		
Basic Analysis			
Spectrum	• Excitation Spectrum, fluorescence Spectrum, synchronous Spectrum		
	 Repeated measurement in a specified time interval (3D excitation Spectrum, 3D fluorescence Spectrum, 3D synchronous Spectrum) 		
3D Spectrum	• Fluorescence Spectrum measurement at a specified excitation wavelength interval (3D Spectrum)		
	Excitation/fluorescence Spectrum extraction		
	• Quantitation using the peak / maximum value / area etc. of single wavelengths, multiple wavelengths (including single, double, and triple wavelength methods), and specified wavelength ranges		
Quantitation	• K-factor method, single-point calibration curve method, and multi-point calibration curve method (1st, 2nd, and 3rd order function-fitting, zero intercept can be specified)		
	• Photometric processing with user-defined functions (functions that use addition, subtraction, multiplication, and division can be embedded together with factors)		
Photometric	• Capturing the fluorescence intensity of single wavelengths and multiple wavelengths as well as peak / maximum value / area in specified wavelength ranges		
Photometric	• Photometric processing with user-defined functions (functions that use addition, subtraction, multiplication, and division can be embedded together with factors)		
	• Time course recording using up to 4 wavelengths		
Time course	• Calculation of a difference between 2 wavelengths and a ratio		
	Activity value calculation		
	• Event recording of reagent additions during measurement		
Data processing functions (common)	 Processing, data printing, point pick, peak pick, area calculation, constant calculation, data set calculation, 1st to 4th order differentiation, smoothing, common logarithm transformation, natural logarithm transformation, reciprocal transformation, exponentiation, square root, index transformation of waveform data (Spectrum/Time course) 		

1 Basic Software Operation

Item	Specification		
Printing functions	Report template creation		
	 Printing using report templates 		
File functions	• Automatic conversion to CSV file and text file (.txt) formats (Only manual text conversion in the Quantitation and Photometric applications)		
Special Analysis (note: unavailable o	n the RF-5300 series)		
	Quantum Yield calculation of unknown samples		
Quantum Yield	 Display and printing of results list of multiple samples 		
	• Text conversion of Spectrum data		
	• Calculation of sample absorption factors, internal Quantum Efficiency, and external Quantum Efficiency		
Quantum Efficiency ^{*1}	 Display and printing of results list of multiple samples 		
	• Text conversion of Spectrum data		
Management tools			
RF Performance Validation Software	S/N ratio, Stability, Wavelength Accuracy ^{*2} , Wavelength Repeatability ^{*2} , resolution (emission side) ^{*2} , and results of initialization		
	NOTE The only test item that can be executed on the RF-5300 series is S/N ratio.		
Register Device	Registration of spectrofluorophotometer and integrating spheres		
Spectrum Correction Function Measurement Tool	Creation of correction functions when an integrating sphere is installed (unavailable on the RF-5300 series).		

*1 An integrating sphere unit (option) is required.

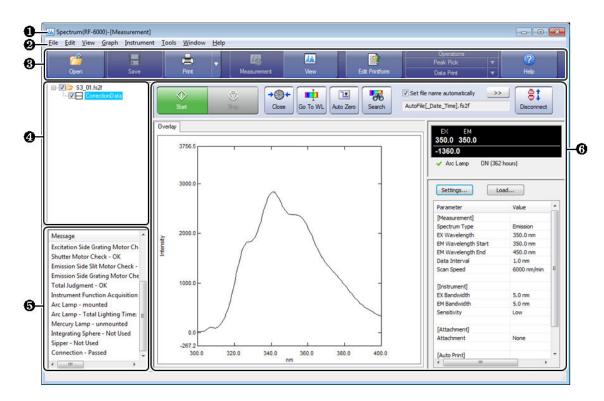
*2 A mercury lamp unit (option) is required. Unavailable on the RF-5300PC/5301PC models.

1.1.2 Analysis Application Window Layout

The layout of the Basic Analysis application window in LabSolutions RF is shown below.

▶ Reference For details on the parts that comprise the window, refer to the help file provided with LabSolutions RF.

For details on the window layout of the Special Analysis applications, see the chapter that describes each application.



Window Layout

No.	Name	Function
0	Title bar	Displays information including the application name, registered instrument name, and window mode ([Measurement] or [View]).
0	Menu bar	Displays the application menus. Selecting a menu along the bar displays multiple command menus. The displayed command menus differ depending on the application type and window mode.
8	Main toolbar	Displays tool buttons for executing main functions, such as file operations, printing, and data processing.
4	Tree view	Displays the open data file and data set contained in this file in tree format. Operations including switching the active data set and closing open files can be performed.
6	Log view	Displays and records logs that indicate the instrument status and operations performed on the system as well as warnings.

1 Basic Software Operation

No.	Name	Function
6	Application area	Displays a graph, data processing table, and information on measurement parameters. The type of view displayed in the area and layout differ depending on the application.

1.1.3 Window Mode Selection

Each Basic Analysis application window in LabSolutions RF has a "measurement mode", "view mode", and "edit print form mode".

The window mode can be changed by clicking [Measurement], [View], and [Edit Printform] on the main toolbar.

The functions of each window mode differ depending on the analysis application. For details, see the chapter of the relevant analysis application in this manual or refer to the help file provided with LabSolutions RF.

Name	Function	
Measurement mode	This mode is used when controlling an instrument to capture data. The "measurement toolbar" used for instrument control and measurement, "istrument status" that indicates the status of connected instruments, and "parameter view" that allows configuration of measurement parameters and other settings are displayed.	
View mode	This mode is used when performing data processing on captured data. The data processing button on the main toolbar becomes active and data processing items become selectable.	
This mode is used when creating, editing, and saving report printing.Edit printformThe report layout can be edited while graphs and different processing tables are displayed and the user does not need change the window to print after editing.		

1.1.4 LabSolutions RF Data Formats

LabSolutions RF data files internally store both the original data from measurement as well as any calculation results obtained from the various data processing functions.

A single Basic Analysis application data file generally stores multiple data.

In addition, each data set is appended with auxiliary information.

• Data sets containe	d in files (for	Spectrum and	3D Spectrum	data)
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ltem	Description
Raw data (measurement data)	Data prior to Spectrum correction. On the RF-5300PC, this data is the sample data that is normally used because the RF-5300 series does not have the Spectrum correction function.
Correction data	Data that has undergone Spectrum correction and is normally used as the sample data. On the RF-6000, this data set is used for sample analysis.
Converted data	Data converted or generated in waveform processing. (Only Spectrum.)

• Data sets contained in files (for Quantitative and Photometric data)

Item	Description	
Standard table	Table data that includes sample information and concentration.	
Unknown sample table	Table data that includes sample information, concentration, and calculation results.	

• Data sets contained in files (for Time course data)

ltem	Description
Raw data (measurement data)	Sample data that is normally used. This data set is used in sample analysis.
Converted data	Data converted or generated in waveform processing.

• Auxiliary data appended to each data set

ltem	Description	
History	History of data set generation and modification	
Measurement parameters	Parameters used during measurement	
Summary	General information on the data set (such as software version, analysis time and date, and instrument information)	
Peak pick table	Peak table generated using the "peak" pick function	
Point pick table	Point pick table generated using the "point pick" function and "batch point pick" function	
Peak area table	peak area table generated using the "area calculation function".	

1.1.5 File Formats of the LabSolutions RF Software

The following file formats can be used with LabSolutions RF.

• Data files

Name	Extension	Description	
Spectrum file	fs2f	Data file created in the Spectrum application. This file contains Spectrum (waveform) data, measurement parameter information, file information (summary), data history, peak pick data, point pick data, and area calculation data.	
3D Spectrum file	fs3f	Data file created in the 3D Spectrum application. This file contains 3D Spectrum data, measurement parameter information, file information (summary), and data history.	
Calibration curve file	fqcf	Calibration curve data file created in the Quantitation application. This file contains standard table data, measurement parameters ^{*1} , calibration curve parameters, file information (summary), and data history.	
Quantitation file	fqqf	Quantitation result data created in the Quantitation application. This file contains standard sample / sample table data, measurement parameters ^{*1} , calibration curve parameters, file information (summary), and data history.	
Photometric file	fquf	Measurement result data created in the Photometric application. This file contains sample table data, measurement parameters, file information (summary), and data history.	
Time course file	fttc	Data of changes in fluorescence intensity over time created in the Time course application. This file contains Time course (waveform) data, measurement parameter information, file information (summary), data history, peak pick data, point pick data, and area calculation data.	
Quantum Yield file	fqty	This measurement result data is created in Quantum Yield measurement. This file contains standard/unknown sample Spectrum (waveform) data, analysis results, and file information (such as summary information and measurement conditions).	
Quantum Efficiency file	fqte	This measurement result data is created in Quantum Eficiency measurement. This file contains blank/sample Spectrum (waveform) data, analysis results, and file information (summary, measurement conditions, etc.).	
Test results file (Validation)	fpvr	This test result data is created by the RF performance validation software. This file contains waveform data, test conditions, test results, and file information (such as summary information) for each test item.	

Name	Extension	Description
Text file (Spectrum)	txt	Data file created (output to text file) in the Spectrum application (can be loaded). This text format file contains horizontal axis values (wavelength) and the corresponding vertical axis values (fluorescence intensity) delimited with commas or other characters ^{*2} .
Text file (3D Spectrum)	txt	Data file created (output to text file) in the 3D Spectrum application (cannot be loaded). This text format file contains X-axis values (fluorescence wavelength) ^{*3} , Y-axis values (excitation wavelength or time) ^{*3} , and Z-axis values (such as fluorescence intensity) delimited with commas or other characters ^{*2} .
Text file (Quantitation)	txt	Data file created (output to text file) in the Quantitation application (cannot be loaded). This text format file contains standard sample and sample table items and data delimited with commas or other characters ^{*2} .
Text file (Photometric)	txt	Data file created (output to text file) in the Photometric application (cannot be loaded). This text format file contains sample table items and data delimited with commas or other characters ^{*2} .
Text file (Time course)	txt	Data file created (output to text file) in the Time course application (cannot be loaded). This text format file contains horizontal axis values (time) and the corresponding vertical axis values (such as fluorescence intensity) delimited with commas or other characters ^{*2} .
Text file (Quantum Yield)	txt	Result file created (output to text file) in the Quantum Yield application (cannot be loaded). This text format file contains horizontal axis values (time) and the corresponding vertical axis values (such as fluorescence intensity) delimited with commas or other characters ^{*2} . When saving, any of the following three types can be selected: standard sample, any unknown sample, or all unknown samples.
Text file (Quantum Efficiency)	txt	Result file created (output to text file) in the Quantum Eficiency application (cannot be loaded). This text format file comprises waveform data of blank spectra and sample spectra and contains horizontal axis values (wavelength) and the corresponding vertical axis values (fluorescence intensity) delimited with commas.
Data Print Table	txt	Data processing result file created in the Spectrum and Time course applications (cannot be loaded). This text format file contains data print table items and data delimited with commas or other characters ^{*2} .
Point Pick Table	txt	Data processing result file created in the Spectrum and Time course applications (cannot be loaded). This text format file contains point pick table items and data delimited with commas or other characters ^{*2} .

Name	Extension	Description
Peak Pick Table	txt	Data processing result file created in the Spectrum and Time course applications (cannot be loaded). This text format file contains peak pick table items and data delimited with commas or other characters ^{*2} .
Peak Area Table	txt	Data processing result file created in the Spectrum and Time course applications (cannot be loaded). This text format file contains peak area table items and data delimited with commas or other characters ^{*2} .
Main Table	txt	Data processing result file created in the Time course application (cannot be loaded). This text format file contains main table items and data delimited with commas or other characters ^{*2} .
Intensity Difference Table	txt	Data processing result file created in the Time course application (cannot be loaded). This text format file contains intensity difference table items and data delimited with commas or other characters ^{*2} .
RFPC Spectrum file	spc	This is an RFPC software file format. This file can be loaded into the Spectrum application.
RFPC Time course file	tmc	This is an RFPC software file format. This file can be loaded into the Time course application.

*1 Configured as the application's measurement parameters when the data file is loaded.

*2 Depends on the application setting when saving. Measurement parameters and summary information can be included when saving.

*3 The X axis and Y axis can be selected when performing text conversion from the application.

Application	Extension	Description
Spectrum	fm2f	This file stores measurement, instrument, and attachment parameters.
3D Spectrum	fm3f	This file stores measurement, instrument, and attachment parameters.
Quantitation	fmqf	This file stores wavelength, calibration curve, measurement (standard sample), measurement (sample), instrument, attachment, calculation, and pass/fail parameters.
Photometric	fmff	This file stores wavelength, measurement (sample), instrument, attachment, calculation, and pass/fail parameters.
Time course	fmtc	This file stores wavelength, measurement, instrument, and attachment parameters.

• Measurement parameter files

• Template files

Name	Extension	Description
Spectrum Peak Area template	fsta	Template file for peak area tables that contain the wavelength range and coefficients used in area calculation.
Spectrum Point Pick template	fstp	Template file for point pick tables that contain the wavelengths used in point picking.
Time course Peak Area template	ftta	Template file for peak area tables that contain the time range and factors used in area calculation.
Time course Point Pick template	fttp	Template file for point pick tables that contain the times used in point picking.
Quantitation template	fqtf	Quantitation measurement file that contains standard sample / sample table information without any data, measurement parameters, and calibration curve parameters.
Photometric template	futf	Photometric measurement file that contains sample table information without any data, and measurement parameters.
Report template	frpt	Template file for printing that contains printable items.

• Other

Name	Extension	Description
Log	log	This file contains the history of operations performed using the software. The contents of this file can be checked via [System Log] - [View] on the [Tools] menu.

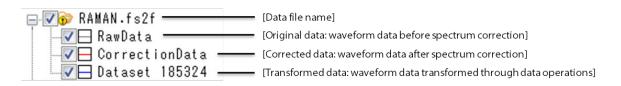
1.2 Window Operation

This section explains window operation in LabSolutions RF.

1.2.1 Tree View Operations

The tree view structure is shown below.

Display or hide the tree view by clicking [Tree View] on the [View] menu.



Example of Spectrum Data

- NOTE When using the RF-6000, [RawData] in Spectrum measurement and 3D Spectrum measurement is considered internal data and is therefore not shown by default. This data can be set to be shown or hidden in the [User Settings], which are accessible from the [Tools] menu.
 - [CorrectionData] does not exist on the RF-5300 series because the Spectrum correction function is not installed on this model.

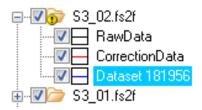
Measure a sample or open data to display data in the tree view and graph view.

At first, data is displayed at the top of the hierarchical structure. When data is processed, new data is added at a lower level.

If other data is added, it is displayed at the top of the hierarchical structure. Close data to remove the data from the tree view and graph view.

Reference For details on the data format of displayed data, see "1.1.4 LabSolutions RF Data Formats" P.7.

The following operations can be performed on data in the tree view of the Spectrum application.



Operation	Description
Clicking [+] and [-]	Display or hide the contents of the data set in the tree view.
	• Click [+] to display data sets lower in the hierarchy.
	• Click [-] to hide data sets lower in the hierarchy.

Operation	Description
	Toggles between showing and hiding data (waveforms).
Clicking checkboxes	• Selected: Displays waveforms on the [Overlay] graph.
	• Unselected: Hides waveforms on the [Overlay] graph.
	Deselect the checkbox next to the filename to hide the waveforms of all data sets contained in the file.
Double-clicking data set names	Toggles the active data set. The double-clicked data set becomes the active data set.
	Reference See "1.2.2 Specifying Data Sets (Activation)".
	Right-click on a filename or data set name to display a menu specific to the current task or area. The following menu items are displayed in the case of a Spectrum.
	• Filename - [Show Full Path]: Displays the filename with it's full path.
Right-click (on mouse)	• Filename - [Close]: Closes the file.
	• Data set name - [Text File Output]: Outputs the selected data set to a text file.
	Reference The menu items differ depending on the analysis application. For details, refer to the help file provided with LabSolutions RF.
Dragging a data set	Places a 3D graph on the [Tile] tab in the 3D Spectrum application.

1.2.2 Specifying Data Sets (Activation)

When multiple data files (data sets) are loaded into the Spectrum, 3D Spectrum, and Time course applications, the data set to be targeted for data processing must be specified. In LabSolutions RF, the data set targeted for data processing through specification is referred to as the "active data set".



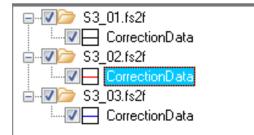
Hint A data set is automatically selected as the active data set immediately after measurement or loading.

The active data set is specified in the tree view.



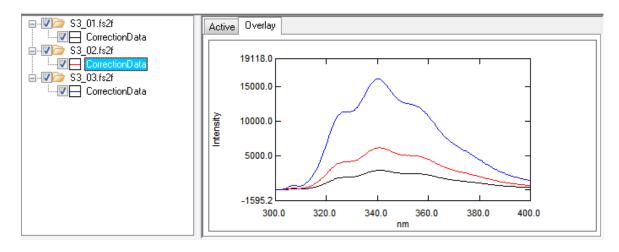
Click the [+] that precedes the data filename in the tree view.

This expands the data file and displays all of the loaded data set names.



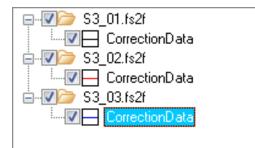
2 Click the [Overlay] tab in the graph view.

Search for the data set to specify (set active) among the loaded data set waveforms and check the line type and color.



In the tree view, check the line type icon that precedes the data set name and then double-click the name of the target data set.

This highlights the specified data set name in blue and sets the data set to active.

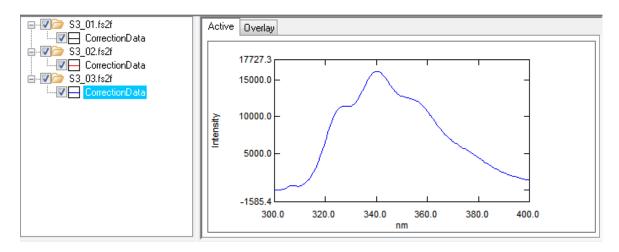


4

3

Click the [Active] tab in the graph view.

Check that the waveform of the target data set is displayed.



1.2.3 Right-Click Menu

Right-click on the tree view or graph view to display a menu specific to the current task or area. This allows commands to be easily executed without having to perform selection via a menu or toolbar.

The following procedure shows how to display and use menus using the Spectrum graph view as an example.

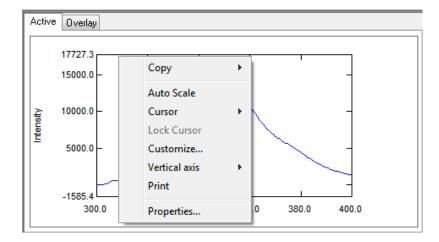


Click the [Active] tab in the graph view.

2 Right-click on the active graph.

The active graph right-click menu is displayed.

Reference For details on the active graph menu, refer to the help file provided with LabSolutions RF.



Click [Customize].

3

The [Customize Graph] window is displayed.

▶ Reference The [Customize Graph] window can also be displayed by selecting [Customaize] on the [Graph] menu.

Customize Graph	×
Line Colors Limits Appearance Sett	ings
Daţa: C:\RF-Data\Data\S3_03.fs2	Basic Color:
Annotation: Line Width:	Created Color:
	Create Color OK Cancel

2 Starting and Shutting Down the System

This chapter explains how to start and shut down the Shimadzu Spectrofluorophotometer system.

Reference For details on Windows operation, refer to the relevant Windows manual.

Explanations Included in this Chapter

This chapter explains the procedure for starting the system, from turning on power to software startup, assuming that the personal computer (hereafter "PC") and instrument are connected using the communication cable and the LabSolutions RF software is installed on the PC.

Turning the Power ON 2.1

2.1.1 For RF-6000

1

2

2

2.2

Turn ON the main switch on the RF-6000. Initialization of instrument settings starts.

Turn ON power to the PC. A system check is performed and then Windows starts up.

2.1.2 For RF-5300 Series

- Turn ON the main switch on the RF-5300 series. 1
 - Turn ON power to the PC. A system check is performed and then Windows starts up.

Registering an Instrument

Before starting up any of the analysis applications, information on the connected instrument must be registered in LabSolutions RF.

Instrument registration is performed using the "Register Device" tool in LabSolutions RF.

Reference For information on the registration method, see "13.1 Registering an Instrument" P.193.

2.3 Connecting the Instrument

2.3.1 Starting an Analysis Application

This section explains application startup using the spectrum general analysis application as an example.

- 1 Double-click [[] (LabSolutions RF) on the desktop.
 - Hint The software can also be started by clicking the [Start] button, navigating to [All Programs] [Shimadzu] [LabSolutions RF], and clicking [LabSolutions RF].

The LabSolutions RF launcher starts.

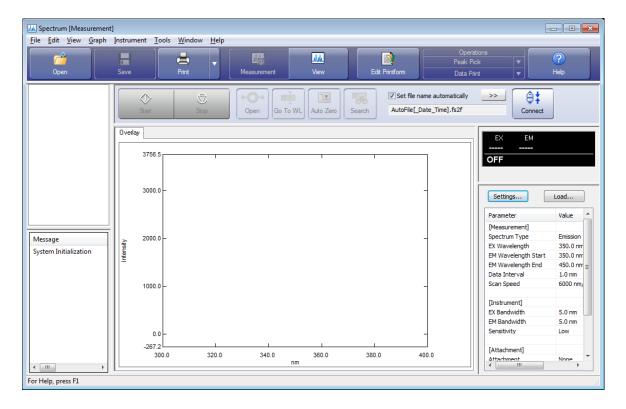
⊞SHIMADZU LabSolutions RF	Settin	3
Fluoresce	ence Manage	
Basic Analysis		
III III III	JII 🕒	
Spectrum 3D Quantitation Pho Spectrum	otometric Time course	
Special Analysis		
Quantum Quantum yield efficiency		
Application		
ee 🏗 Help Operation Guide		

LabSolutions RF Launcher



Click [Spectrum] on the [Fluorescence] tab.

The spectrum general analysis application starts.



2.3.2 Connecting to the Instrument

1

Click [Connect] on the measurement toolbar.

This section explains instrument connection using the spectrum application window for the RF-5300 series as an example.

•	.÷.	ì					
\diamond	$\overline{\mathbb{Z}}$	+O→		T		Set file name automatically _>>	
Start	Stop	Open	Go To WL	Auto Zero	Search	AutoFile[_Date_Time].fs2f	Conne



The application connects to the instrument and the initialization of settings starts.

- ▶ Reference For details on the items set during initialization, refer to the instrument instruction manual or the help file provided with LabSolutions RF.
- **NOTE** The RF-6000 automatically performs initialization of settings when the power is turned ON. Because the initialization of settings completes in a short time, if it completes normally before communication is established, the [Initialization] window is not displayed.

Initialization								
Instrument: RF-5300								
Serial Number: A40193	901186SA							
Version: 3.2								
ROM								
🗧 RAM								
eeprom	EEPROM							
e Excitation Slit	Excitation Slit							
🗧 Emission Slit	🗧 Emission Slit							
Excitation Gra	Excitation Grating							
C Emission Gra	ling							
C Zero setting	C Zero setting							
Initializing	🗧 Passed	🔶 Failed						
	ОК							

[Initialization] Window

2

Click [OK] after the settings are initialized.

The instrument control button on the measurement toolbar becomes active and measurement can now be performed.



Spectrum Measurement Toolbar

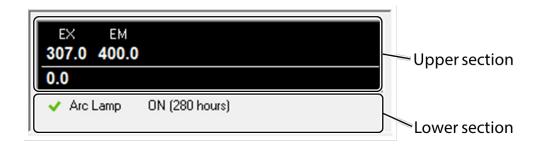
NOTE If an NG occurs for any of the items set during initialization, a connection cannot be established with the instrument.

2.3.3 Instrument Status

When a connection is established with the instrument, the currently set wavelength and fluorescence intensity are displayed in real time on the upper section of the instrument status located on the right of the main window in the analysis application.

The lower section displays the lighting state and cumulative operating time of the light source lamp and the type of any installed attachments. The cumulative operating time of the light source lamp is updated every hour.

The lower section can be shown or hidden from the right-click menu of the instrument status.



Instrument Status

The following table describes the meaning of each icon.

lcon	Description
~	(Xenon) Xenon arc lamp Indicates that the cumulative operating time is within the service life range. The service life of the xenon arc lamp used by the RF-5300 series is 500 hours and the service life of the xenon arc lamp used by the RF-6000 is 2000 hours. Attachments (sipper, integrating sphere) Indicates that a sipper or integrating sphere (RF-6000-only option) is installed in the sample compartment.
<u>^</u>	(Xenon) Xenon arc lamp Indicates that the cumulative operating time of the xenon arc lamp has exceeded the service life range. The lamp must be replaced.
8	(Xenon) Xenon arc lamp A problem is occurring with the xenon arc lamp or lighting circuit. Contact your Shimadzu representative.

2.3.4 Log View

The general analysis applications display instrument log information in the log view located at the lower left of the window when a connection is established with the instrument.

1												
Open Save		🚔 Print		Measureme	nt	Mew	and the second se	Vintform	Pe	Operations ak Pick v sta Print v	? Help	
		∢∲ Start		Stop	→ (Gose	Go To WL	Auto Zero	Search	And a second second second	name automatically	>>	
	Over	lay								EX EM		
		1555523353								350.0 350.0		
		3756.5		1	1	1	1			-1722.6		
										Arc Lamp ON (362 hours)	
ssage		3000.0	-							Settings	Load	
M Check - OK ROM Check - OK												
rdware Configuration - OK										Parameter	Value	
itation Side Slit Motor Check - OK										[Measurement]	-	
itation Side Grating Motor Check	2	2000.0	-					-		Spectrum Type EX Wavelength	Emission 350.0 nm	-
utter Motor Check - OK	Intensity									EX wavelength EM Wavelength Start	350.0 nm	
ission Side Slit Motor Check - OK	te l									EM Wavelength End	450.0 nm	
	-									Data Interval	1.0 nm	
ission Side Grating Motor Check -										Scan Speed	6000 nm/min	
tal Judgment - OK		1000.0	L					_		- Scar Speco	0000 1111/1111	
trument Function Acquisition - Pa										[Instrument]		
Lamp - mounted										EX Bandwidth	5.0 nm	
Lamp - Total Lighting Time: 362										EM Bandwidth	5.0 nm	
rcury Lamp - unmounted										Sensitivity	Low	
egrating Sphere - Not Used												
per - Not Used		0.0								[Attachment]		
nnection - Passed		-267.2								Attachment	None	
-		300	0.0	320.0	340.0	360.0 m	380.0	400.0				
					-	m				<		•

Log View

■ NOTE Although exiting the application clears the log view, log information is saved. To reference previous log information, click [System Log] - [View] on the [Tools] menu and check the required log in the displayed [System Log] window. For details, refer to the help file provided with LabSolutions RF.

2.4 Shutting Down the System

NOTE Do not turn off the power or press the reset switch on the PC while Windows is running.

2.4.1 Disconnecting From the Instrument

The spectrum application screen is used as an example to explain this operation.



Click [Disconnect] on the measurement toolbar.

Communication with the instrument stops and "OFF" is displayed on the instrument status.



2.4.2 Exiting the Analysis Application

	Click [End] in the [File] menu.
1	The analysis application closes. If an unsaved data file exists, a confirmation message
	asking whether to save the data file is displayed.



1

Click [X] at the upper right of the LabSolutions RF launcher. The LabSolutions RF launcher closes

2.4.3 Turning the Power OFF

3 Launcher

This chapter explains how to use the LabSolutions RF launcher (hereafter "launcher").

▶ Reference For cases not covered in this chapter and detailed descriptions on LabSolutions RF functions, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedure for starting analysis applications and tools from the launcher as well as registering external applications to the launcher.

Functions Used in this Chapter

- Starting analysis applications and tools from the launcher
- Registering external applications to the launcher

3.1 Starting the Launcher





(LabSolutions RF) on the desktop to start the LabSolutions RF

launcher.



LabSolutions RF Launcher

Name	Function
[Fluorescence] tab	Start LabSolutions RF analysis applications for fluorescence measurement and any registered external applications or files from this tab.
[Manage] tab	Start the RF performance validation software, instrument registration, spectrum correction function measurement tool, and any registered external applications or files.
[Settings]	Perform operations including configuring the startup method of analysis applications and registering external applications to the launcher.

Launcher functions are divided into the following three types.

Hint The launcher can be exited independently even if any analysis applications that were started using the launcher are still displayed. The launcher can also be restarted when applications are running.

3.2 [Fluorescence] Tab

Analysis applications for fluorescence measurement that uses the xenon arc lamp can be started from this tab.

In addition, frequently used external applications can be started directly from the [Fluorescence] tab by registering them.

	⊕shimadzu LabSolutions RF							
		Fluor	escence		Ĩ	Manage		
Basic Ana	lysis							
<u>,III</u>				Ŀ				
Spectrum	3D Spectrum	Quantitation	Photometric	Time course				
Special Ar	nalysis							
	M							
Quantum yield	Quantum efficiency							
Applicatio	n							
Help	PF Operation Guide							

[Fluorescence] Tab

3.2.1 Analysis Applications

General analysis and special analysis applications can be started from this tab.

While multiple applications can be started at the same time, only one application can communicate with the instrument.

Note that when using (or performing instrument registration of) the RF-5300 series, the special analysis applications ([Quantum yield] and [Quantum efficiency]) cannot connect to these instruments.

NOTE Multiple instances of the same application cannot be started.

3.2.2 External Applications

Frequently used external applications can be started from this tab by registering them. In addition, folders on the PC that contain related data and information can be opened directly from the launcher by registering them.

▶ Reference For details on the registration method, see "3.4.2 Registering External Applications" P.32.

3.3 [Manage] Tab

Tools for instrument management and creating and saving correction functions for integrating spheres can be started from this tab.

In addition, frequently used external applications can be started directly from the [Manage] tab by registering them.

	- Setting	
Fluorescence	Manage	
Management Tool		
Validation Register Correction Device		
Application		
Help Operation Guide		

[Manage] Tab

3.3.1 Management Tools

Tools for instrument management and creating and saving correction functions for integrating spheres can be started from the [Manage] tab.

While the [Validation] and [Correction] tools can be started when other applications are running, multiple instances of the same tool cannot be started.

3.3.2 External Applications

Frequently used external applications can be started from this tab by registering them. In addition, folders on the PC that contain related data and information can be opened directly from the launcher by registering them.

▶ Reference For details on the registration method, see "3.4.2 Registering External Applications" P.32.

3.4 Configuration

Click [Settings] in the launcher to display the [Configuration] window.

External applications for starting from the launcher can be registered in the [Configuration] window. Applications to be started together with the launcher when starting LabSolutions RF can also be selected.

Configuration for Application Pluorescence Manage	
No. Title Filename	Up
1 Help .\LabSolutionsRF.chm	Down
2 Operation Guide .\Lab Solutions RF.pdf	Lowin
3	Edit
4 5	
6	Delete
7	

[Configuration] Window

3.4.1 Startup Settings

Set the applications to be started together with the launcher.

Conf	igurati	on		
	◉ Lau ⊙ Lau	ng procedure ncher and Window ncher only ation for Application cence Manage	Spectrum window 3D Spectrum window Quantitation window Photometric window Time course window Quantum yield Quantum yield	
	No.	Title	Filename	Up
	1 2	Help Operation Guide	.\LabSolutionsRF.chm .\LabSolutionsRF.pdf	Down
	3			Edit
	5 6 7			Delete
				OK Cancel

ltem	Description		
[Launcher and Window]	Start the LabSolutions RF analysis application selected in the list together with the launcher.		
[Launcher only]	Start only the launcher.		

3.4.2 Registering External Applications

Register frequently used applications and PC folders to the launcher.

Registering external applications

Up to a combined total of 14 external applications and folders can be registered (seven each for the [Fluorescence] tab and [Manage] tab).

1

2

Click [Settings] in the launcher.

Click the tab ([Fluorescence] tab or [Manage] tab) for registering an external application.

A list of registered external applications and folders is displayed.

Configuration		—X —
Launching procedure Launcher and Window Launcher only Configuration for Application Fluorescence Manage	Spectrum window	•
No. Title 1 Help 2 Operation Guide 3 4 5 6	Filename .\LabSolutionsRF.chm .\LabSolutionsRF.pdf	Up Down Edit Delete
7		OK Cancel

[Configuration] Window



Click an empty number in the list to highlight the row and then click [Edit]. An [Edit Application] window is displayed.

Edit Applicat	ion	x
	Title	
Select	File/Folder	Browse File Browse Folder
		OK Cancel

[Edit Application] Window

Click [Browse File], select the application to be registered in the [Select File] window, and then click [Open].

🕒 🗢 📕 « Win7E	g64 (C:) ► Windo	ws 🕨 System32 🕨	▼ 4 ₇	Search System	32	م
Organize 👻 New fo	der			Ē	II • 🔟 🤇	2
🛠 Favorites	Name	<u>^</u>	Date	e modified	Туре	4
Desktop	NOISE.CH	s	6/10	/2009 2:29 PM	CHS File	
Downloads	NOISE.CH	т	6/10	/2009 2:29 PM	CHT File	
Recent Places	NOISE.DA	т	6/10	/2009 2:32 PM	DAT File	
Acad .	📄 noise.jpn		6/10	/2009 2:32 PM	JPN File	
🥽 Libraries	noise.kor		6/10	/2009 2:29 PM	KOR File	
Documents	NOISE.TH	Α	6/10	/2009 2:29 PM	THA File	
J Music	🚳 normaliz.c	111	7/13	/2009 6:09 PM	Application exte	n
Pictures	🦉 notepad		7/13	/2009 6:14 PM	Application	-
Videos	🔊 npmproxy	dll	7/13	/2009 6:16 PM	Application exte	n
	shhttp.d	I	7/13	/2009 6:16 PM	Application exte	n
🖳 Computer	🚳 nshipsec.o	11	11/2	0/2010 7:24 PM	Application exte	n
🏭 Win7Eng64 (C:)	🚳 nshwfp.dl	l	11/2	0/2010 7:24 PM	Application exte	n
Win7Jpn32 (D:)		T	11		1	•
Fil	name: notepad		•	All Files (*.*)		
				Open 🚽	Cancel	ĥ

[Select File] Window

NOTE A folder can be registered by clicking [Browse Folder] instead of [Browse File].

Hint The application icon is set automatically. Click [Select] to change the icon.

5

4

Enter a title in the [Title] field and click [OK].

The user is returned to the [Configuration] window.

NOTE The order of registered applications can be changed using the [Up] and [Down] buttons.



This chapter explains how to operate the spectrum general analysis application.

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedures for measuring fluorescence spectra using distilled water, changing the scale on graphs, and printing using the quick print function.

NOTE Measurement parameter configuration is explained assuming that a connection is established between an RF-6000 and LabSolutions RF.

Functions Used in this Chapter

The following functions are used in spectrum measurement mode.

- Configuring measurement parameters, saving measurement parameter files
- Auto file function (setting filenames automatically)
- Fluorescence spectrum measurement
- Changing graph scales
- Printing (quick print)

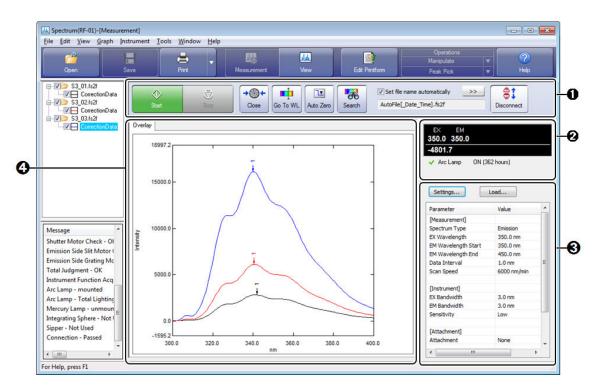
4.1 Startup

Click [Spectrum] on the [Fluorescence] tab in the LabSolutions RF launcher to start the spectrum general analysis application.

The [Spectrum] window features a "measurement mode", "view mode", and "edit print form mode" and the mode can be changed by clicking the relevant button on the main toolbar.

Reference For details and operation method of the "edit print form mode" window, see "10 Printing" P.135.

4.1.1 [Spectrum - [Measurement]] Window Layout



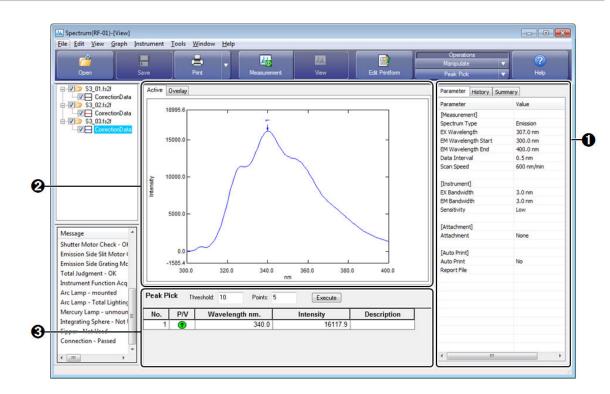
[Spectrum - [Measurement]] Window

The measurement mode is used when controlling an instrument to perform measurement.

No.	Name	Function	
0	Spectrum measurement toolbar	The buttons used for starting and stopping measurement and performing instrument control are located on this toolbar. Buttons such as [Start] become active after clicking [Connect] and establishing a connection with the instrument.	
0	Instrument Status	The upper section displays the current wavelength and fluorescence intensity and the lower section displays the status of the spectrofluorophotometer. Reference For details on the instrument status, see "2.3.3 Instrument Status" P.23.	

4 Spectrum

No.	Name	Function	
3	Parameter view	Displays the settings of the currently configured measurement parameters (settings such as parameters related to measurement and whether to perform automatic printing). This view is used to configure, save, and load measurement parameters.	
 Measurement. Only [Overlay] i display method. Spectrum graph view Hint Displaying and hiding 			
		 Reference For details on the operating procedure, see "1.2. 1 Tree View Operations" P.13. 	



4.1.2 Spectrum - [View] Window Layout

[Spectrum - [View]] Window

The view mode is used to perform operations such as data processing with respect to captured or saved data.

No.	Name	Function		
0	Parameter view	Displays measurement parameter information, data history, and summary information (such as sample information and instrument information) of the active data.		
2	Spectrum graph view	 Displays a spectrum graph of the loaded data. [Active] and [Overlay] are available as graph display methods. Hint Displaying and hiding of the spectrum graph is performed in the tree view. Reference For details on the operating procedure, see "1.2. 1 Tree View Operations" P.13. 		
8	Data processing view	Displays the parameter setting window for the Peak Pick table, Point Pick table, and Manipulate. Reference For details on data processing, see "9 Data Processing" P.118.		

1

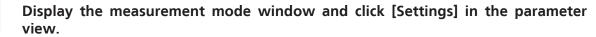
4.2 Configuring and Saving Measurement Parameters

Create (configure) measurement parameters for measuring the fluorescence spectrum of distilled water and save them to a file.

Measurement parameters can be set by loading a saved measurement parameter file. Spectrum measurement parameters comprise "measurement (parameters)", "instrument (parameters)", and "attachments" and are configured in the parameter view.

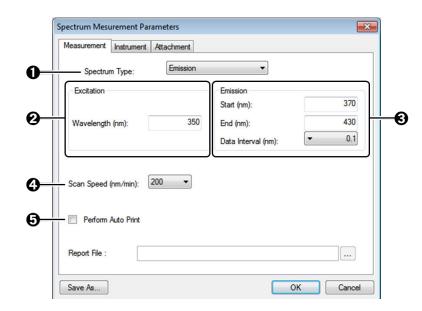
4.2.1 Configuring Measurement Parameters

▶ Reference For details on each measurement parameter item, refer to the help file provided with LabSolutions RF.



The [Spectrum Measurement Parameters] window is displayed.

2 Configure the measurement conditions (parameters) on the [Measurement] tab.



[Spectrum Measurement Parameters] Window ([Measurement] Tab)

No.	Measurement Condition (Parameter)	Setting	
0	[Spectrum Type]	Emission	
0	[Excitation]	350 nm	
8	[Emission]	• [Start]: 370 nm • [End]: 430 nm	
		• [Data Interval]: 0.1 nm	
4	[Scan Speed]	200 (nm/min)	

No.	Measurement Condition (Parameter)	Setting
6	[Perform Auto Print]	No (unselected)

Configure the instrument conditions (parameters) on the [Instrument] tab.

3

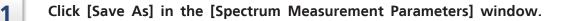
	Spectrum Mesurement Parameters	
	Measurement Instrument Attachment	
	Spectral Bandwidth	
0-	Excitation: 3.0nm	ivity: Low 🗸 🖌 🕑
	Emission: 3.0nm	
	Save As	OK Cancel

[Spectrum Measurement Parameters] Window ([Instrument] Tab)

No.	Instrument Condition (Parameter)	Setting	
0	[Spectral Bandwidth]	 [Excitation]: 5.0 nm [Emission]: 5.0 nm	
2	[Sensitivity]	High	

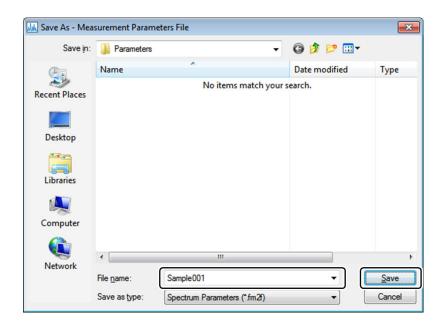
2

4.2.2 Saving Measurement Parameters



Enter a filename and click [Save].

The file is saved and the configured measurement parameters are accepted for use.



[Save As - Measurement Parameters File] Window

4.3 Configuring the Auto File Function (Setting Filenames Automatically)

Filenames with the measurement start date and time or serial number appended to an arbitrary character string can be created automatically.

- Hint While file information such as the sample name, ID, and comments can be entered in the [New Data Set] window displayed for each measurement, measurement can be performed without displaying this window.
- Reference For details on this function and setting items, refer to the help file provided with LabSolutions RF.



Select the [Set file name automatically] checkbox on the spectrum measurement toolbar.

The [Settings] window of the auto file function is displayed.

NOTE If the checkbox is already selected, click \rightarrow next to the checkbox.



Spectrum Measurement Toolbar

4 Spectrum

2

Set the auto file function conditions (parameters). Settings 0 Show new data set creation dialog when measurement is performed Sample Name Filename Name: Use sequential number 0 Spc Name: First No.: Step: 0 O Use date Our Use sequential number Test sample 1 1 + First No.: 1 Sample ID Sample: Spc 001.fs2f Use sequential number Ð Analyst Name First No.: Step: Name: Shimadzu + 1 1 Comment Option Use sequential number 0 0 First No.: Step: Name: + 1 1 OK Cancel

[Settings] Window

No.	Condition (Parameter)	Setting	
0	[Show new data set creation dialog when measurement is performed]	Yes (selected)	
		• [Name]: Spc	
0	[Filename]	 [Use date]/[Use sequential number]: [Use sequential number] 	
		• [First No.]: 1	
8	[Analyst Name] Enter a name.		
4	[Cample Name]	• [Name]: Test sample (example)	
0	[Sample Name]	• [Use sequential number]: No (unselected)	
6	[Sample ID]	• [Name]: -	
		• [Use sequential number]: No (unselected)	
6	[Ontion]	• [Name]: -	
•	[Option]	• [Use sequential number]: No (unselected)	

3 Click [OK].

The [Settings] window closes and the filename is displayed on the spectrum measurement toolbar.



Spectrum Measurement Toolbar

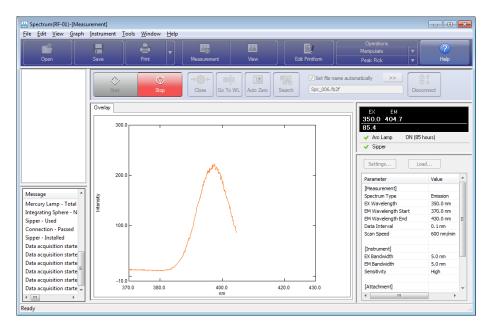
4.4 Spectrum Measurement

- 1 Check that the shutter is closed () and then click [Auto Zero] on the spectrum measurement toolbar.
- **2** Place the sample in the instrument's sample compartment and close the lid.
- **3 Click [Start] on the spectrum measurement toolbar.** The [New Data Set] window is displayed.
- 4

Enter a comment and click [OK].

New Data Set		
<u>F</u> ilename:	C:\RF-Data\Data\Spc_001.fs2f	 🖬 🔗
<u>D</u> ata Set Name:	RawData	
<u>A</u> nalyst:	Shimadzu	
Sample Name:	Test sample	
Sample <u>I</u> D:	•	
Option(<u>O</u>):	•	
Comment:	Sample data	*
	4	+
	OK Cancel	

[New Data Set] Window



Measurement starts and the captured data is graphed in real time.

[Spectrum - [Measurement]] Window

4.5 Changing the Graph Scale

The following methods are available for changing the scale on spectrum graphs.

- Directly Edit the Upper and Lower Limits of the Scale
- Perform automatic scaling
- Configure the scale in the [Customize Graph] window

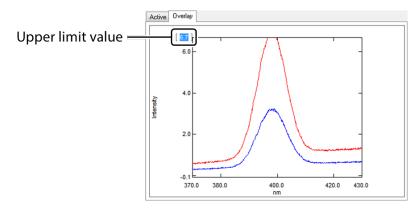
Directly edit the upper and lower limit values of the scale



2

Click the upper limit value (on the intensity axis in this example) of the graph scale.

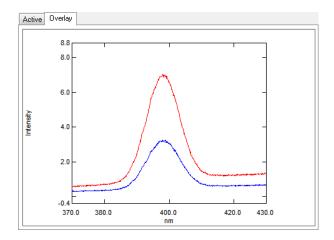
The value changes to the editable state (value becomes highlighted).



Changing the Upper Limit Value

Directly enter a new value and press the "Enter" key.

The graph is redrawn using the entered value as the upper limit.

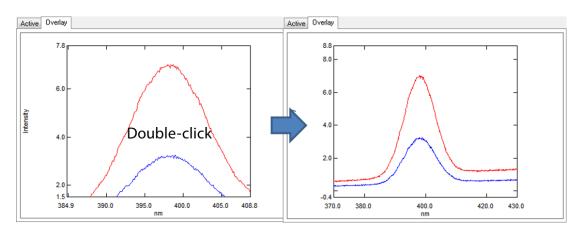


Perform Automatic Scaling



Double-click on the graph.

Automatic scaling is performed according to the current state of the graph.



Performing Automatic Scaling

■ Configure the scale in the [Customize Graph] window

Open the right-click menu on the graph and click [Customize].

The [Customize Graph] window is displayed.



1

Hint The right-click menus in the graph view differ depending on the window mode and graph tab type.

			Сору
	Сору	•	Auto Scale Cursor
	Auto Scale		Lock Cursor
	Cursor	•	Customize
ſ	Customize		Vertical axis
	Vertical axis	•	Print
	Properties		Properties

Measurement Mode

View Mode

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Right-Click Menus (Overlay Graph)

Change the scale on the [Limits] tab and then click [OK].

+ Hint Set the margin ratio for automatic scaling here.

2

s Appearance	Settings	
370		
430		
Left		Right
-0.39	Min:	0
8.84	Max:	1
	Y Axis:	
0	Percentage:	10
	870 430 Left -0.39 8.84	870 430 Left -0.39 8.84 Max:

[Customize Graph] Window ([Limits] Tab)

1

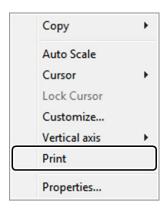
4.6 Printing (Quick Print)

Print using the report file (report template) linked to the overlay graph in the view mode window.

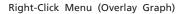
Reference For details on the quick print function (such as creating report files and setting links), see "10 Printing" P.135.

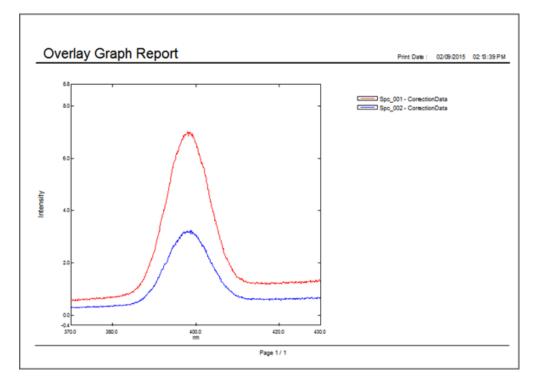
Change to the view mode window, open the right-click menu on the overlay graph, and click [Print].

Printing is performed using the overlay graph and the linked report file.



View Mode





Example of Printout

5 3D Spectrum

This chapter explains how to operate the 3D spectrum general analysis application.

Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedures for measuring a 3D spectrum using a fluorescence sample and extracting a fluorescence spectrum from the captured 3D data.

NOTE Measurement parameter configuration is explained assuming that a connection is established between an RF-6000 and LabSolutions RF.

Functions Used in this Chapter

The following functions are used in 3D spectrum measurement mode.

- Configuring measurement parameters, saving measurement parameter files
- 3D spectrum measurement
- Switching to view mode

The operation explanation uses a sample that emits fluorescent light at around 340 nm for an applied excitation light of 307 nm as an example.

The following functions are used in 3D spectrum view mode.

- Graph enlargement
- Cursor position setting
- Fluorescence spectrum extraction (file saving)

5.1 Startup

Click [3D Spectrum] on the [Fluorescence] tab in the LabSolutions RF launcher to start the 3D spectrum general analysis application for capturing 3D data

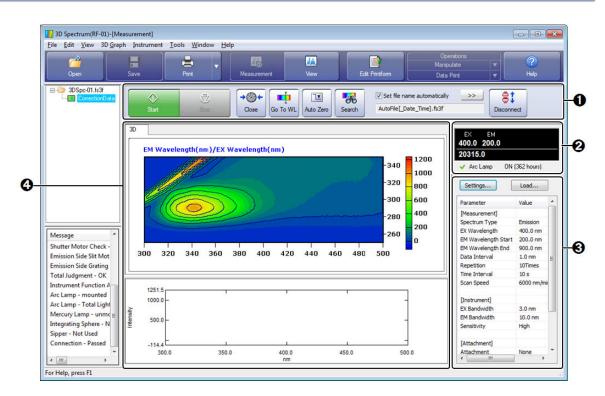
(excitation/fluorescence wavelength - time - fluorescence intensity or fluorescence wavelength - excitation wavelength - fluorescence intensity).

The [3D Spectrum] window features a "measurement mode", "view mode", and "edit print form mode" and the mode can be changed by clicking the relevant button on the main toolbar. The "measurement mode" window is displayed when the 3D spectrum application starts up.

Reference • For details on the "view mode" window, see "5.5.1 3D Spectrum - [View] Window Layout" P.57.

• For details and operation method of the "edit print form mode" window, see "10 Printing" P.135.

5.1.1 [3D Spectrum - [Measurement]] Window Layout



[3D Spectrum - [Measurement]] Window

The [3D Spectrum - [Measurement]] window is divided into the following four parts.

No.	Name	Function
0	3D spectrum measurement toolbar	The buttons used for starting and stopping measurement and performing instrument control are located on this toolbar. Buttons such as [Start] become active after clicking [Connect] and establishing a connection with the instrument.
0	Instrument status	The upper section displays the current wavelength and fluorescence intensity and the lower section displays the status of the spectrofluorophotometer. ▶ Reference For details on the instrument status, see "2.3.3 Instrument Status" P.23.
8	Parameter view	Displays the settings of the currently configured measurement parameters (settings such as parameters related to measurement and whether to perform automatic printing). This view is used to configure, save, and load measurement parameters.
4	3D spectrum graph view	The lower section displays a spectrum graph and the upper section displays a 3D spectrum graph in real time during measurement.

5.2 Configuring Measurement Parameters

Create (configure) measurement parameters for measuring the fluorescence spectrum (3D spectrum) at a certain excitation wavelength interval.

Reference For details on the procedure for saving measurement parameters to a file, see "4.2 Configuring and Saving Measurement Parameters" P.38.

3D spectrum measurement parameters comprise "measurement (parameters)", "instrument (parameters)", and "attachments" and are configured in the parameter view.

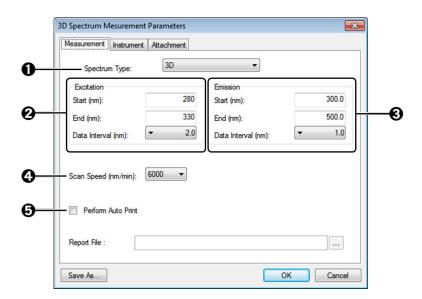


2

Click [Settings] in the parameter view.

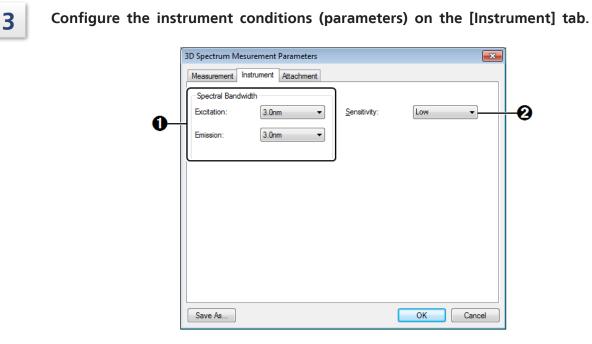
The [3D Spectrum Mesurement Parameters] window is displayed.

Configure the measurement conditions (parameters) on the [Measurement] tab.



[3D Spectrum Mesurement Parameters] Window ([Measurement] Tab)

No.	Measurement Condition (Parameter)	Setting
0	[Spectrum Type]	3D
		• [Start]: 280 nm
0	Excitation	• [End]: 330 nm
		• [Data Interval]: 2.0 nm
		• [Start]: 300 nm
6	Emission	• [End]: 500 nm
		• [Data Interval]: 1.0 nm
4	[Scan Speed]	6000 (nm/min)
6	[Perform Auto Print]	No (unselected)



[3D Spectrum Method] Window ([Instrument] Tab)

• [Excitation]: 3.0 nm	
[Spectral Bandwidth]	
• [Emission]: 3.0 nm	
2 [Sensitivity] Low	

4 Click [OK] to close the window.

The measurement parameter settings are accepted for use.

5.3 Disabling the Auto File Function

An arbitrary filename and sample information (sample name and comments) can be set when starting measurement.

▶ Reference For details on the procedure for enabling automatic filename creation (auto file function), see "4.3 Configuring the Auto File Function (Setting Filenames Automatically)" P.41.

Check that the [Set file name automatically] checkbox on the 3D spectrum measurement toolbar is not selected.

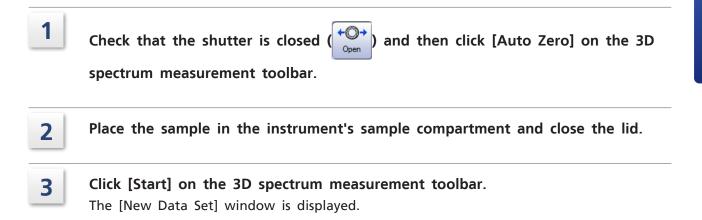
If this checkbox is selected, deselect it.

1



3D Spectrum Measurement Toolbar

5.4 3D Spectrum Measurement



New Data Set		
<u>F</u> ilename:	C:\RF·Data\Data\File_150210_130142.fs3f) 🖬 🖂
Data Set Name:	RawData	
<u>A</u> nalyst:		
Sample Name:		
Sample <u>I</u> D:		
Option(<u>O</u>):		
<u>C</u> omment:		*

[New Data Set] Window

5	Enter	а	filename	and	click	[Open].
---	-------	---	----------	-----	-------	---------

📙 New File Nam	e					— ×-
Look in:	鷆 Data	-	G	ø 🖻 🖽	-	
(Per	Name		Dat	e modified	-	Туре
Recent Places		No items match you	ir search	n.		
Desktop						
Libraries						
Computer						
Network	•					+
	File <u>n</u> ame:	3DSpec-01		•	9	Open
	Files of type:	Spectrum File (*.fs3f)		•	0	Cancel

[New Filename] Window

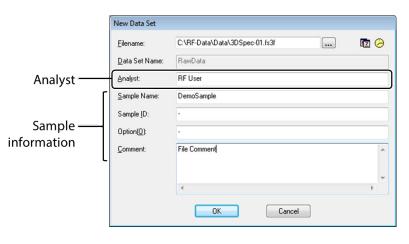
Hint The save destination of data files can be changed from [Destination Folder] on the [Tools] menu.

Reference For details, refer to the help file provided with LabSolutions RF.

6

7

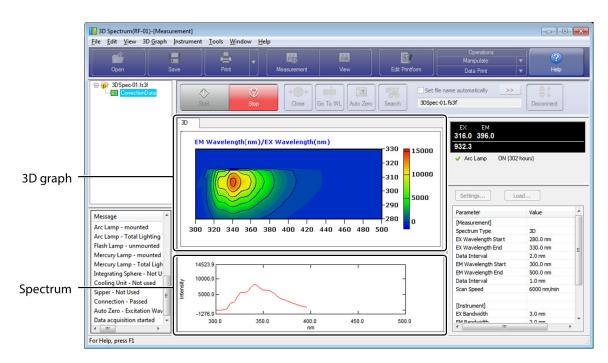
Enter the name of the analyst and sample information (such as sample name and comments).



[New Data Set] Window

Click [OK] to start measurement.

During measurement, the upper section of the 3D spectrum graph view draws a 3D graph (intensity distribution diagram) and the lower section draws the fluorescence spectrum being captured in real time.



During Measurement

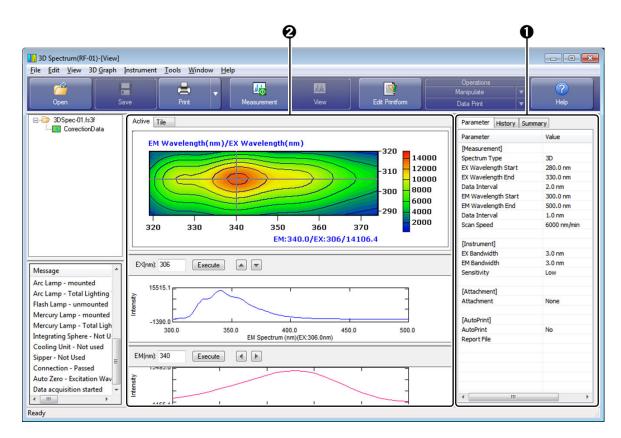


Main Toolbar

The window changes to view mode.

5.5 View Mode

5.5.1 3D Spectrum - [View] Window Layout



[3D Spectrum - [View]] Window (View Mode)

No.	Name	Function
0	Parameter view	Displays the measurement parameter information, data history, and summary information of data shown on the [Active] tab.
	3D spectrum graph view	Displays graphs of the loaded 3D data. Moving the mouse cursor into the 3D graph area changes the cursor to a crosshair, and moving the mouse moves the crosshair.
0		 The [Active] tab displays graphs of the currently active data set. An "intensity distribution diagram" or "3D spectrum graph" can be shown in the graph display.
		• The [Tile] tab can display up to six 3D graphs of any data set in tiled form. Dragging a filename from the tree view into the tiled graph area displays a 3D graph corresponding to the file.
_		▶ Reference For details on the operating procedure of the [Tile] tab, refer to the help file provided with LabSolutions RF.

5.5.2 Enlarging 3D Graphs

NOTE When the "3D spectrum graph" display is enabled, click [Contour Plot] on the [3D Graph] menu.

Enlarge 3D graphs on the [Active] tab.

3D graphs can be enlarged either by specifying a range using the mouse or by directly entering a range in [3D Graph Range] from the right-click menu. The method of using the mouse is explained in this example.

Hint The intensity distribution of an enlarged area can be viewed more clearly by configuring automatic scaling to be performed on fluorescence intensity according to the drawing range. Configure the settings in the window displayed by clicking [Customize] on the [3D Graph] menu.

ustomize 3D Graph		
Contour Plot		
Show Color Bar		
Monochrome	Olor	
Gradation:	32	•
Lmit (Intensity)		
Auto Scale (Drawing Ran	ge)
O Auto Scale (Full Range)	
Fixed		
Max:	15518.241	Min: -1424,409
3D Spectrum Graph		
Number of Spectrum:	100	•
		OK Cancel

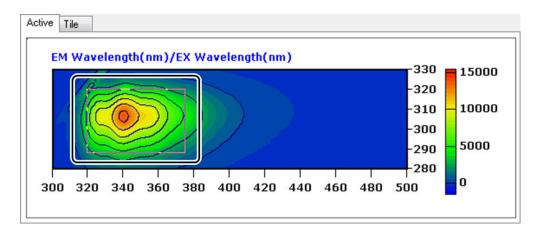
[Customize 3D Graph] Window

1

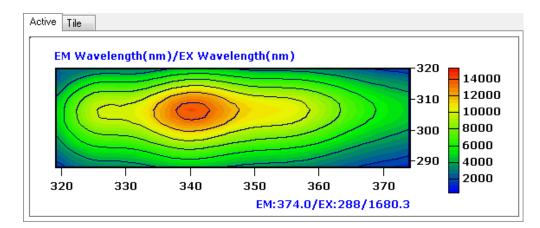
Drag the mouse on the 3D graph to create a quadrilateral and then click on the position to enlarge.

Hint After creating a quadrilateral, the created quadrilateral can be moved within the 3D graph using the mouse.

The enclosed area is displayed enlarged.



3D Graph (Before Enlarging)



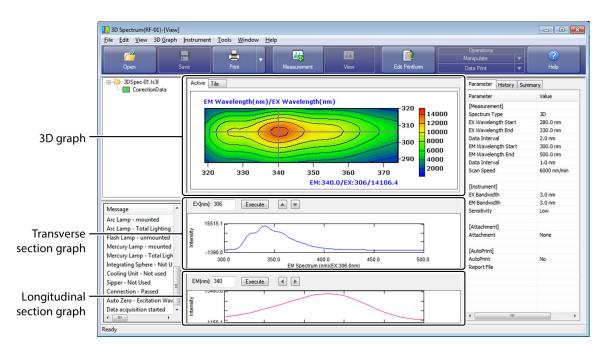
3D Graph (After Enlarging)

1

5.6 Extracting Spectrum Data

Extract a fluorescence spectrum from captured 3D spectrum data and save it to a spectrum data file.

Move the mouse cursor onto the 3D graph (upper section of the graph view). A transverse section graph (middle section) and longitudinal section graph (lower section) of the cursor line position are displayed.



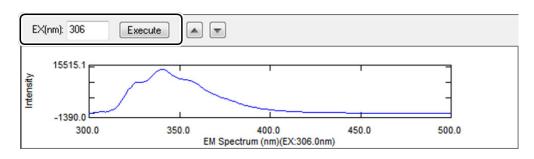
[3D Spectrum - [View]] Window (Example of 3D Spectrum Data Display)

2 Move the cursor to the position for extraction on the fluorescence spectrum on the 3D graph and click to lock the cursor position.

The fluorescence spectrum graph can also be updated by clicking A / T located above

the transverse section graph in the middle section to move the extraction position (the excitation wavelength in this example) by the amount set for the data interval.

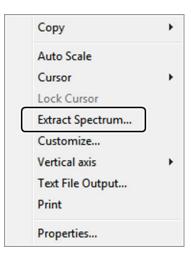
Hint To display the fluorescence spectrum for any excitation wavelength, directly enter the wavelength into the [EX] field and click [Execute].



Transverse Section Graph (Fluorescence Spectrum)



Open the right-click menu on the middle section graph area and click [Extract Spectrum].



Right-Click Menu

4 Enter a filename for the created spectrum data and click [Save].

Extract Spectru	ım			×
Save in:	鷆 Data	•	G 🤌 📂 🛄 -	
C.	Name		Date modified	Туре
Recent Places		No items match your s	search.	
Desktop				
Libraries				
Computer				
Q	4	m		
Network		0		
	File <u>n</u> ame:	3DSpec-01-Ex306nm.fs2f	Ľ	Save
	Save as type:	Spectrum (*.fs2f)		Cancel

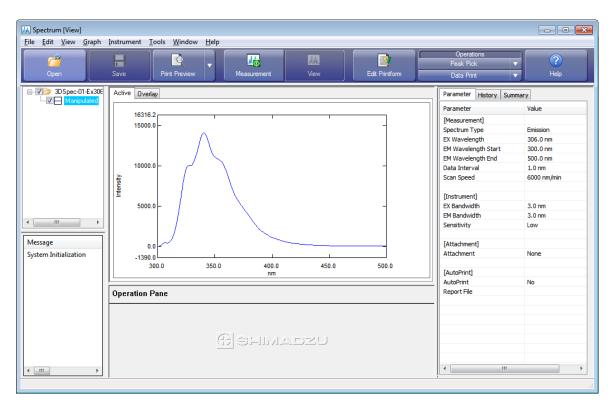
Saving a Spectrum Data File

5 Start [Spectrum] from the LabSolutions RF launcher.



Open the spectrum data file saved in step 4.

The extracted spectrum data can be loaded into the spectrum general analysis application. Reference To proceed to data processing, see "9 Data Processing" P.118.



[Spectrum - [View]] Window

6 Quantitation

This chapter explains how to operate the quantitation general analysis application.

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedures for performing quantitation measurement with the multi-point calibration curve method using three types of standard samples of varying concentrations and creating and saving calibration curve files and (quantitation) template files.

The following table shows the files that can be created by the quantitation application and the settings and data contained in these files (indicated with a check mark).

NOTE Measurement parameter configuration is explained assuming that a connection is established between an RF-6000 and LabSolutions RF.

File Type	Configuring Measurement Parameters (Including Calibration Curve Parameters)	Data and Information in the Standard Table	Data and Information in the Sample Table
Measurement parameter file	\checkmark	-	-
Calibration curve file	\checkmark	\checkmark	-
Quantitation file	\checkmark	\checkmark	\checkmark
Template file	\checkmark	 ✓ (excluding measurement data^{*1}) 	 ✓ (excluding measurement data^{*1})

*1 This refers to information and values that can be directly entered into tables, such as sample information (sample name and ID) and standard sample concentration.

■ Functions Used in this Chapter

The following functions are used in quantitation.

- Configuring measurement parameters
- Creating standard tables
- Creating and saving calibration curve files (multi-point calibration curve method)
- Quantitation measurement
- Creating, saving, and loading template files

The operation explanation uses a sample that emits fluorescent light at around 340 nm for an applied excitation light of 307 nm as an example.

6.1 Startup

Click [Quantitation] on the [Fluorescence] tab in the LabSolutions RF launcher to start the quantitation general analysis application that allows quantitation using the calibration curve method.

6.1.1 [Quantitation - [Measurement]] Window Layout

Open	Save	nent <u>T</u> ools <u>W</u> ind		Measurement	Edit Printform	? Help	
Qnt-01.fqqf Gtandard Table Sample Table			-	Open Au	to Zero	Template: Open Save As File Name: Qnt-01.fqqf	>>> Disconnect
	Add L	ine Edit	Open Sav	ve As			EX EM 307.0 340.0
		Sample Name	Sample ID	Ex (Conc EX307.0_EM	M340.0 Comments	-0.0
	1	Std-1	ID-01		10.000 5	855.497	 Arc Lamp ON (306 hours)
	2	Std-2	ID-02		20.000 8	604.319	
	3	Std-3	ID-03		40.000 13	766.649	Caribration Curve Sample Graph Parameters
	-	1					Standard Curve
Message Emission Side Grating Total Judgment - OK	Add L						14575.434 Standard Curve
Emission Side Grating Total Judgment - OK Digital Signal Process			Sample ID	Conc	EX307.0_EM340.		14575.434 Standard Curve
Emission Side Grating Total Judgment - OK Digital Signal Process Instrument Function	1	ine Edit	Sample ID ID-U91	Conc 21.6	EX307.0_EM340.	0 Comments	14575.434 Standard Curve 12000.000
Emission Side Grating Total Judgment - OK Digital Signal Process Instrument Function Arc Lamp - mounted	1 2	ine Edit			EX307.0_EM340. 81 8974.37	0 Comments	14575.434 Standard Curve
Emission Side Grating Total Judgment - OK Digital Signal Process Instrument Function . Arc Lamp - mounted Flash Lamp - unmoun	1	ine Edit Sample Name Unk-1	ID-U91	21.6	EX307.0_EM340.0 81 8974.37 03 8927.62	0 Comments 2 2	Standard Curve 14575.434 12000.000 10000.000 8000.000
Emission Side Grating Total Judgment - OK Digital Signal Process Instrument Function Arc Lamp - mounted	1 2	ine) Edit) Sample Name Unk-1 Unk-2	ID-U91 ID-U92	21.6 21.5	EX307.0_EM340.1 81 8974.37 03 8927.62 96 8952.04	0 Comments 2 2 2 1	Iteration Standard Curve 14575.434 - 12000.000 - 10000.000 - 8000.000 - 6000.000 -
Emission Side Grating Total Judgment - OK Digital Signal Process Instrument Function. Arc Lamp - mounted Flash Lamp - unmou Mercury Lamp - mou	1 2 3	ine) Edit) Sample Name Unk-1 Unk-2 Unk-3	ID-U91 ID-U92 ID-U93	21.60 21.50 21.59	EX307.0_EM340.1 81 8974.37 93 8927.62 96 8952.04 85 9001.65	0 Comments 2 2 1 1 9	Standard Curve 14575.434 12000.000 10000.000 8000.000

[Quantitation - [Measurement]] Window

NOTE The quantitation application has only the measurement mod	NOTE	The quantitation	application	has only the	measurement mode
---	------	------------------	-------------	--------------	------------------

No.	Name	Function
0	Quantitation measurement toolbar	The buttons used for starting and stopping measurement and performing instrument control are located on this toolbar. Buttons such as [Start] become active after clicking [Connect] and establishing a connection with the instrument.
0	Instrument status	The upper section displays the current wavelength and fluorescence intensity and the lower section displays the status of the spectrofluorophotometer. ▶ Reference For details on the instrument status, see "2.3.3 Instrument Status" P.23.
8	Graph/Parameter view	Displays information including the settings of the currently configured measurement parameters and information and graph of the calibration curve. Clicking [Settings] on the [Parameters] tab displays the window for creating (configuring) the quantitation measurement parameters. When loading an existing measurement parameter file, click [Load].

No.	Name	Function
4	Standard table	Displays information on the standard sample (such as sample information, concentration, and fluorescence intensity) used to create calibration curves.
5	Sample table	Displays information on unknown samples (such as sample information and fluorescence intensity) and quantitation results (concentration).

6.2 Creating and Saving Calibration Curve Files

6.2.1 Configuring Measurement Parameters

Set parameters related to measurement, such as measurement wavelength and instrument conditions, and the calibration curve information used in quantitation.

NOTE When connecting to the instrument in the quantitation general analysis application, measurement parameters must be configured in advance.



Click [Settings] on the [Parameters] tab in the graph/parameter view. The [Quantitation Measurement Parameters Wizard] window is displayed.

Hint If measurement parameter configuration is already complete, the [Quantitation Measurement Parameters Wizard] window is displayed.

2 Set the [Instrument], [Wavelength], [Calibration], [Measurement (Standard)], and [Measurement(Sample)] according to the wizard and click [Finish] when finished.

• [Instrument]

Spectral Bandy			G	
Excitation:	3.0nm	<u>S</u> ensitivity:	Low	•
Emission:	3.0nm	Accumulation	Time: 10ms	•

[Quantitation Measurement Parameters Wizard - [Instrument]] Window

No.	Instrument Condition (Parameter)	Setting
0	[Spectral Bandwidth]	 [Excitation]: 3.0 nm [Emission]: 3.0 nm
0	[Sensitivity]	Low

No.	Instrument Condition (Parameter)	Setting
3	[Accumulation Time]	10 ms

• [Wavelengths]

Click [Add] after setting the following parameters to register the wavelength and automatically create a (modifiable) column name.

	(
	Quantitation Measurement Par	ameters Wizard - [Waveler	ngths]	×
•				
0—	Type: Point	<u>C</u> olumn Name:	EX307.0_EM340.0	
0	EX Wavelength (nm):	307		
0	EM Wavelength (nm):	340		
	Entries:			
	Columns	Туре	Add	
	EX307.0_EM340.0	Point	Remove	
		< <u>B</u> ack	<u>N</u> ext > Canc	el

[Quantitation Measurement Parameters Wizard - [Wavelengths]] Window

No.	Wavelength Condition (Parameter)	Setting
0	[Type]	Point
2	[EX Wavelength (nm)]	307
3	[EM Wavelength (nm)]	340

• [Calibration]

- Type: M	ulti Point	•	Column Na <u>m</u> e:	
<u> </u>	ked Wavelength	-	<u>U</u> nit:	mg/ml
-WL <u>1</u> EX307.0	_EM340.0 🔻	WL <u>2</u>	✓ WL3	
Parameters				
<u>l</u>	nt = f (Conc)	○ Conc = f (Int)		
Int =	K1*(Conc) + K0			
	er of Curve:	1st ▼		
<u>O</u> rde				
	ero Interception			
	ero Interception			

[Quantitation Measurement Parameters Wizard - [Calibration]] Window

No.	Calibration Curve Condition (Parameter)	Setting
0	[Type]	Multi Point
2	[Formula]	Fixed Wavelength
3	[WL1]	(Select the column name of the wavelength registered on the previous screen (wavelengths).)

• [Measurement (Standard)]

	Quantitation Measurement Parameters Wizard - [Measurement (Standard)]
	STD
0-	Data Acguired By: O User Entry O Instrument
0—	Sample Repetitions: 1
	Settings of the decimal place to display Use Rounded Value OFF for Calculation: OFF Settings of the decimal 3 place to display: 3 (for standard sample table and calibration curve)
	< <u>B</u> ack Next > Cancel

[Quantitation Measurement Parameters Wizard - [Measurement (Standard)]] Window

No.	Measurement Condition (Parameter)	Setting
0	[Data Acquired By]	[Instrument]
0	[Sample Repetitions]	1

• [Measurement (Sample)]

	Quantitation Measurement Para	meters Wizard - [Meas	urement (Sample)]
	SMP		
0-	Data Acguired By 💿 User	Entry O Instrument	
0	Sample Repetitions: 1	Prompt before	e repeat
	for Calculation:	OFF i	Follow [Tool] - [User Setting] to carry out this setting. The number of decimal places' digits display can be changed afterward.
		< <u>B</u> ack	Finish Cancel

[Quantitation Measurement Parameters Wizard - [Measurement (Sample)]] Window

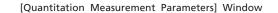
No.	Measurement Condition (Parameter)	Setting
0	[Data Acquired By]	[Instrument]
0	[Sample Repetitions]	1

Click [Close].

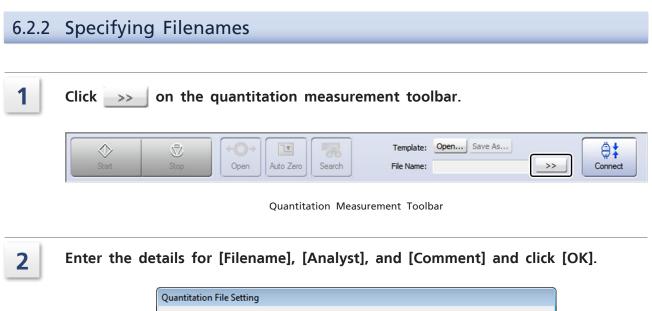
3

The [Quantitation Measurement Parameters] window closes.

Quantitation Measurement	Parameters			
Measurement (Sample)	Equations	Pass/Fail	Instrument	Attachment
Wavelengths	Calibrati	on	Measurement	(Standard)
Type: Point	•	<u>C</u> olumn Name:	EX350.0_EM4	00.0
EX Wavelength (nm):	350			
EM Wavelength (nm):	400			
Entries:				
Columns	Ту	be		Add
EX307.0_EM340.0) Poi	nt		Remove
Save As				Close



▶ Reference For details on the setting procedure of other parameters (such as for the calculation function and attachments), refer to the help file provided with LabSolutions RF.



<u>F</u> ilename:	C:\RF-Data\Data\Qnt-01.fqqf	ڪ 🗊
<u>A</u> nalyst:	Shimadzu	
<u>C</u> omment:	File comment	*
	OK	

[Quantitation File Setting] Window

The name of the quantitation file is displayed on the quantitation measurement toolbar.



Quantitation Measurement Toolbar

6.2.3 Connecting to the Instrument

In the quantitation general analysis application, a connection with the instrument cannot be established unless the measurement parameters have been configured in advance.

NOTE Closing a quantitation file by clicking [Close] on the [File] menu will clear the configured measurement parameters thereby automatically disconnecting from the instrument.



Quantitation Measurement Toolbar

6.2.4 Creating a Standard Table

Sample Name Sample ID Option Type	Add Line	Open Save As	
	Sample Nam	e Sample ID Optic	on Type



Enter the number of lines to add and click [OK].

Add Line	
Number of Line:	
OK Cancel	

[Add Line] Window

6

6 Quantitation



4

Click the select all cells button and then click [Edit].

Hint Separate rows can be selected by clicking the corresponding number button on the left edge of the table (multiple rows can be selected in the same manner by holding down the "Shift" key).





Set the sample information in the [Edit Table] window and click [OK].

Hint Sample information (such as sample name and sample ID) can be directly entered into the table or copied and pasted from other application software.

Sample Name				
		🔽 Use seque	ntial numbe	er
Name:		First No.:	Step:	
Std-	+	1		1
Sample ID				
		🔽 Use seque	ntial numbe	er
Name:		First No.:	Step:	
ID-0	+	1		1
Option				
		🔽 Use seque	ntial numbe	er
Name:		First No.:	Step:	
Option	+	1		1
				-

[Edit Table] Window

Open the right-click menu on the standard table and click [Properties].

Add L	.ine Edit	Open Save As					
	Sample Name	Sample ID	Ontion Type	2	Ex	Conc	[
1 *	Std-1	ID-01	Сору				
2	Std-2	ID-02	Paste				
3	Std-3	ID-03	Select All				
•			Show Repeats Hide Excluded Lines Delete Line				
			Print				
			Properties				

Right-Click Menu of the Standard Table



5

Hide the columns that are unnecessary in this example ([Option], [Type], [Wgt. Factor]).

lumns			
Columns	Status	•	
Sample Name	Show		Hide
Sample ID	Show	E	Chau
Option	Hide		Show
Туре	Hide		Show All
CX	SHOW		
Date	Hide	-	
7			

[Standard Table Properties] Window



Enter the concentration of each standard sample into the standard table.

Add L	Line Edit	Open Save					
	Sample Name	Sample ID	Ex	Conc	EX307.0_EM340.0	Wgt.Factor	Comments
1*	Std-1	ID-01		10.000		1.000	
2	Std-2	ID-02		20.000		1.000	
3	Std-3	ID-03		40		1.000	

Entering Concentrations into the Standard Table

6.2.5 Measuring Standard Samples (Creating Calibration Curves) and Saving Calibration Curve Files



2

Click on the standard table to activate it (the standard table becomes enclosed in a red frame).

Check that the shutter is closed (\bigcirc) and then click [Auto Zero] on the

quantitation measurement toolbar.



4

Place a standard sample in the instrument's sample compartment and close the lid.

Click [Start] on the quantitation measurement toolbar.

The measurement value is displayed in the wavelength column. Clicking the [Calibration] tab in the graph/parameter view displays the data point plotted on a calibration curve graph.



To display the calibration curve function or the squared correlation coefficient on the [Calibration Curve] tab, select [Calibration Curve Statistics] on the [Graph] menu.

Repeat the same operations with respect to the other prepared standard samples.

				W	/aveleng	th co	olumn					
Quantitation(RF_01)-[Me	easurem	ient]								- • •		
<u>File Edit View G</u> raph	Instru	ment <u>T</u> ools <u>W</u> ind	dow <u>H</u> elp									
Copen	H Save	Print		surement	Edit Printform		? Help					
Grt-01.fqqf Grt-01 Standard Table		€ Start	Stop		Search	Templ File Na	late: Open Save As ame: Qnt-01.fqqf	_>>		Disconnect		
	Add	Line Edit	Open Save A	s				EX 307.	EM 0 340.0			
		Sample Name	<u> </u>	x Conc	EX307.0_EM		Comments	Caribra	tion Curve	e		[Calibration
	1	Std-1	ID-01	10.000		55.497		145	75.434	Standard Curve		Curve] tab
	2	Std-2 Std-3	ID-02 ID-03	40.000	10.0	04.319 66.649			00.000 -			Curvejtab
Message Excitation Side Sitt M Excitation Side Gratin	-	Line Edit	10-03	40.000	137	00.043	JJ		00.000 -			
Shutter Motor Check	Add	Line						Ite				
Emission Side Slit Mc Emission Side Gratine		Sample Name	e Sample ID	Option	Туре	E	Ex Conc E		00.000	Ø	Ν	
Total Judgment - OK								00	00.000		$ \rangle$	
Instrument Function												Data nainta
Arc Lamp - mounted Mercury Lamp - unm								60	00.00		-	Data points
Integrating Sphere - I								50	62.775Ľ			
Sipper - Not Used	•						,		10.00	0 20.000 30.000 40.000 Conc. (mg/ml)		
C:\RF-Data\Parameters\Qnt	-01.fmq	f loaded						_]		ai ai		

Quantitation Measurement of Standard Samples

5 Once measurement of all standard samples is complete, click [Save] on the main toolbar.

Save the quantitation file before creating a calibration curve file.





6

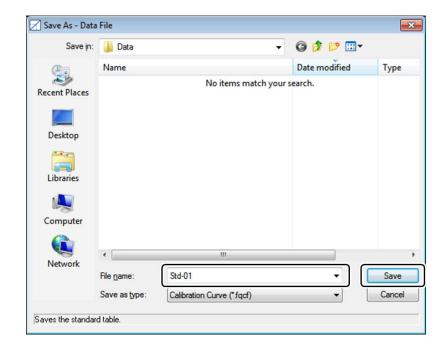
Click [Save As] above the standard table.

Add	Line Edit					
	Sample Name	Sample ID	Ex	Conc	EX307.0_EM340.0	Comments
1	Std-1	ID-01		10.000	5855.497	
2	Std-2	ID-02		20.000	8604.319	
3	Std-3	ID-03		40.000	13766.649	

Saving a Calibration Curve File

7

Enter a name for the calibration curve file and click [Save].



[Save - Data File] Window

6.3 Quantitation



Click on the sample table to activate it (the sample table becomes enclosed in a red frame).

2

Use [Add Line] above the sample table to create a number of lines equal to the number of samples for measurement and enter the sample information.

▶ Reference For details on the procedure for adding rows and editing the table, see "6.2.4 Creating a Standard Table".

Add Lir	ne Edit				
[]	Sample Name	Sample ID	Conc	EX307.0_EM340.0	Comments
*	Unk-1	ID-U91			
1	Unk-2	ID-U92			
	Unk-3	ID-U93			
	Unk-4	ID-U94			
1	Unk-5	ID-U95			

[Add Line] Above the Standard Table



4

Check that the shutter is closed and then click [Auto Zero] on the quantitation measurement toolbar.

Place the sample in the instrument's sample compartment and close the lid.

Click [Start] on the quantitation measurement toolbar.

A measurement value is displayed in the wavelength column and the concentration calculated using the calibration curve is displayed in the concentration column. Clicking the [Sample Graph] tab in the graph/parameter view displays the data point plotted on a sample graph.

Repeat the same operations with respect to the other prepared samples.

Add Li										
	ine Edit	Open Say	ve As				EX EM 307.0 340.0			
	Sample Name	Sample ID	Ex	Conc	EX307.0_EM340.0	Comments	0.0			
1	Std-1	ID-01		10.000	5855.497		🗸 Arc Lamp ON	✓ Arc Lamp ON (306 hours)		
2	Std-2	ID-02		20.000	8604.319					
3	Std-3	ID-03		40.000	13766.649		Caribration Curve Sar	mple Graph Parameters		
							21 800 -	_		
Add Li		Sample IF	Con	EX	307.0 EM340.0	Commonte	21.800 - - 	. *		
Add Li	Sample Name	Sample ID	Conc 21		307.0_EM340.0	Comments				
1		Sample IC ID-U91 ID-U92	21.	c EX	307.0_EM340.0	Comments	-	. • *		
	Sample Name Unk-1	ID-U91	21. 21.	.681	8974.372	Comments		. • *		
1	Sample Name Unk-1 Unk-2	ID-U91 ID-U92	21. 21. 21.	.681 .503	8974.372 8927.622	Comments		. • *		

Quantitation Measurement Results



5

Once measurement of all samples is complete, click [Save As] on the main menu bar.

A quantitation file is saved using the filename displayed on the quantitation measurement toolbar.

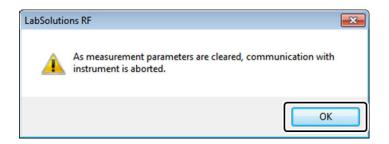


Quantitation Measurement Toolbar



Close the quantitation file by clicking [Close] on the [File] menu.

A message window indicating that communication with the instrument will end. Click [OK].



6.4 Saving and Loading Template Files

Quantitation template files are convenient when performing repeated quantitation measurements using the same standard samples because they include measurement parameter information, standard table information, and sample table information (excluding measurement data).

Template files can be created from existing data files. This section explains the procedure for saving and loading template files.



Click [Open] on the main toolbar.

Select the source quantitation data file in the [Open Data File] window and click [Open] to open the file.

🖉 Open - Data Fi	ile				×
Look in:	鷆 Data		•	G 🤌 📂 🛄 -	
(An	Name			Date modified	Туре
Recent Places	Mr Qnt-01			2/10/2015 4:35 PM	FQQF File
Desktop					
Libraries					
Computer	1				Þ
	File name:	Qnt-01		- [Open
Network	Files of type:	Quantitation (*.fqqf)			Cancel

[Open - Data File] Window (Quantitation)

-
-

Click [Save As] - [Template] on the [File] menu.

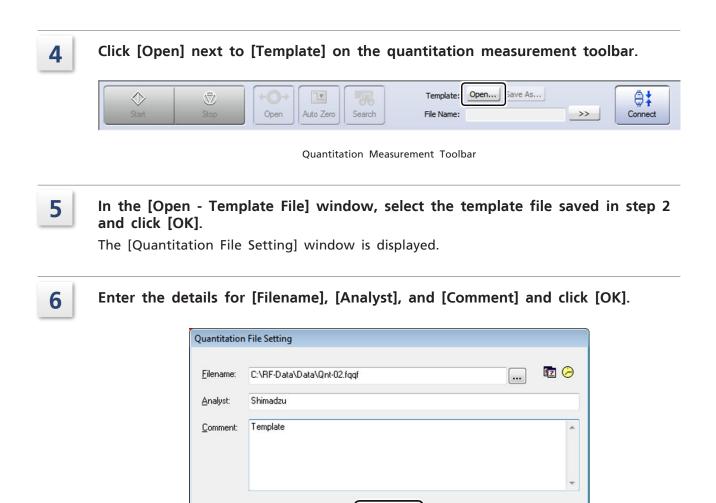
Enter the template filename and click [OK] to save the quantitation data file as a template file.

Hint The folder specified for [Template Folder] in [Destination Folder] on the [Tools] menu is displayed as the default save location.



Click [Close] in the [File] menu.

This clears the loaded data, table information, and measurement parameter settings (returns to the startup state).



OK

[Quantitation File Setting] Window

7

This sets the measurement parameters and loads the standard sample and sample table information.

Click [Connect] on the quantitation measurement toolbar to establish communication with the instrument and then perform quantitation measurement.

Quantitation(RF-01)-[Mea			w Help								×
Open -	H Save	e e e e e e e e e e e e e e e e e e e		I leasuremen	,	Edit Printform		Provide the second s			
Qnt-002 fqqf Gamma and Table Sample Table			~	Open	Auto Zero	Search		ame: Qnt-002.fqqf	Jisconne	st	
	Add L	ineEdt	Open	e As					EX EM 307.0 340.0		
		Sample Name	Sample ID	Ex	Conc	EX307.0 EM34	0.0	Comments	-0.0		
	1*	Std-1	ID-01		10.000				✓ Arc Lamp ON (36	3 hours)	_
	2	Std-2	ID-02		20.000		-				
	3	Std-3	ID-03		40.000		-		Caribration Curve Sample	Curry Daramaters	1
									Parameter	value	*
message									[Instrument]		
Excitation Side Grating Shutter Motor Check -	-								EX Bandwidth EM Bandwidth	3.0 nm 3.0 nm	=
Emission Side Slit Mot	Add L	ine Edit							Sensitivity	Low	
Emission Side Grating				-					Accumulation Time	10 ms	
Total Judgment - OK	1*	Sample Name	Sample ID	Con	C EX.	307.0_EM340.0		Comments	[Wavelengths]		-
Instrument Function A	1.1	Unk-1	ID-U91						Column Name 1	EX307.0 EM340.	0
Arc Lamp - mounted	2	Unk-2	ID-U92						EX Wavelength	307.0 nm	
Arc Lamp - Total Light E	3	Unk-3	ID-U93						EM Wavelength	340.0 nm	
Mercury Lamp - unmo Integrating Sphere - N	4	Unk-4	ID-U94						[Calibration Curve]		-
Sipper - Not Used	5	Unk-5	ID-U95						Column for Cal. Curve	EX307.0_EM340.	0
Connection - Passed									Cal. Curve Type	Multi Point	
<									Cal. Ourve Unit	ma/ml	
C:\RF-Data\Template\Qnt-00	 2.fqtf loi	aded	_		_						 /d

Main Window After Loading a Template File

7 Photometric

This chapter explains how to operate the photometric general analysis application.

Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedures for measuring using a user-defined calculation function and the pass/fail judgment function as well as saving the results of these functions.

The following table shows the files that can be created by the photometric application and the settings and data contained in these files (indicated with a check mark).

NOTE Measurement parameter configuration is explained assuming that a connection is established between an RF-6000 and LabSolutions RF.

File Type	Measurement Parameter Settings (Including Calculation Formula Parameters)	Data and Information in the Sample Table
Measurement parameter file	\checkmark	-
Photometric file	\checkmark	\checkmark
Template file	\checkmark	 ✓ (excluding measurement data^{*1})

*1 This refers to information and values that can be directly entered into tables, such as sample information (sample name and ID) and factors.

Functions Used in this Chapter

The following functions are used in photometric measurement.

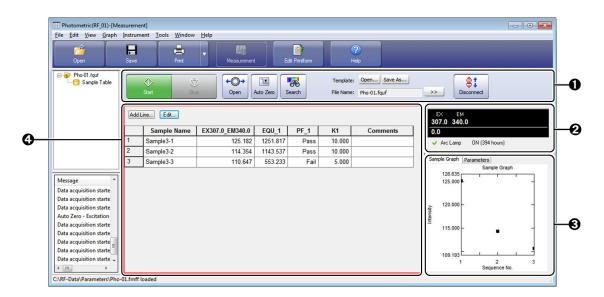
- Creating measurement parameters (including creation of calculation formulas and judgment equations)
- Creating a sample table
- Creating and saving a sample file

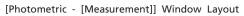
The operation explanation uses a sample that emits fluorescent light at around 340 nm for an applied excitation light of 307 nm as an example.

7.1 Startup

Click [Photometric] on the [Fluorescence] tab in the LabSolutions RF launcher to start the photometric general analysis application that allows obtaining of fluorescence intensity at any wavelength, or a calculation result using that fluorescence intensity.

7.1.1 [Photometric - [Measurement]] Window Layout





	NOTE The photometric application only has the measurement mode.						
No.	Name	Function					
0	Photometric measurement toolbar	The buttons used for starting and stopping measurement and performing instrument control are located on this toolbar. Buttons such as [Start] become active after clicking [Connect] and establishing a connection with the instrument.					
0	Instrument status	The upper section displays the current wavelength ar fluorescence intensity and the lower section displays the status of the spectrofluorophotometer. Reference For details on the instrument status, see "2.3 Instrument Status" P.23.					
0	Graph/Parameter view	Displays information including the settings of the currently configured measurement parameters as well as information and a graph of the calibration curve. Clicking [Settings] on the [Parameters] tab displays the window for creating (configuring) the photometric measurement parameters. When loading an existing measurement parameter file, click [Load].					
4	Sample table	Displays sample information and measurement results.					

7.2 Configuring Measurement Parameters

Configure measurement parameters as well as calculation and judgment equations that use captured data.

Photometric measurement parameters comprise measurement related parameters of "wavelength", "measurement (sample)", "instrument", and "attachments" as well as user-definable parameters of "calculation formulas" and "pass/fail" judgment. These settings are configured in the graph/parameter view.

7.2.1 Configuring Measurement Parameters (Related to Measurement)

Set the parameters related to measurement, such as measurement wavelength and instrument conditions.

NOTE When connecting to the instrument in the photometric general analysis application, measurement parameters must be configured in advance.



EX EM	
OFF	
Sample Graph Param	eters
Settings	Load
Parameter	Value

Parameter View

The [Photometric Measurement Parameters Wizard] window is displayed.

Hint If measurement parameter configuration is already complete, the [Photometric Measurement Parameters Wizard] window is displayed.



- Set the [Instrument], [Wavelength], and [Measurement(Sample)] according to the wizard and click [Finish] when finished.
- [Instrument]

	Photometric Measurement Parameters Wizard - [Instrument]	
0	Spectral Bandwidth Excitation: 3.0nm Emission: 3.0nm Accumulation Time:	-0 -0
	< Back Cancel	

[Photometric Measurement Parameters Wizard - [Instrument]] Window

No.	Instrument Condition (Parameter)	Setting			
0	[Spectral Bandwidth]	 [Excitation]: 3.0 nm [Emission]: 3.0 nm			
0	[Sensitivity]	Low			
3	[Accumulation Time]	10 ms			

• [Wavelengths]

Click [Add] after setting the following parameters to register the wavelength and automatically create a (modifiable) column name.

	Photomet	ric Measurement Par	ameter	s Wizard - [Wavel	engths]		×
0	Туре:	Point		<u>C</u> olumn Name:	EX307.0	_EM340.0	
0—	EX W	avelength (nm):	307				
0—	EM W	avelength (nm):	340				
	Entries	3:					
		Columns		Туре		Add	
		EX307.0_EM340.0		Point		Remove	
				< <u>B</u> ack	<u>N</u> ext >	Cance	1

[Photometric Measurement Parameters Wizard - [Wavelengths]] Window

No.	Wavelength Condition (Parameter)	Setting
0	[Type]	Point
0	[EX Wavelength (nm)]	307
3	[EM Wavelength (nm)]	340

• [Measurement (Sample)]

Photometric Measurem	ent Parameter	s Wizard - [Mea	surement (Sample)]
SMP			
— Data Acguired By	© <u>U</u> ser Entry	Instrument	
<u>Sample Repetitions:</u>	1	Prompt befo	re repeat
Use Rounded Valu for Calculation: Settings of the deci place to display:	e OFF imal 3))	Follow [Tool] - [User Setting] to cany out this setting. The number of decimal places' digits display can be changed afterward.
	Data Acguired By Data Acguired By Sample Repetitions: Settings of the decim Use Rounded Valu for Calculation: Settings of the deci place to display:	Data Acguired By User Entry Sample Repetitions: 1 Settings of the decimal place to displation: Settings of the decimal place to display:	Settings of the decimal place to display Use Rounded Value for Calculation: Settings of the decimal

[Photometric Measurement Parameters Wizard - [Measurement (Sample)]] Window

No.	Measurement Condition (Parameter)	Setting
0	[Data Acquired By]	Instrument
2	[Sample Repetitions]	1

The [Photometric Measurement Parameters] window is displayed.

Vaveleng	gths	Measurement (S	Sample)	Equations	Pass/Fa	il Instrument	Attachment
Туре:	Po	int 👻		Column	Name:	EX350.0_EM4	400.0
EX Wa	veler	ngth (nm):	350				
EM Wa	avele	ength (nm):	400				
Entries	12.00			-			144
	Columns			Туре			Add
	EX3	07.0_EM340.0		Point			Remove
- L							

[Photometric Measurement Parameters] Window

▶ Reference For details on the setting procedure of other parameters (such as for attachments), refer to the help file provided with LabSolutions RF.

7.2.2 Measurement Parameter Settings (Calculation Forumulas / Judgment Equations)

Register a calculation formula / judgment equation in order to display calculation results and judgment results, which use captured measurement values, in the sample table. This section explains the procedure for displaying measurement results in the sample table together with a pass or fail, which is determined by multiplying a measurement value by the factor K1, where a result of 1000 or more is considered a pass and less than 1000 is a fail.

Registering a Calculation Formula

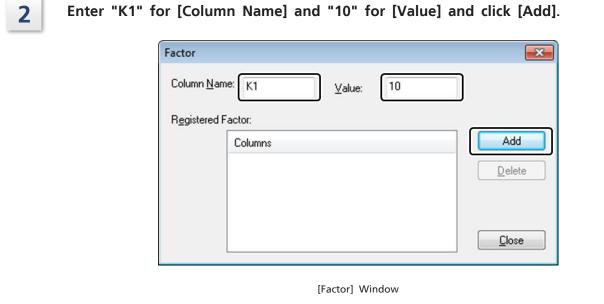
1

Click [Factors] on the [Equations] tab in the [Photometric Measurement Parameters] window.

Wavelengths	Measurement (Sample)	Equations	Pass/Fai	I Instrument	Attachment
<u>Type:</u>	Custom 🔻				
Column <u>N</u> ame:	EQU_1	<u>U</u> nit: mg	ı/ml		Eactors
Equation:					Clear
Build (doub	le click to add an item to	equation)			
<u>C</u> olumns:	EX307.0_EM340.0	<u>Q</u>	perators:	+ - /	*
Entries:					
	Columns				Add
				ſ	Remove

[Photometric Measurement Parameters] Window

7 Photometric





Check that "K1" is added to the [Registered Factor] list and then click [Close].

Set the calculation formula.

4

Do not change the value of [Column Name] ("EQU_1") from its default setting. This item is explained later in this section.

Wavelengths	Measurement (Sample	Equations	Pass/Fail	Instrument	Attachment
<u>T</u> ype:	Custom 👻	2			
Column Name:	EQU_1	<u>U</u> nit: mg/i	ml		Factors
Equation:	EX307.0_EM340.0*K	1			Clear
Entries:	Caluma		L		Add
	Columns				<u>A</u> dd <u>R</u> emove

Setting the Calculation Formula

- 1 Double-click [EX307.0_EM340.0] in the [Columns] list of the [Build] area.
- 2 Double-click [*] in the [Operators] list of the [Build] area.
- 3 Double-click [K1] in the [Columns] list of the [Build] area. The set calculation formula is displayed in the [Equation] field.



Click [Add].

The created calculation formula is registered with the column name of "EQU_1".

Navelengths	Measurement (Sample)	Equa	tions	Pass/Fai	Instrument	Attachment
Type:	Custom 🔻					
Column <u>N</u> ame:	EQU_2	<u>U</u> nit:	mg/	ml		Factors
Equation:						Clear
Build (doub	le click to add an item to	equatio	n)			
<u>C</u> olumns:	EX307.0_EM340.0 K1 EQU_1		Op	erators:	+ - /)	* •
Entries:						
	Columns					Add
	EQU_1					<u>R</u> emove

Registering a Calculation Formula

Registering a Judgment Equation

- Click the [Pass/Fail] tab in the [Photometric Measurement Parameters] window.
 Set the judgment equation. Do not change values of [Column Name] ("PF_1"), [Passed Text], or [Failed Text] from their default settings. These items are explained later in this section.
 - Hint [Passed Text] and [Failed Text] are used as the judgment result in the judgment result column of the sample table.

Wavelengths	Measurement (Sample) Equation Pass/Fail	nstrument Attachment
Column <u>N</u> am	e: PF_1	— %
Passed Text	Pass Failed Text: Fail	Eactors
Equation:	EQU_1>=1000	Clear
Entries:		>=, &
Entries:	Columns	<u>A</u> dd <u>R</u> emove

Setting a Judgment Equation

- 1 Double-click [EQU_1] in the [Columns] list of the [Build] area.
- 2 Double-click [>=] in the [Operators] list of the [Build] area.
- 3 Enter "1000" to the end of the string in the [Equation] field. The set judgment equation is displayed in the [Equation] field.



Click [Add].

The created judgment equation is registered with the column name of "PF_1".

avelengths	Measurement (Sample)	Equations	Pass/Fail	Instrument	Attachment
Column Name	: PF_2				
Passed Text:	Pass	Failed Text:	Fail		Eactors
Equation:					Clear
Build (double	e click to add an item to	equation)			
<u>C</u> olumns:	EX307.0_EM340.0 K1 EQU_1 PF_1	Qp	I	< != >= <= &	•
Entries:	Columns				Add
	PF_1				<u>R</u> emove

Registering a Judgment Equation



Click [Close].

This closes the [Photometric Measurement Parameters] window.

The "EQU_1" column and "K1" column registered on the [Equations] tab and the "PF_1" column registered on the [Pass/Fail] tab are added to the sample table.

7.3 Photometric Measurement

7.3.1 Specifying Filenames

1	Click >>> on the	photometric measurer	ment toolbar.	
	Start Stop	← O+ Open Auto Zero Search	Template: Open Save As File Name:	>>> Connect
		Photometric Measu	rement Toolbar	



Enter the details for [Filename], [Analyst], and [Comment] and click [OK]. The filename is displayed for [Photometric File] on the photometric measurement toolbar.

Photometric	File Setting	
<u>F</u> ilename:	C:\RF-Data\Data\Pho-01.fquf	1
<u>A</u> nalyst:	Shimadzu	
<u>C</u> omment:	Photometric file comment	
		-
	ОК	

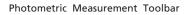
[Photometric File Setting] Window

7.3.2 Connecting to the Instrument

In the photometric general analysis application, a connection with the instrument cannot be established unless the measurement parameters have been configured in advance.

NOTE Closing a photometric file by clicking [Close] on the [File] menu will clear the configured measurement parameters thereby automatically disconnecting from the instrument.

\Diamond	Ŵ	+O →	V		Template:	Open Save As		(ät
Start		Open	Auto Zero	Search	File Name:	Pho-01.fquf	>>	Connect



7.3.3 Creating a Sample Table



Open the right-click menu on the sample table and click [Properties].

Properties	
Print	
Delete Line	
Hide Excluded Line	s
Show Repeats	
Select All	
Paste	
Сору	

Right-Click Menu of the Sample Table

2 Hide the columns that are unnecessary in this example (those other than [Sample Name], [Comment], [EQU_1], [K1], and [PF_1]).

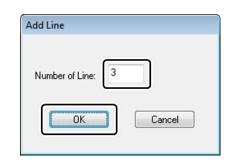
Columns	Status	^ c	
Time	Hide		<u>H</u> ide
Comments	Show	L.	Show
EX307.0_EM340.0	Show		<u></u>
K1	Show	E	Sh <u>o</u> w All
EQU_1	Show		
PF 1	Show	-	

[Sample Table Properties] Window

3	Click	Click [Add Line] above the sample table.						
	Add	Line Edit						
		Sample Name	EX307.0_EM340.0	EQU_1	PF_1	K1	Comments	

[Add Line] Above the Sample Table

4 Enter the number of lines to add and click [OK].





5

Enter the name of the sample to measure.

- **Hint** All sample information can also be edited at once using the edit function or copied and pasted from other application software.
- ▶ Reference For details on the procedure for adding rows or editing tables, see "6.2.4 Creating a Standard Table" or refer to the help file provided with LabSolutions RF.

Add Line Edit							
	Sample Name	EX307.0_EM340.0	EQU_1	PF_1	K1	Comments	
1*	Sample3-1				10.000		
2	Sample3-2				10.000		
3	Sample3-3				10.000		

Entering Sample Names

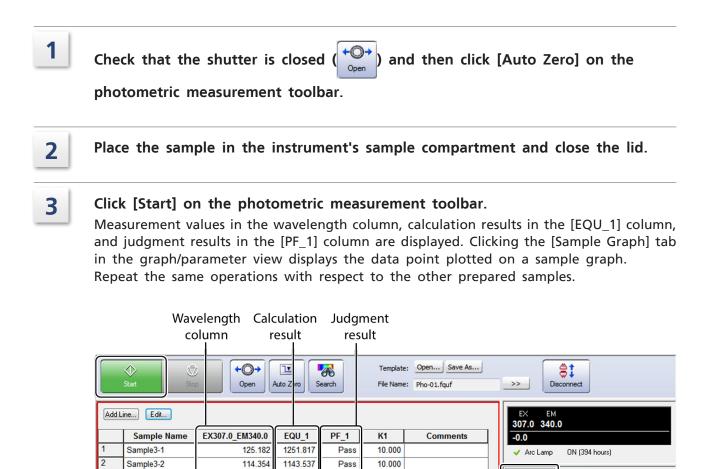
6

Change the factor under [K1] of "Sample3-3" to "5".

Add	Line Edit					
	Sample Name	EX307.0_EM340.0	EQU_1	PF_1	K1	Comments
1*	Sample3-1				10.000	
2	Sample3-2				10 000	
3	Sample3-3				5	

Changing Factors

7.3.4 Measuring Samples and Saving Photometric Files



Sample Measurement Results

5 000

Fail

Sample Graph

126.635

120.00

115.000

109.193 t

Intensity

rameters

Sample Graph

2

Sequence No

3

Once measurement of all samples is complete, click [Save As] on the main menu bar.

A photometric file is saved using the filename displayed on the photometric measurement toolbar.

\bigcirc	Ŵ	→ ⊗+			Template:	Open Save As	_	81
Start	Stop	Close	Auto Zero	Search	File Name:	Pho-01.fquf	<u>>></u>	Disconnect



Sample3-3

3

4

110 647

553 233

8 Time Course

This chapter explains how to operate the time course general analysis application.

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedures for measuring time-course intensities, automatically printing results upon completion, and calculating activity values when using samples with intensities that change over time.

NOTE Measurement parameter configuration is explained assuming that a connection is established between an RF-6000 and LabSolutions RF.

Functions Used in this Chapter

The following functions are used in time course measurement mode and view mode.

- Configuring measurement parameters (including auto print function settings)
- Auto file function (setting filenames automatically)
- Time course measurement
- Calculating activity values using the main table

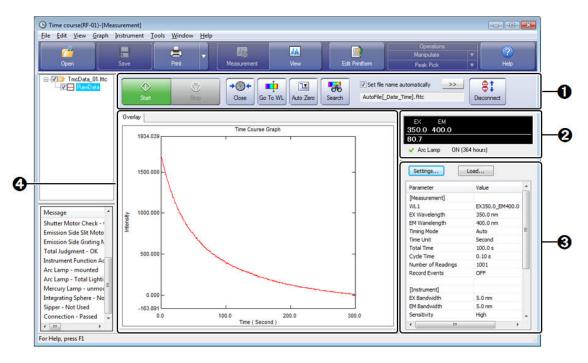
The operation explanation uses a sample that emits fluorescent light at around 340 nm for an applied excitation light of 200 nm as an example.

8.1 Startup

Click [Time course] on the [Fluorescence] tab in the LabSolutions RF launcher to start the time course general analysis application that allows measurement of changes in intensity over time.

The [Time course] window features a "measurement mode", "view mode", and "edit print form mode" and the mode can be changed by clicking the relevant button on the main toolbar.

8.1.1 [Time course - [Measurement]] Window Layout



[Time course - [Measurement]] Window

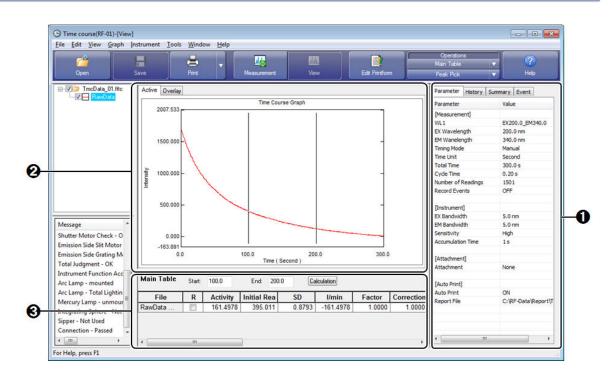
The measurement mode is used when controlling an instrument to perform measurement.

No.	Name	Function
0	Time course measurement toolbar	The buttons used for starting and stopping measurement and performing instrument control are located on this toolbar. Buttons such as [Start] become active after clicking [Connect] and establishing a connection with the instrument.
0	Instrument status	The upper section displays the current wavelength and fluorescence intensity and the lower section displays the status of the spectrofluorophotometer. Reference For details on the instrument status, see "2.3.3 Instrument Status" P.23.

Reference For details and operation method of the "edit print form mode" window, see "10 Printing" P.135.

No.	Name	Function			
3	Parameter view	Displays the settings of the currently configured measurement parameters (settings such as parameters related to measurement and whether to perform automatic printing). This view is used to configure, save, and load measurement parameters.			
0	Time course graph view	Displays a time course graph in real time during measurement. Only [Overlay] is available as the graph display method.			
4	Time course graph view	 Hint Displaying and hiding of the time course graph is performed in the tree view. Reference For details on the operating procedure, see "1.2. 1 Tree View Operations" P.13. 			

8.1.2 Time course - [View] Window Layout



[Time Course - [View]] Window

The view mode is used to perform operations including data processing with respect to captured or saved data.

No.	Name	Function				
0	Parameter view	Displays measurement parameter information, data history, summary information (such as sample information and instrument information), and event records of the active data.				
0	Time course graph view	 Displays a time course graph of the loaded data. [Active] and [Overlay] are available as graph display methods. Hint Displaying and hiding of the time course graph is performed in the tree view. Reference For details on the operating procedure, see "1.2. 1 Tree View Operations" P.13. 				
8	Data processing view	Displays the parameter setting window for the main table, data printing, and data calculation. Reference For details on data processing, see "9 Data Processing" P.118.				

8.2 Configuring and Saving Measurement Parameters

Create (configure) measurement parameters for measuring changes in fluorescence intensity over time and save them to a file.

Measurement parameters can be set by loading a saved measurement parameter file. Time course measurement parameters comprise "wavelength (parameters)",

"measurement (parameters)", "instrument (parameters)", and "attachments" and are configured in the parameter view.

8.2.1 Configuring Measurement Parameters

▶ Reference For details on each measurement parameter item, refer to the help file provided with LabSolutions RF.

Click [Settings] in the parameter view.

350.0 400.0		
-0.0		
🗸 Arc Lamp 🛛 ON	(394 hours)	
Settings	Load	
		-
Parameter	Value	-
Parameter [Measurement]	Value	^
	Value EX350.0_EM400.0	•
[Measurement]		•

parameter view - [Settings]

The [Time Course Measurement Method] window is displayed.

2 Set the wavelength conditions (parameters) on the [Wavelength] tab and click [Add].

The measurement wavelength is registered and a (modifiable) name is automatically generated.

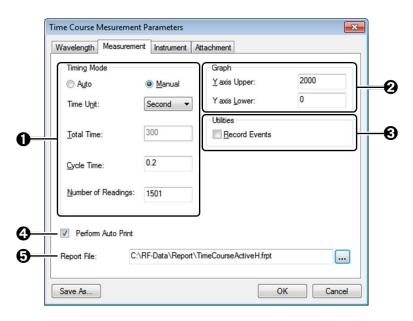
NOTE Delete the wavelengths used in the previous measurement before adding new wavelengths for measurement.

Navelength	Measurement	Instrument	Attach	ment			
Waveleng	th	_		Add	Edit	Delete	в
Excitation	200.0	WL	Name		EX	EM	
Emission:	340.0						
<u> </u>			WL	Name		EX	EM
			1	EX200.0_EM34	0.0	200.0	340.0

[Time Course Measurement Method] Window ([Wavelength] Tab)

Wavelength Condition (Parameter)	Setting
Wavelength	• [Excitation]: 200.0 (nm)
	• [Emission]: 340.0 (nm)

3 Configure the measurement conditions (parameters) on the [Measurement] tab.



[Time Course Measurement Method] Window ([Measurement] Tab)

No.	Measurement Condition (Parameter)	Setting		
		• [Timing Mode]: Manual		
		• [Time Unit]: Second		
0	[Timing Mode]	• [Total Time]: 300 ^{*1}		
		• [Cycle Interval]: 0.2		
		• [Number of Reading]: 1501		
2	[Graph]	• [Y axis Upper]: 2000		
G		• [Y axis Lower]: 0		
3	[Utilities]	• [Record Events]: Unselected		
4	[Perform Auto Print] Selected			
6	[Report File]	C:\RF-Data\Report\TimeCourseActiveH.frpt		

*1 When using the manual setting, the measurement time is automatically calculated using the entered data interval and number of data points.

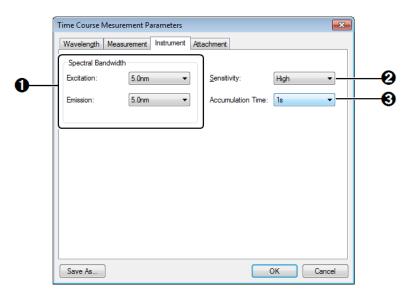
Hint While the full path of the report filename can be directly entered into the [Report File] field, the report file can also be selected in the [Select File] window displayed by clicking [...] (browse).

Look in:	🔒 Report	•	🎯 🤌 📂 🛄 -		
(Pa)	Name		Date modified	Туре	
	B SpectrumPointPick		1/9/2015 3:59 PM	FRPT F	
Recent Places	TimeCourseActiveH		2/3/2015 1:40 PM FRPT		
	TimeCourseActiveV		1/9/2015 4:16 PM	FRPT F	
	TimeCourseBatchPointPick		1/9/2015 4:16 PM FRP		
Desktop	TimeCourseDataPrint		1/9/2015 4:15 PM		
	TimeCourseDifference		12/12/2014 3:15 PM	FRPT F	
1000 B	TimeCourseEvent	1/9/2015 4:15 PM	FRPT F		
Libraries	TimeCourseMainH		12/16/2014 1:45 PM		
	🔚 TimeCourseOverlayH		1/9/2015 4:14 PM	FRPT F	
	P TimeCourseParameters		1/9/2015 4:13 PM	FRPT F	
Computer	TimeCoursePeakArea		1/9/2015 4:12 PM		
(A)	TimeCoursePeakPick		1/9/2015 4:10 PM	FRPT F	
	TimeCoursePointPick		1/9/2015 4:10 PM	FRPT F	
Network	•				
	File name: TimeCourseActiveH			Open	

[Select File] Window



Configure the instrument conditions (parameters) on the [Instrument] tab.



[Instrument] Tab

No.	Instrument Condition (Parameter)	Setting			
0	[Spectral Bandwidth]	 [Excitation]: 5.0 nm [Emission]: 5.0 nm			
2	[Sensitivity]	High			
8	[Accumulation Time]	1 s			

8.2.2 Saving Measurement Parameters

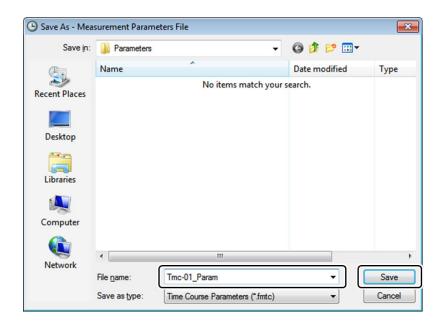
2

Click [Save As] in the [Time Course Measurement Method] window.

The [Save As - Measurement Parameters File] window is displayed.

Enter a name for the measurement parameter file and click [Save].

The file is saved and the configured measurement parameters are accepted for use.



[Save As - Measurement Parameters File] Window

8.3 Configuring the Auto File Function (Setting Filenames Automatically)

Filenames with the measurement start date and time or serial number appended to an arbitrary character string can be created automatically.

This sections explains the settings for starting measurement without displaying the [New Data Set] window after clicking [Start].

- **Hint** File information, such as the sample name, ID, and comments, can be entered for each measurement by displaying the [New Data Set] window.
- ▶ Reference For details on this function and setting items, refer to the help file provided with LabSolutions RF.



Select the [Set file name automatically] checkbox on the time course measurement toolbar.

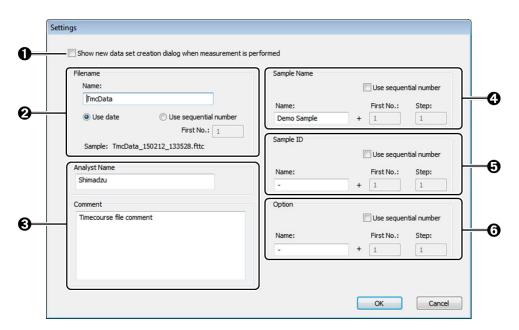
The [Settings] window of the auto file function is displayed.

NOTE If the checkbox is already selected, click >> .



Time Course Measurement Toolbar

Set the auto file function conditions (parameters).



[Settings] Window

No.	Condition (Parameter)	Setting		
0	[Show new data set creation dialog when measurement is performed]	No (unselected)		
0	[Filonamo]	• [Name]: TmcData		
	[Filename]	• [Use date]/[Use sequential number]: [Use date]		
8	[Analyst Name]	Enter a name.		
4	[Sample Name]	• [Name]: Demo Sample		
		• [Use sequential number]: No (unselected)		
6	[Sample ID]	• [Name]: -		
•		• [Use sequential number]: No (unselected)		
6	[Option]	• [Name]: -		
•		• [Use sequential number]: No (unselected)		

3

2

Click [OK].

The [Settings] window closes and the filename is displayed on the time course measurement toolbar.



Time Course Measurement Toolbar

8.4 Time Course Measurement

1

3

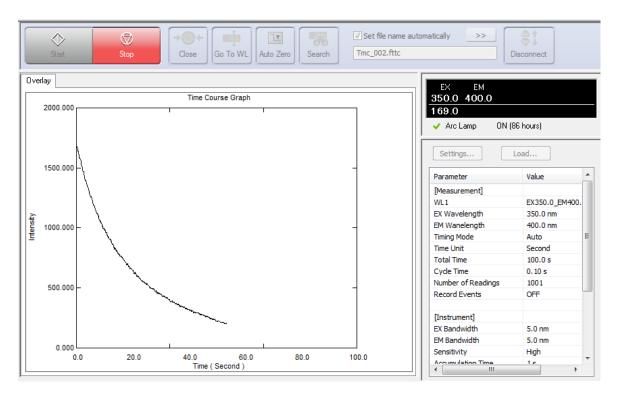


2 Place the sample in the instrument's sample compartment and close the lid.

Click [Start] on the time course measurement toolbar.

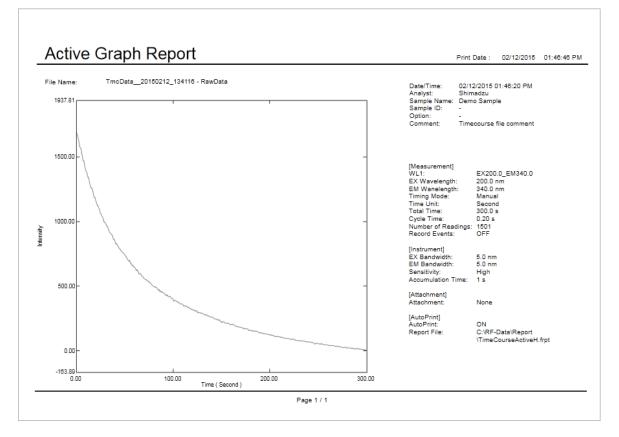
Time course measurement starts and the captured data is graphed in real time.

▶ Reference For details on the procedure for changing the graph scale, see "4.5 Changing the Graph Scale" P.45.



[Time Course] Window

When measurement is complete, printing is executed automatically (automatic printing). The report file set in the measurement parameters is used for printing.



Example of Printout

8.5 Calculating Activity Values



Click [View] on the main toolbar.





- - -G Time course(RF-01)-[View] <u>File Edit View Graph Instrument Tools Window Help</u> 2 46 ? C Ope Me View Peak Pic TmcData_01.fttc Active Overlay Parameter History Summary Event Time Course Graph Parameter Value 1864.221 [Measurement] EX200.0_EM340.0 WL1 1500.000 EX Wavelength 200.0 nm EM Wanelength 340.0 nm Timing Mode Manual 1000.000 rtensity Time Unit Second Total Time 300.0 s Cycle Time 0.20 s 500.000 Number of Readings 1501 Record Events OFF 0.000 [Instrument] -163.891 L EX Bandwidth 5.0 nm 200.0 300.0 0.0 100.0 Message EM Bandwidth Time (Second) 5.0 nm Sensitivity High Shutter Motor Check -Accumulation Time 15 Emission Side Slit Mot Emission Side Grating [Attachment] Total Judgment - OK Attachment None Instrument Function A Arc Lamp - mounted [Auto Print] Arc Lamp - Total Light Auto Print ON C: RF-Data Report Mercury Lamp - unm Report File Integrating Sphere - N Sipper - Not Used Connection - Passed ۲ 🗌 . < III. For Help, press F1

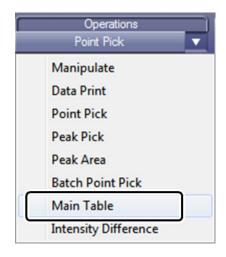
The window changes to view mode.

View Mode

8.5.1 Displaying the Main Table

1 Click [Operations] - [Main Table] on the main toolbar.

Int [Operations] displays the two most recent data processing functions that were used. If the data processing function for use is not displayed under [Operations], click [▼] and select the function from the displayed list.

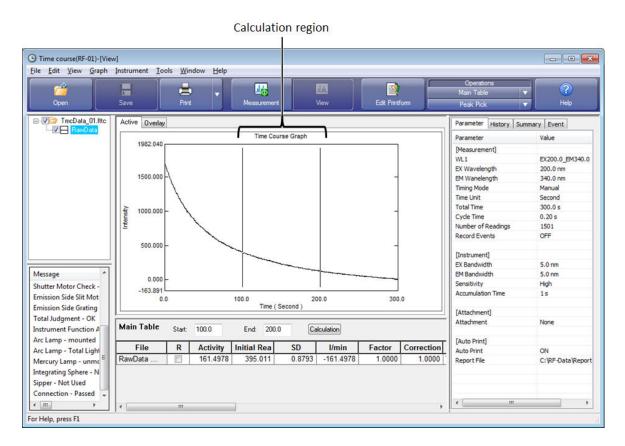


Selecting a Data Processing Function



The main table is displayed in the data processing view.

The display changes to the active graph and cursors for setting the activity value calculation region are displayed in the graph area.



Main Table Display

8.5.2 Changing the Activity Value Calculation Region

There are two methods for changing the activity value calculation region: moving the cursors on the graph and directly entering values on the main table.

Setting the region using the cursors

Use the cursors on the graph to set the activity region. The region between the two cursors is the activity value calculation region.

Hint The main table displays all time course data that resides in memory. When multiple data files are loaded, select (highlight) the target data row before setting the calculation region.

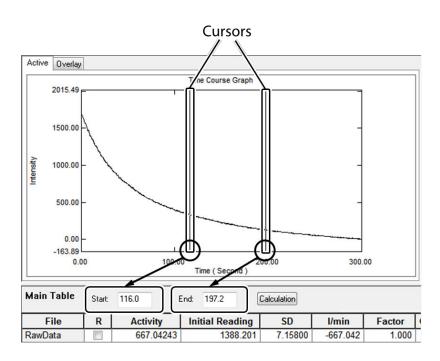
Drag the cursors on the graph.

The [Start] and [End] times in the settings area of the main table are also updated.

🛉 Hint

1

int Values can also be directly entered into the [Start] and [End] fields. In this case, the cursors on the graph do not move to reflect the entered values.



Setting the Region



Click [Calculation].

The activity value is recalculated and the value in the main table is updated.

Main Table	Start:	116.0	End: 197.2	Calculation		
File	R	Activity	Initial Reading	SD	l/min	Factor
RawData		667.04243	1388.201	7.15800	-667.042	1.000

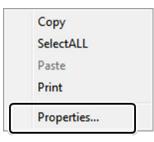
Settings Area of the Main Table

■ Directly Specifying the Start Time and End Time

Enter the calculation region directly into columns in the main table.



Open the right-click menu on the main table and click [Properties].



Right-Click Menu of the Main Table



Double-click both [Start] and [End] in the column list to change the display status to "Show".

olumns	
Column	Status
Activity	Show
WI	Hide
Start	Show
End	Show
inidal meading	onow

[Main Table Properties] Window

The [Start] and [End] columns are displayed in the main table.

File	R	Activity	Start	End	Initial Reading	SD	l/min
RawData		151.5280(116.000	197.200	336.313	0.80193	-151.528

Main Table



Enter the end time of the activity value calculation range into [End] in the main table.

Press the "Enter" key to accept the value and automatically recalculate the activity value.

File	R	Activity	Start	End	Initial Reading	SD	l/min
RawData		151.52806	116.000	200.000	336.313	0.80193	-151.528
)		

Entering the End Time



Enter the start time of the activity value calculation range into [Start].

Press the "Enter" key to accept the value and automatically recalculate the activity value.

File	R	Activity	Start	End	Initial Reading	SD	l/min
RawData		151.52802	100.000	200.000	336.313	0.80193	-151.528

Entering the Starting Time and Recalculating the Activity Value

9 Data Processing

This chapter explains how to perform data processing in the spectrum and time course general analysis applications.

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains how to perform data processing using operations in the spectrum general analysis application as an example.

■ Functions Used in this Chapter

While data processing consists of the following functions, this chapter uses the examples of Peak Pick, Point Pick, batch Point Pick, and smoothing processing, which can be performed in both the spectrum and time course general analysis applications, to explain these functions and operating procedures.

Data processing in the spectrum application

- Data Print
- Peak Pick
- Point Pick
- Batch Point Pick
- Peak Area
- Manipulate (data set calculation, transformation, arithmetic)

Data processing in the time course application

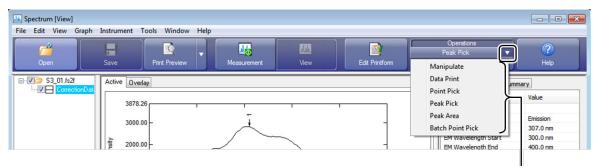
- Data Print
- Peak Pick
- Point Pick
- Batch Point Pick
- Peak Area
- Main Table (activity value calculation)
- Intensity Difference
- Manipulate (data set calculation, transformation, arithmetic)

9.1 Startup

To use a data processing function, click the desired data processing function under [Operations] in view mode.

Clicking $\mathbf{\nabla}$ to the left of [Operations] displays a list of data processing commands. The desired data processing can be performed by selecting the required command from the data processing list. (This explanation uses the spectrum application window as an example.)

[Operations] displays the name of the most recently used data processing function.



Data processing function list

Displaying the Data Processing List

9.2 Peak Pick

Peaks and valleys are detected according to the set threshold value and number of points.

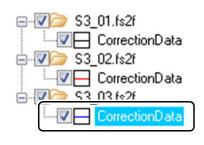
When the number of points is set to n, peak detection occurs after the value consecutively increases for more than n points and then consecutively decreases for more than n points. The top of the peak (peak point) is taken as the point at which the value starts decreasing. Valley detection occurs when the opposite condition (value consecutively decreases for more than n points and then consecutively increases for more than n points) is satisfied.

• The threshold value indicates the distance (fluorescence intensity) between the peak point and a line connecting the valley points on each side (or provisional valley points) of the peak. Peaks with a distance shorter than the set threshold value are excluded. The detection of unwanted peaks and noise can be avoided by adjusting the threshold value and number of points.

When multiple data is loaded, set the data for peak detection to active.



Hint Double-click the target data set in the tree view to make it the active data (highlight in blue).

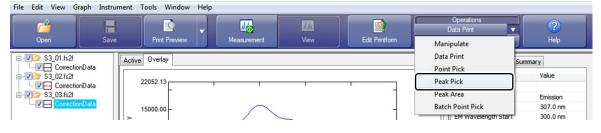


Active Data Display

1

Click [Peak Pick] under [Operations].

The Peak Pick window is displayed.



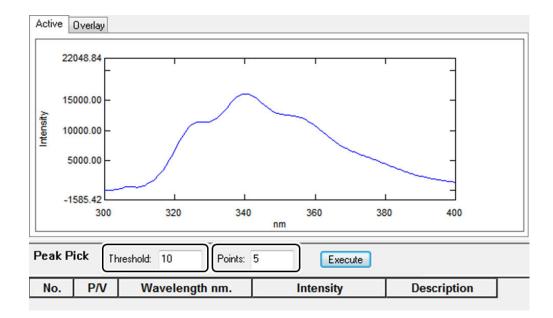
[Operations] - [Peak Pick]

Enter values for [Threshold] and [Points] and click [Execute].

- ^{- -} 🎙 I

2

Hint The initial values of the Peak Pick parameters [Threshold] and [Points] are "1" and "4" respectively.



Peak Pick Window



È

The wavelength and fluorescence intensity of each detected peak are displayed in the Peak Pick table.

Hint The mark in the [P/V] column indicates whether the detected wavelength is a peak or valley.
 indicates a peak and
 indicates a valley.

Peak Pi	ck Tł	reshold: 10 Po	oints: 5	Execute	
No.	P/V	Wavelength nm	.)	Intensity	Description
1	1		340	16117.92	
	,				
		l Wavelength	ר F	ا luorescence int	ensitv

Wavelength and Fluorescence Intensity of Peaks



Open the right-click menu on the Peak Pick table and click [Print]. The report file linked to the Peak Pick table is printed.

	Copy Paste Select All			
	Graph	•	<	Show Peak Mark
 Image: A start of the start of	Show Peaks Show Valleys			Show Valley Mark
	Print			
	Properties			

Right-Click Menu (Peak Pick Table)



nt The report file to be linked can be set on the [Quick Print] tab of the [User Settings] window, which is displayed by clicking [User Settings] on the [Tools] menu.

9.3 Point Pick

Detect fluorescence intensity at any wavelength (time).

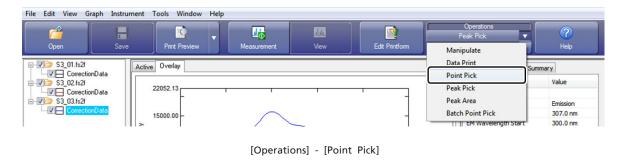
When multiple data is loaded, set the target data to active.

Reference For details on the procedure for setting the target data to active, see "9.2 Peak Pick" P.120.



Click [Point Pick] under [Operations].

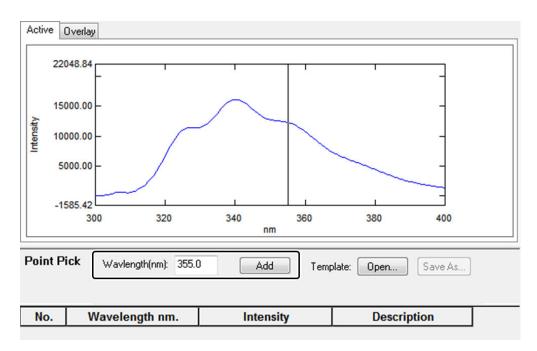
The Point Pick window is displayed.



2

Enter a value for [Wavelength] and click [Add].

Repeat this operation when detecting multiple wavelengths.



Adding a Wavelength



The fluorescence intensity of each set wavelength is displayed in the Point Pick table.

 $\mathbf{\hat{\Psi}}$ Hint Wavelengths can also be specified using the cursor on the graph.

Dragging the cursor on the graph displays the value of the wavelength at the cursor position in the [Wavelength] field.

Point Pie	ck Wavlength(nm): 360	Add Temp	late: Open Save As
No.	Wavelength nm.	Intensity	Description
1	327.0	11400.4	
2	360.0	10719.5	
		:;)





Open the right-click menu on the Point Pick table and click [Print]. The report file linked to the Point Pick table is printed.

	Сору
	Paste
	Select All
	Delete Point
_	Show Point Mark
	Print
	Properties

Right-Click Menu (Point Pick Table)

Hint The report file to be linked can be set on the [Quick Print] tab of the [User Settings] window, which is displayed by clicking [User Settings] on the [Tools] menu.

9.3.1 Creating and Saving Template Files

The wavelengths (times) used in the Point Pick table can be saved as a template file.

Point Pi	ck Wavlength(nm): 36	0 Add	Template: Open Save As
6		<u> </u>	
No.	Wavelength nm.	Intensity	Description
No. 1	Wavelength nm. 327.		00.4 Description



Click [Save As] on the Point Pick table.

Hint Saving can also be performed by clicking [Save As] - [Template] on the [File] menu.

Point Pi	ck Wavlength(nm): 360	Add Template	Copen Save As
No.	Wavelength nm.	Intensity	Description
1	327.0	11400.4	
2	360.0	10719.5	

2	Enter	a name for	the templa	ate file and click [Save]	l	
		🚲 Save As - Tem	plate File			— X
		Save in:	鷆 Template	•	G 🤌 📂 🛄 -	
		P	Name	*	Date modified	Туре
		Recent Places		No items match your	search.	
		Desktop				
		Libraries				
		Computer				
			4			•
		Network	File name:	327-360_Point	· (Save
			Save as type:	Point Pick Template(*fstp)	•	Cancel

[Save As - Template File] Window

- Hint The folder shown as the save location when the [Save As Template File] window is displayed is the folder specified for [Destination Folder] on the [Tools] menu. This can also be changed when opening a template file.
 - Opening a Point Pick template with the target spectrum made active will execute Point Pick on the spectrum.
- ▶ Reference For details on the operating procedure for Point Pick using templates, see "9.4 Batch Point Pick" P.127.

9.4 Batch Point Pick

Detect fluorescence intensity at any wavelength (time) with respect to all loaded data. While any wavelength (time) can be detected by directly entering values or moving the cursor in the same manner as for Point Pick, this section explains the Point Pick procedure when using a Point Pick template file.

- Hint Point Pick template files can be used for both Point Pick and batch Point Pick.
- ▶ Reference For details on the procedure for directly entering values and moving the cursor, see "9.3 Point Pick" P.123.

9.4.1 Using Template Files

1

Click [Batch Point Pick] under [Operations].

The batch Point Pick window is displayed.

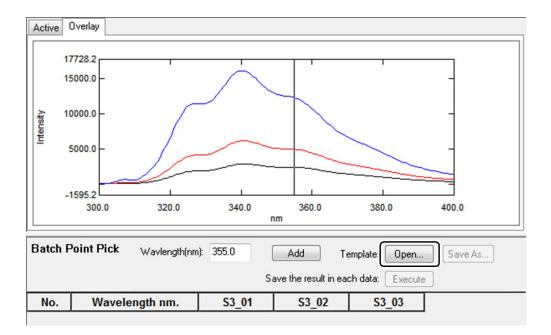
File Edit View Gra	aph Instrument Save	Tools Window He Print Preview	elp	MA View	Edit Printform	Operations Point Pick Manipulate	? Help
S3_01.fs2f S3_01.fs2f Correction S3_02.fs2f Correction Correction Correction	nData	22052.13	1 1			Data Print Point Pick Peak Pick	Summary Value
S3_03.fs2f		15000.00	\sim]	Peak Area Batch Point Pick	Emission 307.0 nm
	×				1		300.0 nm

[Operations] - [Batch Point Pick]



Click [Open] on the batch Point Pick table.





Batch Point Pick Table

Select the template file to use and click [Open].

- P

3

Hint The folder shown as the save location when the [Open - Template File] window is displayed is the folder specified for [Destination Folder] on the [Tools] menu. This can also be changed when opening a template file.

🚻 Open - Templa	ate File				-
Look in:	🔰 Template		•	G 👂 📂 🗔 -	
Ca.	Name	^		Date modified	Туре
Recent Places	₩ <u>327-360_</u> Po	int		2/12/2015 3:15 PM	FSTP File
Desktop					
Libraries					
Computer					
Computer	4				•
Network	File <u>n</u> ame:	327-360_Point		•	Open
	Files of type:	Point Pick Template(*fstp)		•	Cancel

[Open - Template File] Window

4

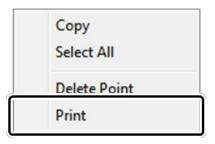
Batch Point Pick is performed according to the opened template file.

Batch F	Point Pick Wavlength(nm): 355.0	Add Te	emplate: Open	Save As
		S	ave the result in ea	ch data: Execute	,
No.	Wavelength nm.	S3_01	S3_02	\$3_03	
1	327.	0 1827.7	4075.5	11400.4	
2	360.	0 2127.0	4393.3	10719.5	

Batch Point Pick Table



Open the right-click menu on the batch Point Pick table and click [Print]. The report file linked to the batch Point Pick table is printed.



Right-Click Menu (Batch Point Pick Table)

Hint The report file to be linked can be set on the [Quick Print] tab of the [User Settings] window, which is displayed by clicking [User Settings] on the [Tools] menu.

9.4.2 Saving Batch Point Pick Results as a Point Pick Table

The batch Point Pick results can be saved as a Point Pick table for each corresponding data.

1

2

Click [Execute] on the batch Point Pick table.

Batch P	oint Pick Wavlength	n(nm): 355.0	Add Ter	mplate: Open	Save As
		S	ave the result in eac	h dat: Execute	
No.	Wavelength nm.	S3_01	S3_02	S3_03	
1	327	7.0 1827.7	4075.5	11400.4	
2	360	0.0 2127.0	4393.3	10719.5	

Click [Yes] in the displayed confirmation dialog box.

Point Pick tables are created for all spectrum data and updated with the batch Point Pick results.

LabSolut	tions RF
?	Updates each spectrum point pick table with batch point pick results. Point pick table is overwritten. OK?
🔲 Do n	tot display this prompt in the future
	Yes No

Confirmation Dialog Box

■ NOTE If a template file that has already been executed (with a saved Point Pick table) is loaded, the existing Point Pick table is overwritten. If a loaded data file that contains an existing Point Pick table that should be preserved, click [No] (do not overwrite) in the confirmation dialog box and then close that particular data file.

9.5 Manipulate - Smoothing Processing

Smoothing processing can be performed on spectrum data and time-course data.

Hint The data created by smoothing processing does not overwrite the original data (data captured in measurement) and resides in the same file as the original data as a new data set.

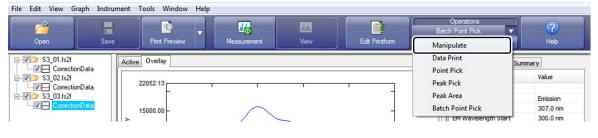
This section explains the smoothing procedure using the spectrum application as an example.



2

Click [Manipulate] under [Operations].

The Manipulate is displayed.



[Operations] - [Manipulate]

Active Overlay 17727.3 15000.0 10000.0 Intensity 5000.0 -1585.4 300.0 320.0 340.0 360.0 380.0 400.0 nm Manipulate Type: Execute. Transformations • Data Set: S3_03 - CorrectionData Transformation Derivative • Method: Order: Smoothing • Delta Lambda: 5.000 • 1 Scaling Factor:

Data prosseing view

Click [Transformations] in the [Type] list.

Check that [Transformation Method] is set to [Derivative] and [Order] is set to [Smoothing].

Hint The target of data manipulation is the data displayed for [Data Set]. Since the active data is displayed, the target data can be changed by reselecting the active data in the tree view.

Manipulate	
Туре:	Transformations
Data Set:	S3_03 - CorrectionData
Transformation Method:	Derivative
Order:	Smoothing
Delta Lambda:	5.000 •
Scaling Factor:	1

Checking the Parameters for Data Transformation

4 Select the value of the derivative wavelength (time) difference in the [Delta Lambda] list ("5.000" in this example) and click [Execute].

The [New Data Set] window is displayed.

3

- Hint For smoothing processing, set [Scaling Factor] to "1".
 - [Delta Lambda] indicates the derivative wavelength (time) difference. While the value of [Delta Lambda] varies according to the data interval of the data to transform (data interval x 10), there are four levels that can be selected. Setting a large derivative wavelength (time) difference will reduce noise but adversely affect resolution.

▶ Reference For details on data transformations, refer to the help file provided with LabSolutions RF.

Manipulate	
Туре:	Transformations
Data Set:	S3_03 - CorrectionData
Transformation Method:	Derivative •
Order:	Smoothing 🗸
Delta Lambda:	5.000 V
Scaling Factor:	10.000 20.000 40.000

Setting the Delta Lambda (Derivative Wavelength (Time) Difference)

5

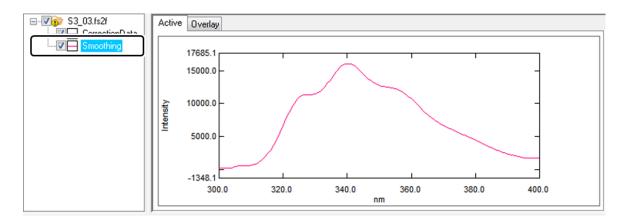
Enter the data set name of the transformation data to create in [Data Set Name] (shown as "Smoothing" here) and click [OK].

C:\RF-Data\Data\S3_03.fs2f	. 😰 🔗
Smoothing	
Shimadzu	
4	
	Smoothing Shimadzu

[New Data Set] Window

A transformed data set is created and a spectrum graph is displayed on the [Active] tab in the graph view.

 $\stackrel{\sim}{\bullet}$ Hint The created transformation data resides in the same file as the original data.



Spectrum Display

10 Printing

This chapter explains the procedure for operating the print function and the function for creating report templates (report files).

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedures for creating report files and printing using report files (Quick Print).

The sample data used in explanations is located in the folder for LabSolutions RF-related files that is created during installation.

For example, if LabSolutions RF is installed on the C drive, the data is copied to the "C:\RF-Data\Sample" folder. This location is abbreviated to "\Sample" in this manual.

Functions Used in this Chapter

- Creating and editing report files
- Data Print (Quick Print)

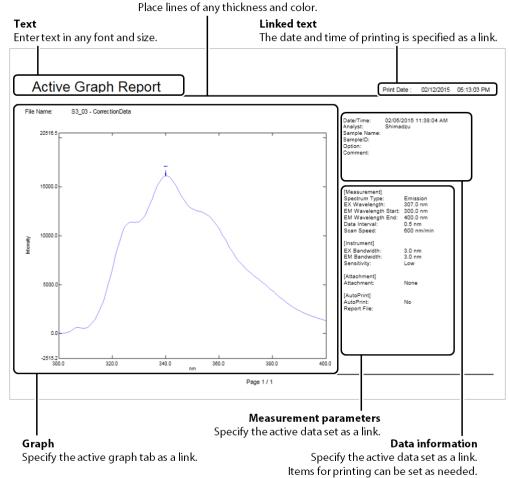
10.1 Quick Print

The general analysis applications feature a Quick Print function that allows printing of graphs and data processing tables using specified report files. This section explains the procedure for printing using the Quick Print function.

10.1.1 Report Files

A report file is a template file for printing that contains the following printable objects arranged on a mock-up page.

- Graphs
- Measurement parameter information
- Data processing results
- Quantitation results
- File information etc.



Straight line

Example of a Report File (spectrum_active graph_landscape.frpt)

LabSolutions RF provides report files with a combination of various printable objects and these files are configured with initial settings that allow them to be used with the Quick Print function in each application.

Report files are located in the folder for LabSolutions RF-related files that is created during installation.

The following table lists the report files prepared for the printing of spectra. Report files can be edited in the "edit print form mode" of each general analysis application.

[▶] Reference For details on the procedure for editing report files, see "10.3 Creating Report Files" P.148.

Report Filename	Description
SpectrumActiveV.frpt	Includes a layout of objects such as the active graph tab, linked graph objects, and measurement parameter information objects. The page orientation is portrait.
Spectrum Overlay H.frpt	Includes a layout of objects such as the overlay graph tab, linked graph objects, and legend information. The page orientation is landscape.
SpectrumParameters.frpt	Includes a layout of measurement parameter information objects corresponding to the active data. The page orientation is portrait.
SpectrumDataPrint.frpt	Includes a layout of the displayed data print table. The page orientation is portrait.
SpectrumPeakPick.frpt	Includes a layout of the peak pick table of the active data and objects related to information regarding the file. The page orientation is portrait.
SpectrumPointPick.frpt	Includes a layout of the point pick table of the active data and objects related to file information. The page orientation is portrait.
SpectrumBatchPointPick.frpt	Includes a layout of the displayed batch point pick table and graph objects (linked to the overlay graph). The page orientation is portrait.
SpectrumPeakArea.frpt	Includes a layout of the point pick table of the active data and objects related to file information. The page orientation is portrait.

Hint If LabSolutions RF is installed on the C drive, the report files are copied to the "C:\RF-Data\Report" folder.

10.1.2 Quick Print Settings

The report file for use with Quick Print can be set on the [Quick Print] tab of the [User Settings] window, which is displayed by clicking [User Settings] on the [Tools] menu.

eneral Qu	uick Print	Links	Text File Formats	Text Output	
nint Item:	Peak P	ick			
	Peak A	rea			
	Point Pi	ck			
	Data Pr	int			E
	Batch F	oint Pick	c		
	Active :	Spectrum	Graph		_
	Overlay	Spectru	m Graph		-
eport File C:\RF-Dat		Spectrur	mPeakPick.frpt		Browse
					<u>R</u> eset

[User Settings] Window (Spectrum Application)

The initial settings are configured as listed in the following table.

Application	View Area Printable Using Quick Print	Report Filename
	Active graph	SpectrumActiveV.frpt
	Overlay graph	SpectrumOverlayH.frpt
	Measurement parameters	SpectrumParameters.frpt
Sportrum	Data Print table	SpectrumDataPrint.frpt
Spectrum	Peak Pick table	SpectrumPeakPick.frpt
	Point Pick table	SpectrumPointPick.frpt
	Batch Point Pick table SpectrumBatchPointPi	SpectrumBatchPointPick.frpt
	Peak Area table	SpectrumPeakArea.frpt
	Peak Area table SpectrumPeakArea.frpt	3Spectrum3DActiveContour.frpt
	Active graph (3D Spectrum Graph)	Spectrum3DActiveShift2D.frpt
	Measurement parameters	Spectrum3DParameters.frpt
3D Spectrum	Tiles 1×2	Spectrum3DTile1x2.frpt
·	Tiles 2×1	Spectrum3DTile2x1.frpt
	Tiles 2×2	Spectrum3DTile2x2.frpt
	Tiles 2×3	Spectrum3DTile2x3.frpt
	Tiles 3×2	Spectrum3DTile3x2.frpt

Application	View Area Printable Using Quick Print	Report Filename
	Standard table	Quantitation Standard Table. frpt
	Sample table	QuantitationSampleTable.frpt
Quantitation	Measurement parameters	Quantitation Parameters. frpt
	Calibration curve	QuantitationCalibrationCurve.frpt
	Sample graph	QuantitationSampleGraph.frpt
	Measurement parameters	Photometric Parameters. frpt
Photometric	Sample table	PhotometricSampleTable.frpt
	Sample graph	PhotometricSampleGraph.frpt
	Active graph	TimeCourseActiveV.frpt
	Overlay graph	TimeCourseOverlayH.frpt
	Measurement parameters	TimeCourseParameters.frpt
	Data Print table	TimeCourseDataPrint.frpt
	Peak Pick table	TimeCoursePeakPick.frpt
Time course	Point Pick table	TimeCoursePointPick.frpt
	Batch Point Pick table	TimeCourseBatchPointPick.frpt
	Peak Area table	TimeCoursePeakArea.frpt
	Main Table	TimeCourseMainH.frpt
	Intensity Difference table	TimeCourseDifference.frpt
	Event table	TimeCourseEvent.frpt

10.1.3 Printing Using Quick Print

This section explains the procedure for printing with the Quick Print function using a report file linked to the peak pick table in the spectrum general analysis application.

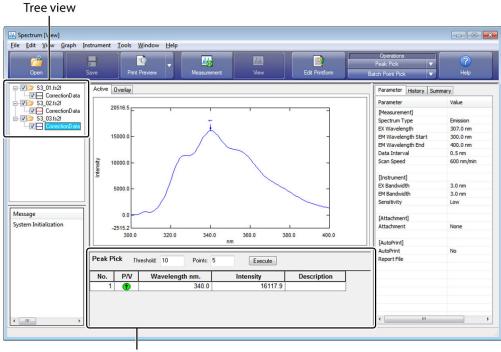


Set the spectrum data targeted for printing to active and display the peak pick table.

This example uses the sample data in the "S3_03.fs2f" file located in the "\Sample" folder.

+ Hint Double-click on the target spectrum data in the tree view to set it to active.

Reference For details on peak pick, see "9.2 Peak Pick".

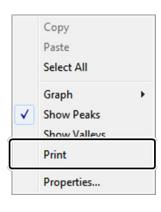


Peak pick table

Displaying the Peak Pick Table

2

Open the right-click menu on the peak pick table and click [Print]. Printing is performed on the printer set as the default printer on the PC in use.

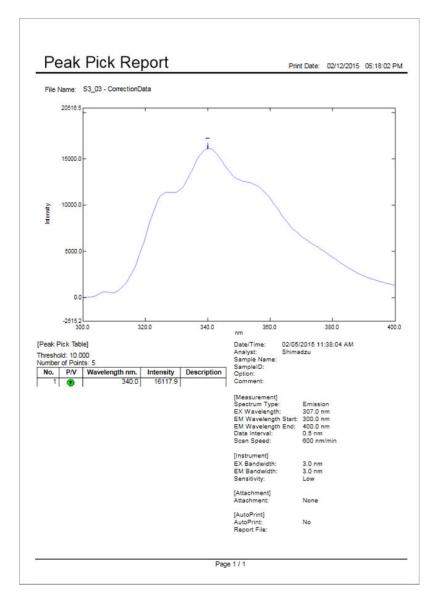


Printing

Printing is performed using the report file linked to the peak pick table.

🛉 Hint

To print after checking the mock-up page, click the view area of the target for printing (the peak pick table in the above example) to select it and then click [Print Preview] on the main toolbar or the [File] menu.



Example of Printout

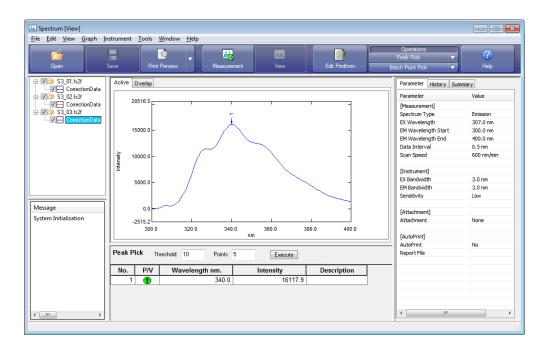
10.2 Printing in Edit Print Form Mode

To print by selecting an existing report file or by selecting the target data for printing, print using the edit print form mode.

This section uses a report file ("spectrum_print operation example.frpt") that contains a layout of spectrum printing objects to explain the procedure for printing any spectrum information and data out of multiple spectrum data that is loaded.

1 Open the spectrum sample data files in the order of "S3_01.fs2f", "S3_02.fs2f", and "S3_03.fs2f".

Click [Open] on the main toolbar to display the [Open-Data File] window, specify the "Sample" folder, and open the files.



2

Click [Edit Printform] on the main toolbar.

The window changes to edit print form mode.





10

Main Toolbar



Select a file and click [Open].

In this example, select "\Report\PrintOperationExample.frpt".

Look in:	Report		•	G 🤌 📂 🛄 🗸	
(And	Name	^		Date modified	Туре
	Photomet	ricParameters		12/5/2014 4:44 PM	FRPT F
Recent Places	Photomet	ricSampleGraph		1/9/2015 4:09 PM	FRPT F
	Photomet	tricSampleTable 12/		12/5/2014 4:45 PM	FRPT F
	PrintOper	ationExample		2/12/2015 7:35 PM	FRPT F
Desktop	📕 Quantitati	onCalibrationCurve		1/9/2015 4:05 PM	FRPT F
F	👰 Quantitati	onParameters	Type: FRPT Fil	e	FRPT F
(1998)	👰 Quantitati	onSampleGraph	Size: 24.0 KB		FRPT F
Libraries	👰 Quantitati	onSampleTable	Date modified	: 1/9/2015 4:05 PM	FRPT F
	QuantitationStandardTable		12/5/2014 4:42 PM	FRPT F	
	B Spectrum	3DActiveContour		1/9/2015 4:00 PM	FRPT F
Computer	Spectrum	3DActiveShift2D		1/9/2015 4:01 PM	FRPT F
-	Spectrum	Spectrum3DIntensityDistribution		1/9/2015 4:01 PM	FRPT F
	Spectrum	3DParameters		1/9/2015 4:01 PM	FRPT F
Network	•				•
	File name:	PrintOperation Exa	ample	- I [Open
	Files of type:	Report File (*.frpt)			Cancel

[Open] Window

Hint The folder shown for [Look in] when the [Open] window is displayed is the folder specified for [Destination Folder] on the [Tools] menu.



Open the [View] menu and put checkmarks on [Properties View] and [Objects List].

File Edit View Fools Window	y Help			
✓ Iree View Log View Ope ✓ Status Bar	Print	Measurement	View	Edit Printform
Coperties View Objects List	ons General Fc		□ □ □ • • • • • • • • • • • • • • • • • •	, <u>100%</u> •

6

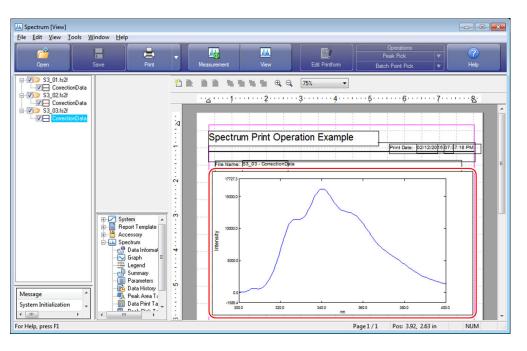
Change the zoom size on the layout toolbar to [75%].

JM Spectrum [View]		
<u>File Edit View Tools Window H</u> elp		
Open Save Print	Measurement Vie	
Image: Signal state state Image: Signal state Image:		⊕ ⊖ [75% ▼] ····· · · · · · · · · · · · · ·
	Layout toolbar	Zoom size

Click the graph object in the report editing area.

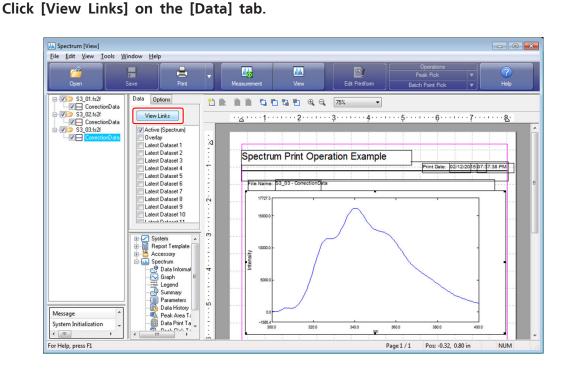
7

8



Report Object Properties

The properties of the graph object are displayed in the window.



Selecting [View Links]

The [View Links] window is displayed.



Check that the spectrum targeted for printing is displayed as follows and click [OK].

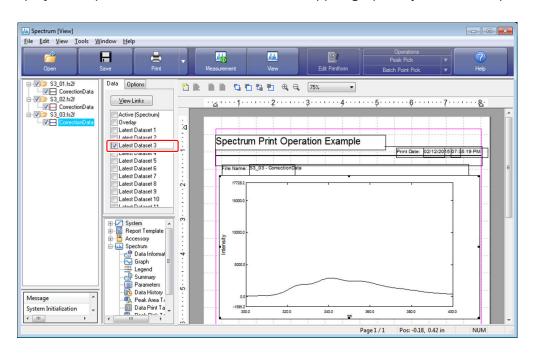
[Latest Dataset 3]: S3_01- CorrectionData

ink Description	DataSet
Active (Spectrum)	S3_03 - CorrectionData
Overlay	S3_01 - CorrectionData
	S3_02 - Correction Data
	S3_03 - Correction Data
atest Dataset 1	S3_03 - Correction Data
staat Dataast 2	C2 A2 Compation Data
atest Dataset 3	S3_01 - CorrectionData

[View Links] Window

10

Select the [Latest Dataset 3] checkbox in the data list on the [Data] tab. This displays the spectrum of "S3_01.fs2f" on the upper graph object in the report.



Changing the Upper Graph object

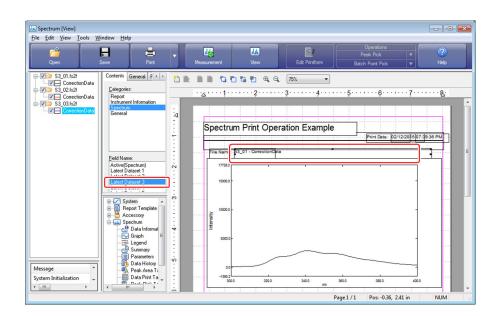
Hint When a latest spectrum data is selected, the scale of the overlay graph in view mode is used as the graph scale.

11

Click the linked text object that displays the filename and then double-click [Latest Dataset 3] in the [Field Name] data list.

The filename of "S3_01 - CorrectionData" is displayed on the linked text object.

+ Hint The display format of the displayed filename is the display format of the dataset set via [User Settings] on the [Tools] menu in view mode window.

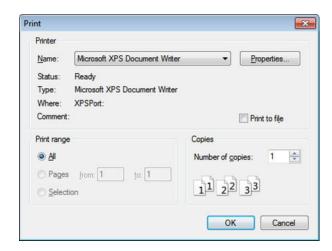


Changing the Lower Graph object



Click [Print] on the main toolbar.

The [Print] window is displayed.



[Print] Window

Hint When [Print Preview] is displayed on the main toolbar, click ▼ to select [Print].



10.3 Creating Report Files

Create and edit report files in the edit print form mode of each analysis application. This section explains the procedure for creating a report file that contains a layout of objects including the filename of the active data, a graph, data information, and a peak pick table.

Prepare spectrum data that has undergone peak pick and load the data in advance.

10.3.1 Configuring Page Settings and Editing Area User Settings

Configure the page settings of page size and margin and user settings of grid size of the editing area.



Click [New] on the [File] menu in the edit print form mode of the spectrum application.

The application changes to the state for creating a new report file.

2

Click [User Setting] on the [Tool] menu.

The [User Settings] window is displayed.

3 Select [Inches] for [Scale Unit], enter "0.5" for [Space] under [Grid], and select the [Align to Grid] checkbox.

User Settings			X
General			
Scale <u>U</u> nit:	Inches	•	
Margin Line Color:			
Show <u>F</u> ields Name: Grid			
<u>C</u> olor:		Align to Grid:	
Space:	0.5		
		OK Can	cel

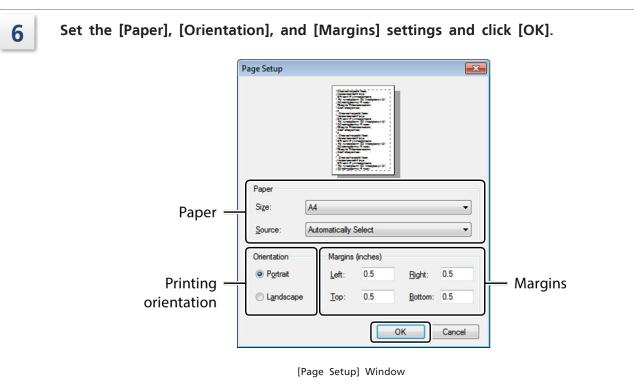
[User Settings] Window

Click [OK].

5

Click [Page Setup] on the [File] menu.

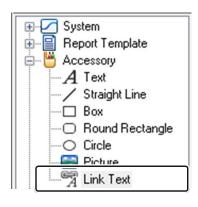
The [Page Setup] window is displayed.



10.3.2 Placing an Object for Printing the Filename

1

Use [Link Text] to print the filename of the active spectrum.



[Link Text]

Drag and drop [Accessory] - [Link Text] in the objects list to the desired location in the editing area.

Hint This item can also be placed in the editing area by double-clicking on the object item in the objects list.

10

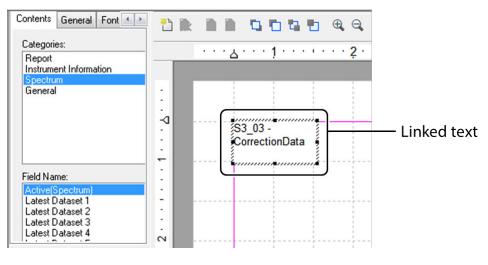
10 Printing

2

3

Display the filename of the active spectrum on the linked text item.

- 1 Click the [Contents] tab (on the properties display of the inserted linked text object) in the property view.
- 2 Click [Spectrum] in the [Categories] list.
- 3 Double-click [Active(Spectrum)] in the [Field Name] list.



Displaying the Filename

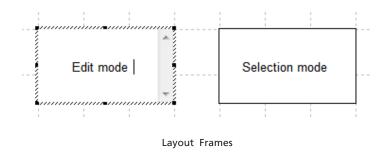
Hint The display format of the displayed filename is the display format selected via [User Settings] on the [Tools] menu in view mode.

Click on the [Font] tab in the properties view and set the type and size of the text font.



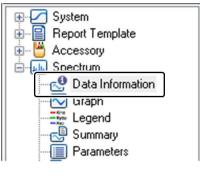
Adjust the position of the linked text and size of the layout frame using the mouse.

- ♥ Hint Aligning the mouse over any of the handles (■) around the layout frame for edit mode or selection mode changes the mouse cursor to an arrow. The size of the linked text can be changed in the direction of the arrow by dragging in this state.
 - Aligning the mouse over the layout frame in edit mode or on an object in selection mode will display crossed arrows under the mouse cursor or change the mouse cursor itself into crossed arrows. The position of linked text can be moved by dragging in this state.



10.3.3 Placing a Data Information Object

Use data information objects to print data information (such as analysis date and time and sample name) of the active spectrum.



[Data Information]

1

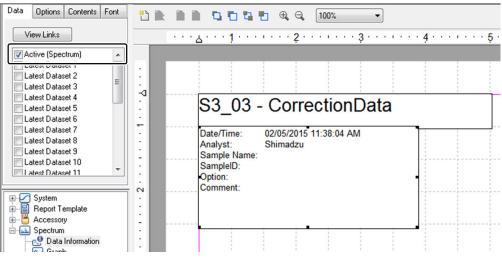
Drag and drop [Spectrum] - [Data Information] in the objects list to the desired location in the editing area.

Hint This item can also be placed in the editing area by double-clicking on the object item in the objects list.



3

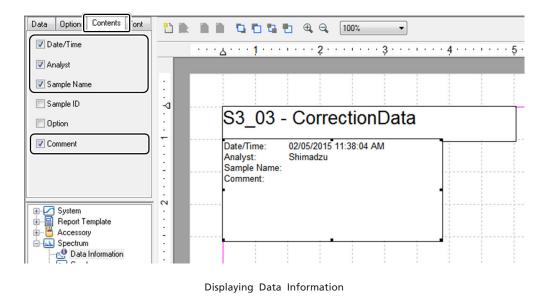
Select the [Active (Spectrum)] checkboxes on the [Data] tab in the properties view.



Specifying the Active Spectrum

Select the [Date/Time], [Analyst], [Sample Name], and [Comment] checkboxes on the [Contents] tab in the properties view.

The selected items are displayed in the data information object.

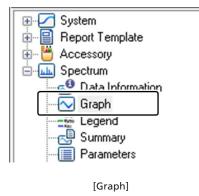


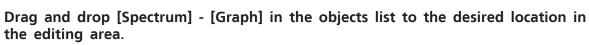
4

Adjust the position of the data information object and size of the layout frame using the mouse.

10.3.4 Placing a Graph Object

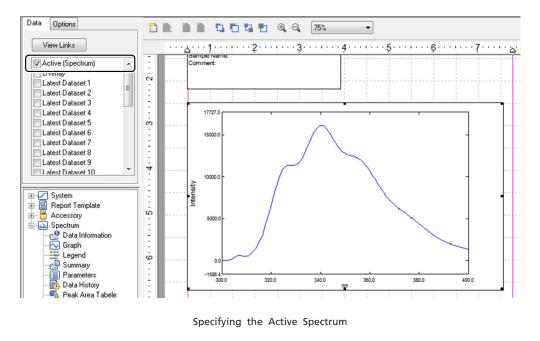
Use a graph object to print a graph of the active spectrum.





Hint This item can also be placed in the editing area by double-clicking on the object item in the objects list.

Check that the [Active (Spectrum)] checkbox on the [Data] tab in the properties view is selected.





1

2

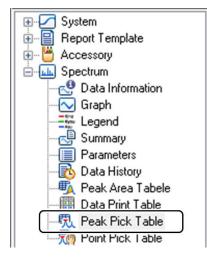
Adjust the position of the graph object and size of the layout frame using the mouse.

1

2

10.3.5 Placing a Peak Pick Table Object

Use a peak pick table object to print the peak pick results of the active spectrum.

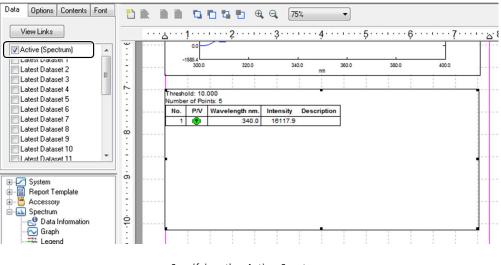


[Peak Pick Table]

Drag and drop [Spectrum] - [Peak Pick Table] in the objects list to the desired location in the editing area.

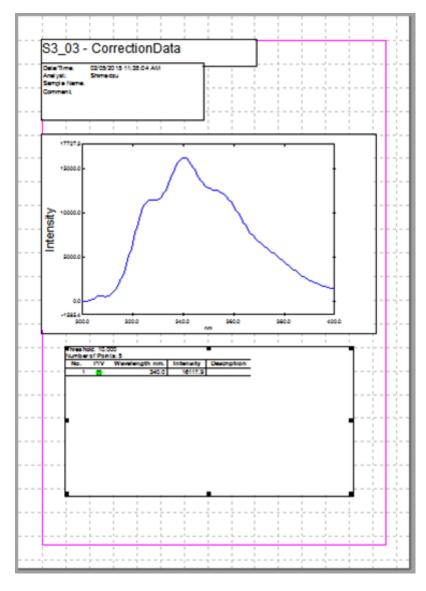
Hint This item can also be placed in the editing area by double-clicking on the object item in the objects list.

Check that the [Active (Spectrum)] checkbox on the [Data] tab in the properties view is selected.



Specifying the Active Spectrum

3 Adjust the position of the peak pick table object and size of the layout frame using the mouse.



Example of Printing Object Layout

Hint The displayed column (row) width of the peak pick table is linked to the column width of the peak pick table in the view mode window.

10

10.3.6 Saving a Report File



Click [Save As] on the [File] menu.

The [Save As] window is displayed.

2	
2	

Enter a filename and click [Save].

A report file is saved to the specified folder.

Save As				×
Save in:	leport 🕌		- 🕝 🤌 📂 🛄 -	
æ	Name	*	Date modified	Туре 🔺
	Photomet	ricParameters	12/5/2014 4:44 PM	FRPT F
Recent Places	Photomet	ricSampleGraph	1/9/2015 4:09 PM	FRPT F ≡
	평 Photomet	ricSampleTable	12/5/2014 4:45 PM	FRPT F
	PrintOpera	ntionExample	2/12/2015 7:35 PM	FRPT F
Desktop	📕 Quantitati	onCalibrationCurve	1/9/2015 4:05 PM	FRPT F
<u> </u>	📕 Quantitati	onParameters	12/5/2014 4:41 PM	FRPT F
	QuantitationSampleGraph		1/9/2015 4:07 PM	FRPT F
Libraries	QuantitationSampleTable		12/5/2014 4:43 PM	FRPT F
	👰 Quantitati	onStandardTable	12/5/2014 4:42 PM	FRPT F
	Spectrum	DActiveContour	1/9/2015 4:00 PM	FRPT F
Computer	👰 Spectrum	BDActiveShift2D	1/9/2015 4:01 PM	FRPT F
	👰 Spectrum	DIntensityDistribution	1/9/2015 4:01 PM	FRPT F
	Spectrum		1/9/2015 4:01 PM	FRPT F
Network	•	III		•
	File <u>n</u> ame:	Practice	-	Save
	Save as type: Report File (*.frpt) Cancel			Cancel

[Save As] Window

Hint The folder shown for [Save in] when the [Save As] window is displayed is the folder specified for [Destination Folder] on the [Tools] menu.

11 Quantum Yield

This chapter explains how to operate the dedicated analysis application for quantum yield.

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This chapter explains the procedures for measuring sample fluorescence spectra and calculating quantum yield, changing the settings of display items in the results table, and printing reports.

Functions Used in this Chapter

The following functions are used in the quantum yield measurement program.

- Configuring measurement and instrument parameters
- Entering sample information and performing sample measurement
- Changing display items in the standard sample and unknown sample tables and setting the number of digits for displaying values
- Printing reports

11.1 Startup

The quantum yield measurement program comprises a measurement mode and file check mode.

In measurement mode, a "preparation window" for performing tasks including configuring parameters for measurement and a "measurement window" for checking measurement results are used.

In file check mode, the content of opened data files can be viewed in the "measurement window".



Click [Quantum yield] on the [Fluorescence] tab in the LabSolutions RF launcher. The dedicated analysis application for quantum yield starts and the [Quantum Yield Measurement] window is displayed.

Quantum Yield Measurement		×
Select an operation		
Measure		
🔘 View data file		
	ОК	Cancel

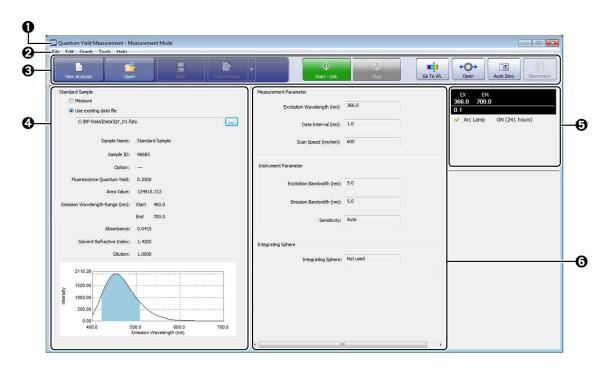
[Quantum Yield Measurement] Window

2

Select an operation and click [OK].

- Selecting [Measure] displays the preparation window in measurement mode.
- Selecting [View data file] displays the measurement window in file check mode.

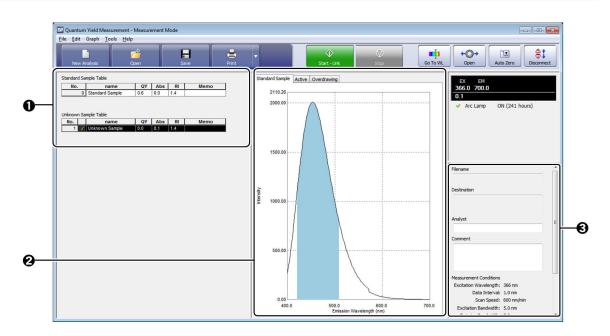
11.1.1 Preparation Window Layout



Quantum Yield - "Preparation Window"

No.	Name	Function
0	Title bar	Displays the application name and window mode ("Measurement Mode" or "File Check Mode").
0	Menu bar	Displays the application menus. Selecting a menu along the bar displays multiple command menus. The displayed command menus differ depending on the application type and window mode.
8	Main toolbar	Displays tool buttons for executing main functions, such as starting and stopping measurement, performing file operations, and printing.
4	Standard sample view	For the standard sample, set whether to perform a new measurement or use previously measured standard sample data.
0	Instrument status	 The upper section displays the current wavelength and fluorescence intensity and the lower section displays the current status of the spectrofluorophotometer. ▶ Reference For details on the instrument status, see "2.3.3 Instrument Status" P.23.
6	Parameter view	Set the various parameters required for measurement.

11.1.2 Measurement Window Layout



Quantum Yield - "Measurement Window"

No.	Name	Function
0	Analysis result view	Displays the analysis results in a standard table and unknown sample table.
0	File information view	Displays file information (such as filename, analyst name, and measurement conditions) on a data file being measured or an open data file.
8	Graph view	 Displays the fluorescence spectrum graph of the standard sample and unknown samples. [Standard Sample] tab Displays the fluorescence spectrum of the standard sample. [Active] tab Displays the fluorescence spectrum of the selected unknown sample. Select an unknown sample by clicking on a row in the unknown sample table. [Overdrawing] tab Displays the fluorescence spectrum of any unknown samples. Whether to overlay the graph of each unknown sample can be performed by selecting the corresponding checkbox in the unknown sample table.

11.2 Preparation for Analysis

Measure the fluorescence spectrum of the sample to prepare for quantum yield calculation.

This section explains how to configure the standard sample settings and analysis parameters.

11.2.1 Setting the Standard Sample

A fluorescence spectrum of a standard sample with a known quantum yield value is required to determine the quantum yield of an unknown sample.

■ When measuring the fluorescence spectrum of a standard sample

When measuring the fluorescence spectrum of a standard sample prior to measuring the fluorescence spectrum of an unknown sample, select [Measure] under [Standard Sample].

Quantum Yield Meas File Edit Graph To	urement - Measuremen ols <u>H</u> elp	t Mode	
New Analysis	Copen	Save) Print
Standard Sample]		
	ata file		

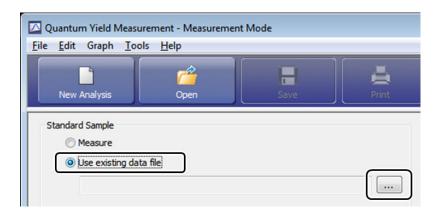
Standard Sample View (Preparation Window)

■ When using a previously measured standard sample fluorescence spectrum

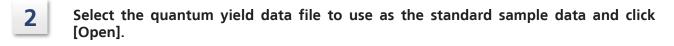
To reference previous measurement data without measuring a new standard sample fluorescence spectrum, use the following procedure.

1	
1	

Select [Use existing data file] and click



Standard Sample View (Preparation Window)



🖾 Open					×
Look in:	鷆 Data		•	G 🤌 📂 🛄 -	
Recent Places	Name			Date modified 2/10/2015 6:41 AM	Type FQTY File
Desktop Libraries					
Computer					
	•		III		Þ
Network	File <u>n</u> ame: Files of type:	QY_01 QuanTum Yi	eld Files (*fqty)	•	Open Cancel

[Open] Window

3 Select the quantum yield data file (.fqty) to use as standard sample data from the relevant folder.

Selecting a quantum yield data file loads the information on the standard sample contained in the file and displays the information under [Standard Sample].

Measure	
Our Use existing data file	
C:\RF-Data\Data\QY_01.1	fqty
Sample Name:	Standard Sample
Sample ID:	96685
Option:	
Fluorescence Quantum Yield:	0.5500
Area Value:	134915.313
Emission Wavelength Range (nm):	Start 400.0
	End 700.0
Absorbance	: 0.0415
Solvent Refractive Index:	1.4200
Dilution:	1.0000
2110.26	
1500.00	
1000.00	<u>\</u>
500.00	
0.00	
	500.0 600.0 700 Emission Wavelength (nm)

Standard Sample View (Preparation Window)

1

11.2.2 Setting Analysis Parameters

When [Measure] is selected under [Standard Sample], set the analysis parameters according to the following procedure.

→ **Hint** When [Use existing data file] is selected under [Standard Sample], the analysis parameters are automatically set to the same settings in the loaded data file and therefore do not require configuration.

Set the parameters under	[Measurement Parameter].
--------------------------	--------------------------

Measurement Parameter	
Excitation Wavelength (nm):	366.0
Data Interval (nm):	1.0 •
Scan Speed (nm/min):	600 🔻

Measurement Parameters (Parameter View)

Measurement Parameter	Setting
[Excitation Wavelength]	366 (nm)
[Data Interval]	1.0 (nm)
[Scan Speed]	600 (nm/min)

Set the parameters under [Instrument Parameter].

Instrument Parameter	
inst americi a americi	
Excitation Bandwidth (nm):	5.0 💌
Emission Bandwidth (nm):	5.0 -
Sensitivity:	Auto 🔻

Instrument Parameters (Parameter View)

Instrument Parameter	Setting
[Excitation Bandwidth]	5.0 (nm)
[Emission Bandwidth]	5.0 (nm)
[Sensitivity]	Auto

3

2

Set the integrating sphere setting under [Integrating Sphere].

Integrating Sphere			
	Integrating Sphere:	Not used	

Integrating Sphere (Parameter View)

Instrument Parameter	Setting
[Integrating Sphere]	Not used

11.3 Entering Sample Information and Performing Sample Measurement

11.3.1 Measuring the Standard Sample

When [Measure] is selected under [Standard Sample], measure the standard sample first. Standard sample measurement is not performed when [Use existing data file] is selected under [Standard Sample]. In this case, proceed to "11.3.2 Measuring the Unknown Sample" P.169.



Set the standard sample into the sample compartment.



Click [Start - Std].

The "preparation window" changes to the "measurement window" and the [Quantum Yield Measurement] window is displayed.



Starting Standard Sample Measurement (Main Toolbar)

Enter	the	sample	information	and	scan	range
Enter	the	sample	information	anu	scan	range.

3

1. Set the standard sample in the s	ample compartmen	t.	
2. Enter the sample information.			
Sample Name:			
Standard Sample			
Sample ID:			
96685			
Option:			
Fluorescence Quantum Yield:	0.5500		
Absorbance:	0.0415		
Solvent Refraction Index:	1.4200		
Dilution:	1.0000		
3. Set the scan range.			
Emission Wavelength Ra	ange (nm): Start	400.0	
	: End	700.0	

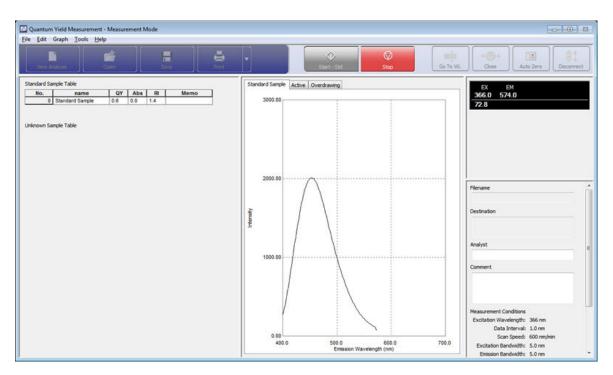
[Quantum Yield Measurement] Window (Entering Standard Sample Information)

Standard Sample Information	Setting
[Sample Name]	Standard Sample
[Sample ID]	96685
[Option]	
[Fluorescence Quantum Yield]	0.55
[Absorbance]	0.0415
[Solvent Refraction Index]	1.4200
[Dilution]	1.0000
[Emission Wavelength Range]	[Start]: 400.0 (nm), [End]: 700.0 (nm)



Click [Measurement].

Measurement of the fluorescence spectrum of the standard sample starts. The captured data is graphed in real time.



Measurement Window

11.3.2 Measuring the Unknown Sample

When measurement of the standard sample is complete, measure the unknown sample.

1	Set the unknown sample into the sample compartment.			
2	Click [Start - Unk].			
3	Enter the sample information and scan range.			
	Quantum Yield Measurement			
	2. Enter the sample information. Sample Name: Unknown Sample Sample ID: Dption: -			
	Absorbance: 0.0579 Solvent Refraction Index: 1.3600 Dilution: 10 3. Set the scan range. Emission Wavelength Range (nm): Start 400.0 : End 700.0			

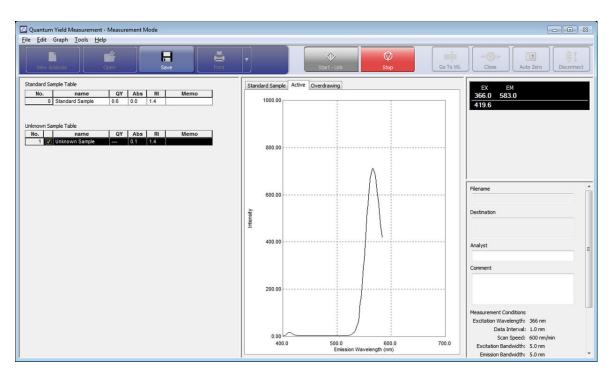
[Quantum Yield Measurement] Window (Entering Unknown Sample Information)

Unknown Sample Information	Setting
[Sample Name]	Unknown Sample01
[Sample ID]	-
[Option]	-
[Absorbance]	0.0579
[Solvent Refractive Index]	1.36
[Dilution]	10
[Emission Wavelength Range]	[Start]: 400.0 (nm), [End]: 700.0 (nm)



Click [Measurement].

Measurement of the fluorescence spectrum of the unknown sample starts. The captured data is graphed in real time.



"Measurement Window"

11.4 Performing Additional Unknown Sample Measurements

To continue measuring multiple unknown samples, use [Start - Unk] on the toolbar.

1	Set the unknown sample into the sample compartment.
2	Click [Start - Unk]. The [Quantum Yield Measurement] window is displayed.
3	Perform steps 3 and 4 in "11.3.2 Measuring the Unknown Sample" P.169.

1

11.5 Changing the Items Displayed in the Analysis Result Table

Change the items displayed in the analysis result table in the "measurement window" as well as the number of digits used to display calculation results.

Click [Set Analysis Results] on the [Tools] menu.

The [Set Analysis Results] window is displayed.

Set the number of displayed digits and whether to show or hide display items.

et Analysi	s Results 🛛 🛋
Number o	f Displayed Digits Decimal Point 4 💌 Digits
Select Di	splay Item
	Sample Name (name) Sample ID (ID) Option Fluorescence Quantum Yield (QY) Area Value (Sem) Emission Wavelength Range (rang Absorbance (Abs) Solvent Refractive Index (RI) Dilution (DR) Memo
	OK Cancel

[Set Analysis Results] Window

ltem	Setting		
[Number of Displayed Digits]	4		
	[Sample Name (name)]	Selected	
	[Sample ID (ID)]	Unselected	
	[Option]	Unselected	
	[Fluorescence Quantum Yield (QY)]	Selected	
[Colort Display Itam]	[Area Value (Sem)]	Unselected	
[Select Display Item]	[Emission Wavelength Range (range)]	Unselected	
	[Absorbance (Abs)]	Selected	
	[Solvent Refractive Index (RI)]	Selected	
	[Dilution (DR)]	Selected	
	[Memo]	Unselected	

11.6 Printing

1

3

This section explains how to print reports of measurement results.

There are two types of reports that can be printed: detailed reports and summary reports.

11.6.1 Printing a Detailed Report

In detailed report printing, a detailed report for the standard sample or any unknown sample is printed.

Printing a detailed report of the standard sample

Click the [Standard Sample] tab in the graph view. The standard sample graph is displayed.

2 Click [Print] on the main toolbar. The [Print] window is displayed.

Confirm that the printer for output is correct and click [OK]. A detailed report for the standard sample is printed.

■ Printing a detailed report of an unknown sample

1	Click the [Active] tab in the graph view.
2	Click a row in the unknown sample table to select the unknown sample for printing.
3	Click [Print] on the main toolbar. The [Print] window is displayed.

4 Confirm that the printer for output is correct and click [OK]. A detailed report for the unknown sample graphed on the [Active] tab is printed.

11.6.2 Printing a Summary Report

In summary report printing, two types of layouts can be selected: table printing and simple table printing.

Printing using [Print Table]

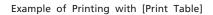
1	Click [Print Layout] - [Print Table] (or [Print Simple Table]) on the [Tools] menu.
2	Click the [Overdrawing] tab in the graph view.
3	Click [Print] on the main toolbar. The [Print] window is displayed.



Confirm that the printer for output is correct and click [OK].

Printing is executed.

Quantum Yield Summary Report	~			
ption. emo:	Quantum Yield Summary Report	File Name:		2/10/2015 6:56:14
No. GY Abs RJ DR 1 0.7681 0.0579 1.3600 10.000	File Name		Comment	
	Destination			
	Analyst			
	Measurement Conditions Excitation Wavelength: 366 nm Data Interval: L9 nm			
	Scan Spead: 600 nm/min Excitation Sitt 50 nm Emission Sitt: 50 nm Bensitivity: Law			
	Integrating Sphere: None Date of Mesourement Standard Sample: 2/10/2015 64521 AM Unknown Sample: 2/10/2015 65149 AM			
	Date of Correction Function Greation Standard Sample: 2/5/2015 95842 AM Unknown Sample: 2/5/2015 95842 AM			
	Standard Name: Standard Sample			
	IC Option Merror No. 97 Abs. 81 D8 0.0550010,041511,42001,0000			



No, 1 Unknown Sample	name	QY Abs Ri DR 0.7681 0.05791 1.3660 10.000	
	Quantum Yield Summary Report (Simple) File Name File Name:	Comment	2/10/2015 65644
	Destination		
	Analyst		
	Measurement Canditions Excitation Wavelength: 366 em Data Interval: 10 em Scan Speed: 600 em/min Excitation Sint: 50 em Emission Sint: 50 em Emission Sint: 50 em Integrating Sphere: None Date of Measurement Standard Sample: 21/02/015 6:4921 AM Urknown Sample: 21/02/015 6:3148 AM Date of Correction Function Standard Sample: 23/2015 5:5148 AM		
	Standard		QY Abs RI DR 5500 0.0415 1.4200 1.0000

Example of Printing with [Print Simple Table]

12 Quantum Efficiency

This chapter explains how to operate the special analysis application for quantum efficiency.

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

This application calculates quantum efficiency from the difference between the peak areas of a blank spectrum measured without a sample placed in the sample compartment (integrating sphere) and the sample spectrum measured with the sample in the sample compartment.

This chapter explains the procedures for measuring sample fluorescence spectra and calculating quantum efficiency, changing the area calculation range, and printing reports.

NOTE An integrating sphere must be installed in the sample compartment when performing measurement using this application.

Functions Used in this Chapter

The following functions are used in the quantum efficiency measurement program.

- Configuring measurement and instrument parameters
- Entering sample information and performing sample measurement
- Changing the area calculation range
- Printing reports

12.1 Startup

The quantum efficiency measurement program comprises a "measurement mode" and "file check mode".

In "measurement mode", a "preparation window" for performing tasks including configuring parameters for measurement and a "measurement window" for checking measurement results are used.

In "file check mode", the content of opened data files can be viewed in the "measurement window".

NOTE An integrating sphere is required to perform measurement using this application. Only start this application after registering instrument information and installing an integrating sphere for which any required spectrum correction functions have been measured and saved.

 Reference For details on registering instrument information, see "13.2 Registering an Integrating Sphere" P.196. For details on measuring and saving spectrum correction functions, see "13. 3 Measuring Integrating Sphere Correction Functions" P.200.

1 Click [Quantum efficiency] on the [Fluorescence] tab in the LabSolutions RF launcher.

The special analysis application for quantum efficiency starts and the [Quantum Efficiency Measurement] window is displayed.

Quantum Efficiency Measurement		
Select an operation Measure		
🔘 View data file	ОК	Cancel

[Quantum Efficiency Measurement] Window

2

Select an operation and click [OK].

- Selecting [Measure] displays the preparation window in measurement mode.
- Selecting [View data file] displays the measurement window in file check mode.

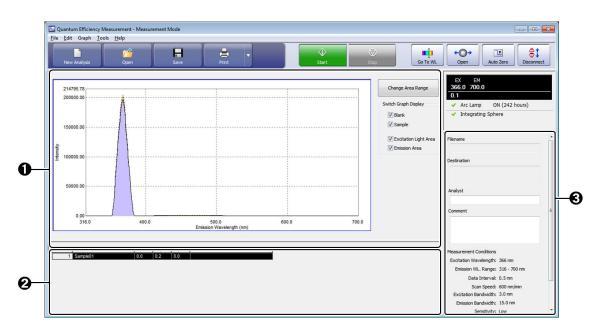
12.1.1 Preparation Window Layout

ile Edit Granh Tools Heln						
New Analysis Open	Save Prin		↔ Start	© Stop	Go To WL	→ ③ + Close Auto Zero Disconnect
Measurement Parameter						EX EM 900.0 900.0
Excitation Wavelength (nm):	366.0					450.6
Emission Wavelength Range (nm): 5	Start 316.0					Arc Lamp ON (242 hours) Integrating Sphere
	End 700.0					• Integrating opinion
Data Interval (nm):	0.5 🔹					
Scan Speed (nm/min):	600 -					<u></u>
Instrument Parameter						
Excitation Bandwidth (nm):	3.0 •					
Emission Bandwidth (nm):	15.0 🔹					
Sensitivity:	Low					
Integrating Sphere						
Integrating Sphere:	ISR-01 •					
		J				

Quantum Efficiency - "Preparation Window"

No.	Name	Function
0	Title bar	Displays the application name and window mode ("Measurement Mode" or "File Check Mode").
0	Menu bar	Displays the application menus. Selecting a menu along the bar displays multiple command menus. The displayed command menus differ depending on the application type and window mode.
8	Main toolbar	Displays tool buttons for executing main functions, such as starting and stopping measurement, performing file operations, and printing.
4	Parameter view	Set the various parameters required for measurement.
6	Instrument status	 The upper section displays the current wavelength and fluorescence intensity and the lower section displays the current status of the spectrofluorophotometer. Reference For details on the instrument status, see "2.3.3 Instrument Status" P.23.

12.1.2 Measurement Window Layout



Quantum Efficiency - "Measurement Window"

No.	Name	Function
0	Graph view	Displays a spectrum graph of the sample. Making changes to the graph display, such as overlaying the blank spectrum or changing the peak area color, can be performed using the checkboxes on the right side of the graph. The wavelength range used in area calculation can also be changed by clicking [Change Area Range].
		▶ Reference "12.5 Changing the Graph Display Range" P.186
2	Analysis result view	Displays the measurement results for the sample in a table. The items displayed in the table and the number of digits used to display calculation results can be changed via [Set Analysis Results] on the [Tools] menu.
3	File information view	Displays information on the currently loaded data file. The analyst name and comments can be edited.

1

12.2 Preparation for Analysis

Measure the fluorescence spectrum of the sample to prepare for quantum efficiency calculation.

This section explains the how to configure the required analysis parameter settings.

12.2.1 Setting Analysis Parameters

Set the parameters under [Measurement Parameter].

Measurement Parameter	
Excitation Wavelength (nm):	366.0
Emission Wavelength Range (nm): St	art 316.0
E	ind 700.0
Data Interval (nm):	.5 🔹
Scan Speed (nm/min):	500 •

Measurement Parameters (Parameter View)

Measurement Parameter	Setting		
[Excitation Wavelength]	366 (nm)		
[Emission Wavelength Range]	[Start]: 316.0 (nm), [End]: 700.0 (nm) • Hint The start wavelength is automatically calculated from the set excitation wavelength (excitation wavelength - 50 nm) and set.		
[Data Interval	0.5 (nm)		
[Scan Speed]	600 nm/min		

Set the parameters under [Instrument Parameter].

Instrument Parameter	
Excitation Bandwidth (nm):	3.0 🔻
Emission Bandwidth (nm):	15.0 🔻
Sensitivity:	Low

Instrument Parameters (Parameter View)

Instrument Parameter	Setting
[Excitation Bandwidth]	3.0 (nm)
[Emission Bandwidth]	15.0 (nm)
[Sensitivity]	Low



2

Set the integrating sphere setting under [Integrating Sphere].

The integrating spheres registered using the instrument registration tool are displayed. Select the integrating sphere to use from the list.

Integrating Sphere		
	Integrating Sphere:	ISR-01 T

Integrating Sphere (Parameter View)

Instrument Parameter	Setting				
[Integrating Sphere]	ISR-01				

Hint The [Integrating Sphere] list displays the names of registered integrating spheres.

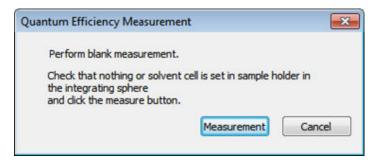
12.3 Entering Sample Information and Performing Sample Measurement

12.3.1 Blank Measurement

1 Click [Start] on the main toolbar. A message is displayed to confirm that the sample compartment is configured for blank measurement.



Check that no sample is set in the sample compartment and then click [Measurement].



Sample Compartment Confirmation

A message is displayed to confirm whether the integrating sphere specified in the analysis parameters is installed.

NOTE The correction function used differs depending on the integrating sphere. Be aware that incorrect data will be created if measurement is performed using an integrating sphere that differs from the integrating sphere selected in the analysis parameters.

3

If the set integrating sphere is correct, click [OK].

Quantum Efficiency Me	asurement	×
Confirm inte	grating sphere: ISR-01/A90255200001 is inst	alled.
	ОК	Cancel

Integrating Sphere Confirmation

The "preparation window" changes to the "measurement window" and blank spectrum measurement starts.

_

12.3.2 Sample Measurement

When blank spectrum measurement is complete, the window for setting sample information is displayed.

.

Quantum Efficiency Measurement	
1. Set the standard sample in the sample con	npartment.
2. Enter the sample information.	
Sample Name:	
Sample01	
Sample ID :	
0001	
Option :	
-	

Window for Setting Sample Information

Sample Information	Setting
[Sample Name]	Sample01
[Sample ID]	0001
[Option]	-



1

Click [Measurement].

Measurement of the fluorescence spectrum of the sample starts. The captured data is graphed in real time.

12.4 Performing Additional Sample Measurements

When measuring multiple samples, whether to perform blank spectrum measurement can be selected for the second and subsequent sample measurements.

12.4.1 When Performing Blank Spectrum Measurement Again



Click [Start] on the main toolbar.

A window is displayed for selecting whether to perform blank measurement.

1	
_	

Select [Blank Measure and Sample Measurement] and click [Measurement].

Quantum Efficiency Measurement	t 💌
Blank Measure and Sam	ple Measurement
Measure Sample Only	
	Measurement Cancel

Blank Measurement Selection Window (When Performing Blank Measurement)



12.4.2 When Skipping Blank Spectrum Measurement

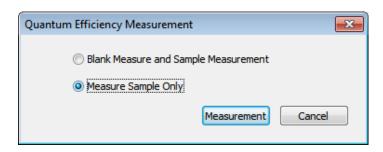


2

Click [Start] on the main toolbar.

A window is displayed for selecting whether to perform blank measurement.

Select [Measure	Sample	Only]	and	click	[Measurement].
-----------------	--------	-------	-----	-------	----------------



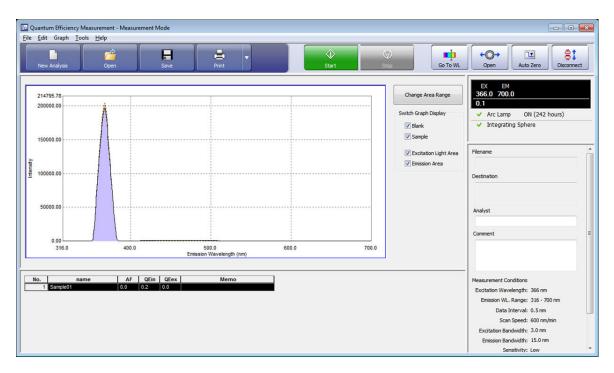
Blank Measurement Selection Window (When Skipping Blank Measurement)

3 Measure the sample spectrum according to the procedure described in "12.3 Entering Sample Information and Performing Sample Measurement" P.182.

NOTE This only performs sample measurement without performing blank spectrum measurement. The blank spectrum information for this sample is copied from the last sample in the result table.

12.5 Changing the Graph Display Range

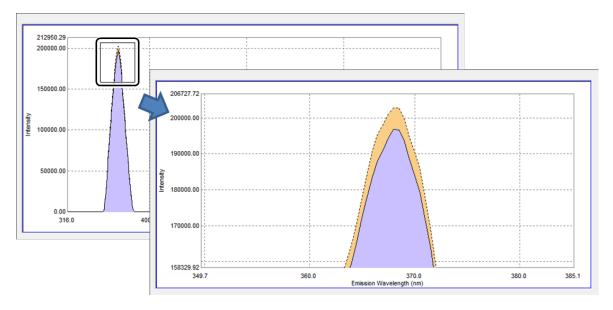
The graph display range in the measurement window can be changed by dragging out a range using the mouse or directly entering values for the upper and lower limits of the graph frame.



"Measurement Window"

■ Specifying the display range with the mouse

Use the mouse to drag out a rectangular frame of the range to magnify and then release the left mouse button. The area enclosed by the rectangular frame is drawn magnified.

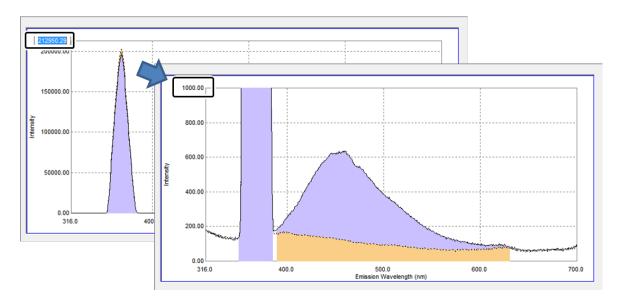




Directly entering upper and lower limit values on the graph axes

The upper and lower limit values of the horizontal and vertical axes on the graph can be changed by clicking on them so they are highlighted.

Enter a value and click on a location outside of the highlighted area to accept the entered value. The graph is then redrawn.



Example of Directly Entering an Upper Limit Value on the Vertical Axis

1

12.6 Changing the Area Calculation Range

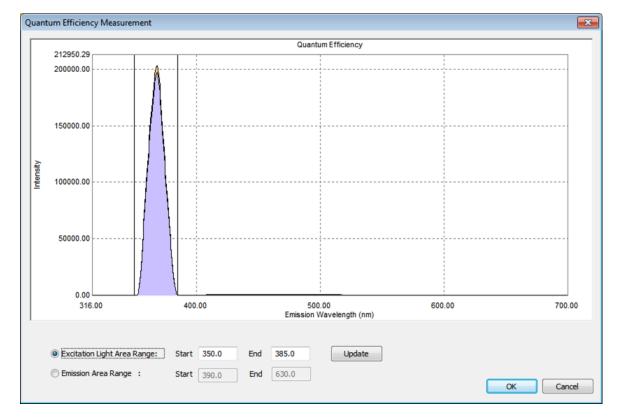
Change the wavelength range used to calculate the peak area of the fluorescence spectrum and then recalculate the quantum efficiency.

Click [Change Area Range] on the right side of the graph view in the measurement window.

The window for changing the area range is displayed. The area range of both the excitation light and emission light can be changed in this window.



The drawing range of the graph can be changed by directly changing the upper and lower limit values on the horizontal and vertical axes of the graph.



▶ Reference "Directly entering upper and lower limit values on the graph axes" P.187

Window for Changing Area Ranges

2 Select [Excitation Light Area Range], enter wavelengths for [Start] and [End], and click [Update].

The wavelength range is accepted.

Excitation Light Area Range:	Start	350.0	End	385.0	Update
Emission Area Range :	Start	390.0	End	630.0	

Changing the Excitation Light Area Range

Item	Setting
[Excitation Light Area Range]	Select
[Start] (wavelength)	350.0 (nm)
[End] (wavelength)	385.0 (nm)

3 Select [Emission Area Range], enter wavelengths for [Start] and [End], and click [Update].

The wavelength range is accepted.

Excitation Light Area Range:	Start	350.0	End	385.0	_
Emission Area Range :	Start	390.0	End	630.0	Update

Changing the Emission Light Area Range

ltem	Setting
[Emission Area Range]	Select
[Start] (wavelength)	390.0 (nm)
[End] (wavelength)	630.0 (nm)



Click [OK].

The quantum efficiency is recalculated using the new area range and the result table is updated.

12.7 Printing

This section explains how to print reports of measurement results.

There are two types of reports that can be printed: detailed reports and summary reports.

12.7.1 Printing a Detailed Report

In detailed report printing, a detailed report for the sample is printed.

Click on the graph view.

The graph periphery is enclosed in a blue frame.

2

3

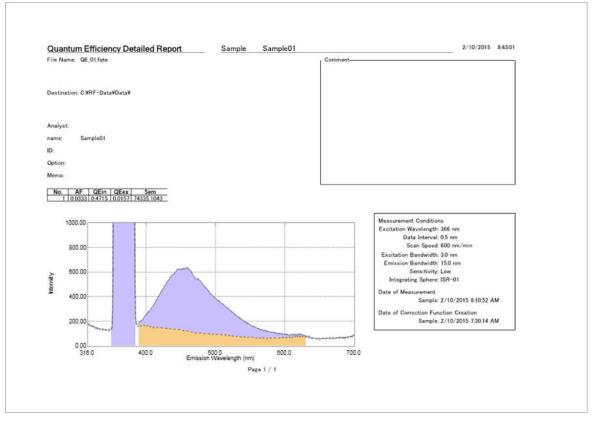
1

Click [Print] on the main toolbar.

The [Print] window is displayed.

Confirm that the printer for output is correct and click [OK].

A detailed report for the standard sample is printed.





12.7.2 Printing a Summary Report

In summary report printing, two types of layouts can be selected: table printing and simple table printing.



2

Click [Print Layout] - [Print Table] (or [Print Simple Table]) on the [Tools] menu.

Click on the result table in the analysis results view. The table periphery is enclosed in a blue frame.



Result Table (Analysis Result View)



4

Click [Print] on the main toolbar.

The [Print] window is displayed.

Confirm that the printer for output is correct and click [OK]. Printing is executed.

No. 1 Sam				
	Quantum Efficiency Summary Report	File Name: QE_01.fqte		2/10/2015 8:45:42
	File Name: QE_01.fqte		Comment	
	Destination: C.¥RF-Data¥Data¥			
	Analyst			
	Measurement Conditions Excitation Wavelength: 366 nm			
	Data Interval: 0.5 nm			
	Scan Speed: 600 nm/min			
	Excitation Bandwidth: 3.0 nm			
	Emission Bandwidth: 15.0 nm			
	Sensitivity: Low			
	Integrating Sphere: ISR-01			
	Date of Measurement Sample: 2/10/2015 8:10:52 AM			
	Date of Correction Function Creation Sample: 2/10/2015 7:30:14 AM			
		Page 1 / 2		

Example of Printing with [Print Simple Table]

13 Management Tools

This chapter explains how to operate the management tools used for instrument management, registration, and performance checks.

▶ Reference For cases and functions not covered in this chapter, refer to the help file provided with LabSolutions RF.

Explanations Included in this Chapter

Three management tools are provided with LabSolutions RF.

⊞ sнімаdzu LabSolution	s RF	– > Settings
	Fluorescence	Manage
Management Tool		
Si Si	*	
Validation Register Device	Correction	
Application		
Help Operation Guide		

RF performance validation software ([Validation])

Check the performance of an RF-6000 instrument.

Instrument registration tool ([Register Device])

Register instruments for control and data processing by LabSolutions RF and register optional integrating spheres for use in applications.

Spectrum correction function measurement tool ([Correction])

Measure spectrum correction functions for optional integrating spheres and check the results.

13.1 Registering an Instrument

Instrument registration must be performed before starting any of the LabSolutions RF applications.



Click [Register Device] on the [Manage] tab in the LabSolutions RF launcher. The [Instrument Registration Tool] window is displayed.

2	Click	[Regist]	on	the	[Instrument]	tab
---	-------	----------	----	-----	--------------	-----

 trument Registration Tool
Instrument Name
Instrument Type
Model
Serial Number
Serial Port
Regist Delete
 Close

[Instrument Registration Tool] Window (Initial Display)

3

Enter the instrument name.

Enter the instrument name of the connected spectrofluorophotometer. In this case, enter "RF-01".

Hint Normally enter the name used on the system or a control number used to differentiate the instrument from other instruments. If the instrument does not have any particular name, enter the model name.

Instru	ument Registration	x
	Instrument Name RF-01	
	Instrument Type	
	RF-6000 Series	
	Model	
	Serial Port	
	OK Cancel	

Entering the Instrument Name

4 Select the instrument type.

Select the instrument type of the connected spectrofluorophotometer. In this case, select "RF-6000 Series".

Instrument Registration (×
Instrument Name RF-01	
Instrument Type RF-6000 Series RF-5300 Series RF-6000 Series Note:	
Serial Port OK Cancel	

Selecting the Model Name

Click [OK].

5

A confirmation message is displayed. Clicking [OK] registers the instrument with the entered information.



- When registering an RF-6000 series instrument, [Model] and [Serial Number] do not need to be entered because they are read from the instrument upon establishing a connection.
 - Set [Serial Port] when registering an RF-5300 series instrument that uses an RS-232C cable as the communication cable.

Instrument Registration Tool	×
Instrument Intgrating Sphere	
Instrument Name	
RF-01	
hate must Tare	
Instrument Type RF-6000 Series	
Tr-buu Selles	
Model	
Model	
Serial Number	
Serial Port	
Edit Delete	
Close	

[Instrument Registration Tool] Window (Instrument Registration Complete)

13.2 Registering an Integrating Sphere

An integrating sphere must be registered in advance in order to perform measurements in each application that require the use of an integrating sphere.



Click [Register Device] on the [Manage] tab in the LabSolutions RF launcher. The [Instrument Registration Tool] window is displayed.

2	Click [Add]	on 1	the	[Integrating	Sphere]	tab.
---	-------------	------	-----	--------------	---------	------

Name	Model	Serial Number	
ſ	Add	Delete	

[Instrument Registration Tool] Window (Initial Display)

3 Enter the integrating sphere name.

Enter the name of the integrating sphere for registration. In this case, enter "ISR-01".

Hint Normally enter the name used on the system or a control number used to differentiate the instrument from other instruments. If the instrument does not have any particular name, enter the model name.

	here Registration	
Integrati	ng Sphere Name	
ISR-01		
Model		
Serial N	umber	

Entering the Integrating Sphere Name

4 Enter

Enter the model name and serial number.

Enter the model name and serial number of the integrating sphere for registration. In this case, enter "ISR-100" for the model name and "A90255200001" for the serial number.

Hint The model name and serial number are indicated on the name plate on the storage case of the instrument.

Integ	rating Sphere Registration
	Integrating Sphere Name
	ISR-01
ſ	Model
	ISR-100
	Serial Number
	A90255200001
	OK Cancel

Entering the Model and Serial Number



Click [OK].

Clicking [OK] on the confirmation message registers the integrating sphere with the entered information.

Name ISR-01	Model ISR-100	Serial Number A90255200001
	Add	Ditte
	Add	Delete

[Instrument Registration Tool] Window (Integrating Sphere Registration Complete)

13.3 Measuring Integrating Sphere Correction Functions

When performing measurement using an integrating sphere, a spectrum correction function must be measured and saved after completing registration of an integrating sphere (see "13.2 Registering an Integrating Sphere" P.196).

Hint Measure and save a spectrum correction function once every year. If the inside of the integrating sphere is stained, also create a new correction function.



Click [Correction] on the [Manage] tab in the LabSolutions RF launcher.

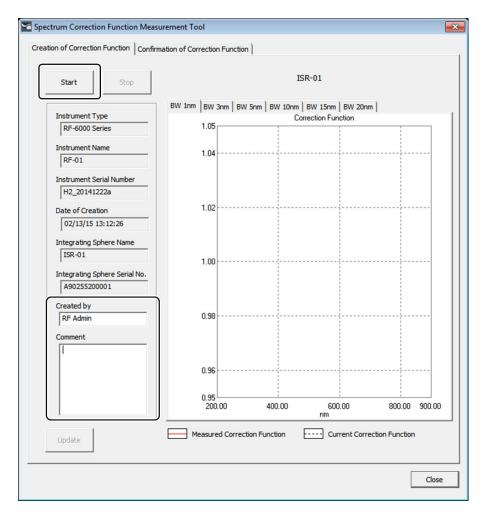
The [Spectrum Correction Function Measurement Tool] window is displayed.

+ Hint A confirmation message is displayed when a correction function has not been created for a registered integrating sphere.

Enter the name of the personnel who is creating the correction function as well as any comments and click [Start].

2

Hint When multiple integrating spheres are registered, select the target integrating sphere with [Integrating Sphere Name].



Entering Name of the Correction Function Creator and Comments

Check the following points and click [OK] according to the onscreen messages.

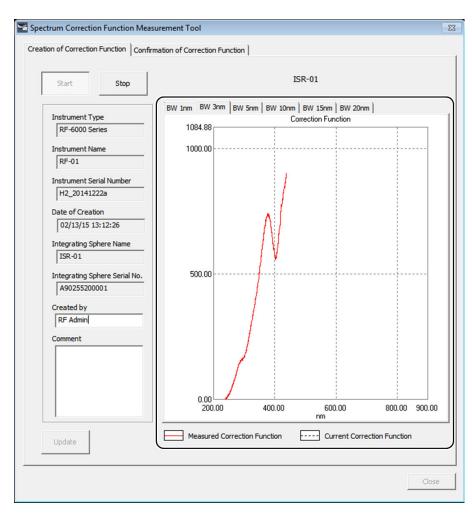
- The target integrating sphere is installed in the instrument's sample compartment.
- No sample is set in the integrating sphere.
- The provided mesh assembly is attached to the emission side filter holder of the instrument's sample compartment.

If 30 minutes has not elapsed since lighting the xenon arc lamp, a standby window is displayed to allow the instrument to stabilize.

Hint Measurement starts automatically after 30 minutes elapse.

Waiting for instrument to stabilize
30 minutes have not elapsed since the arc lamp turned on. Inspection will start automatically after 30 minutes.
Waiting (remaining time: 20 min46 sec)
Click the "Execute" button to execute immediately.

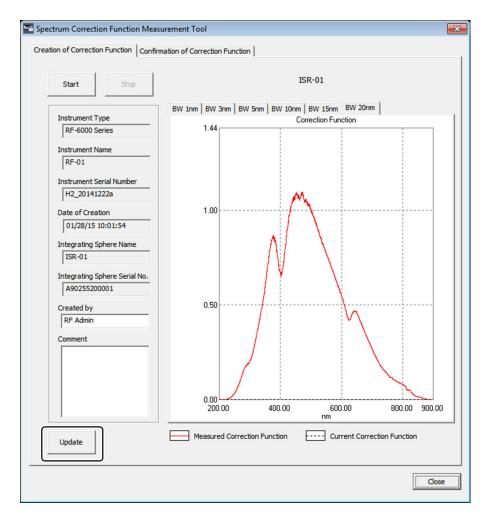
[Waiting for instrument to stabilize] Window



When measurement starts, spectrum data is displayed in real time in the graph area.

[Spectrum Correction Function Measurement Tool] Window (During Measurement)

After measurement is complete, check that the measured spectrum is free from abnormalities and then click [Update].



[Spectrum Correction Function Measurement Tool] Window (Measurement Complete)

A message to confirm updating is displayed.



Click [Yes] to update.

A message indicating that updating has completed is displayed and the spectrum correction function obtained in measurement is saved.



Update Complete Message

OK

13.4 Checking Integrating Sphere Correction Functions

Click [Correction] on the [Manage] tab in the LabSolutions RF launcher. The [Spectrum Correction Function Measurement Tool] window is displayed.

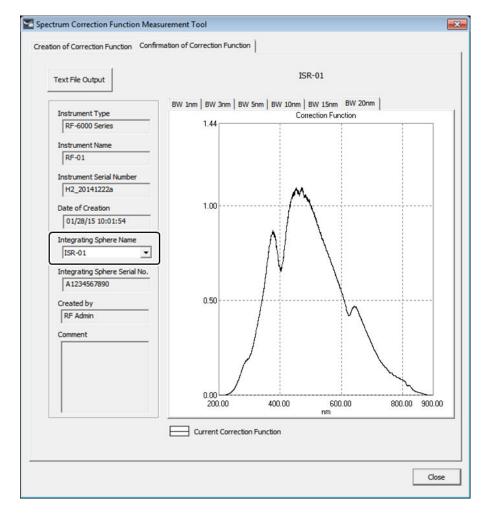
t A confirmation message is displayed when a correction function has not been created for a registered integrating sphere.

2

Click the [Confirmation of Correction Function] tab.

3 When multiple integrating spheres are registered, select the target integrating sphere with [Integrating Sphere Name].

The data of the spectrum correction function in use is displayed in the graph area.



[Spectrum Correction Function Measurement Tool] Window (Checking the Correction Function)

Hint The data of the spectrum correction function in use can be saved in text format.

[🖣] Hint

4	Click [Text File O	Spectrum Correction Function Measurement Tool
		Creation of Correction Function Confirmation of Correction Function
		Text File Output
		Slit 1nm Slit 3nm Slit 5nm Instrument Type
		RF-6000 Series 1.05
		Instrument Name 1.04

[Text File Output]

The [Save As] window is displayed.

5

Specify the save destination, enter a filename, and click [Save].

🔚 Save As					— ×
Save in:	Laport 🔒		•	← 🗈 💣 📰 ◄	
C.	Name			Date modified	Туре
Recent Places					
Desktop					
Libraries					
Computer					
Network					
_	•	III			F
	File <u>n</u> ame:	ISR-01_CorrectionData		•	<u>S</u> ave
	Save as type:	ASCII Files (*.txt)		<u> </u>	Cancel

[Save As] Window

A message indicating that the data was output in text format is displayed.



Click [OK].

A text file is created in the specified folder.

Check the content of the text file.

7

ISR-01_CorrectionData_Slit1nm.txt - Notepad	X	3
<u>File E</u> dit F <u>o</u> rmat <u>V</u> iew <u>H</u> elp		
"Correction Function","Slit 1nm" "Instrument Type","RF-6000 Series" "Instrument Name","RF-01" "Serial Number(Instrument)","H2_20141222a" "Date","11/17/14 07:19:47"	(
"ISR Name", "ISR-01"		
"Serial Number(ISR)","A90255200001" "Analyst Name","Administrator" "Comment","for Manual"		
"wavelength(nm)","Correction Number" 200.00,00.00000 200.10.0.000000		
200.20,0.000000 200.30,0.000000		
200.40,0.000000 200.50,0.000000 200.60,0.000000		
200.70,0.000000 200.80,0.000000 200.90,0.000000		÷
<	Þ	

Checking the Text File

13

13.5 Checking RF-6000 Performance

Instrument performance can be checked using the RF performance validation software.

13.5.1 Startup



Click [Validation] on the [Manage] tab in the LabSolutions RF launcher. The RF performance validation software starts.

Validation System-[Disconnect] File View Tests Instrument Help			
BSHIMADZU RF Performance Validation Print View Test (F7) (F8)	Connect (F9)	? Help (F1)	Stop (F12)
Batch of Test		File Property	
Cear All Cear All	Select Processing Finished	Folder for Saving: C:RF-Data\ValidationResult	
Batch of Test(s)	Result Not executed	Test Results File:	
V Stability	Not executed		
V WL Accuracy	Not executed	Analyst:	
WL Repeatability	Not executed		
WL Repeatability(USP)	Not executed		
Resolution	Not executed		
Results of Initialization	Not executed		
		Result	
Inspection Progress Overall Progress Remain:	47 min	Result is displayed here.	

[Validation System] Window (Initial Display)

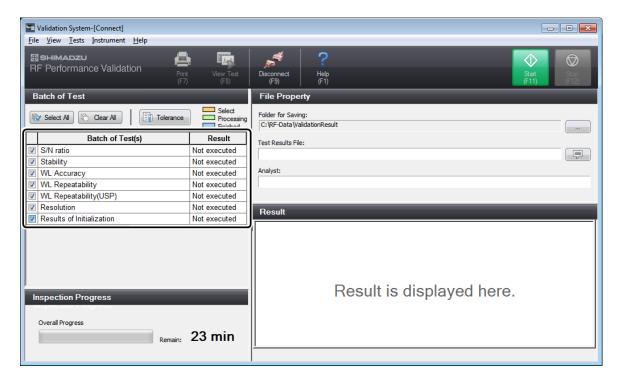
2 Click [Connect] on the main toolbar.



Tool Buttons

The available test items are displayed when a connection is established with the instrument.

Hint If the optional mercury lamp unit is installed, wavelength accuracy, wavelength repeatability, and resolution test items are also available.



[Validation System] Window (Connected)

13.5.2 Setting Judgment Criteria

Click [Tolerance] in the test item area.

Batch of Test	
Clear All	Select Processing Finished
Batch of Test(s)	Result
S/N ratio	Not executed
Stability	Not executed
WL Accuracy	Not executed
WL Repeatability	Not executed
WL Repeatability(USP)	Not executed
Resolution	Not executed
Results of Initialization	Not executed

Setting Tolerances

The [Tolerance] window is displayed.



Switch between the tabs to check and change the tolerance settings, and then click [OK].

Tolerance	×
arc Mercury Lamp	
S/N ratio	
RMS	1000
P-P	350
Stability	
Stability(%)	1.0
	Recommend
	OK Cancel

[Tolerance] Window

Accept the tolerance settings and close the [Tolerance] window.

▶ Reference For details on each test item and recommended values, see the help file provided with LabSolutions RF.

13.5.3 Executing Testing

1	

Select the checkboxes of the test items to perform in the test item area.

In this case, perform all test items. The total testing time is displayed in the test progress area according to the items selected for testing.

	B	atch of Test	
	R	Y Select All Clear All Tolerance	Select Processing Finished
	\Box	Batch of Test(s)	Result
	V	S/N ratio	Not executed
	V	Stability	Not executed
	V	NL Accuracy	Not executed
	V	NL Repeatability	Not executed
	V	NL Repeatability(USP)	Not executed
	V	Resolution	Not executed
	V	Results of Initialization	Not executed
1	-)	
	In	spection Progress	
		speciion riogress	
	9	Overall Progress	
		Remain:	26 min



Check the save destination of the result file in the file information area.

Folder for Saving:	
C:\RF-Data\ValidationResult	
Test Results File:	
Analyst:	

Checking the Save Destination

🖣 Hint

The save destination can be changed by clicking

Test Item Area/Test Progress Area

Enter the test result filename and analyst name.

File Property	
Folder for Saving: C:\RF-Data\ValidationResult	
Test Results File:	
RFtest150128.fpvr	
Analyst: RF Tester	

Entering the Filename and Analyst Name



Comments can also be entered for the result file by clicking

4

3

Click [Start] on the main toolbar.

If 30 minutes has not elapsed since lighting the xenon arc lamp, a standby window is displayed to allow the instrument to stabilize. Testing starts automatically after 30 minutes elapse.

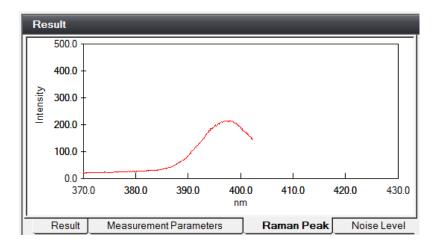
30 minutes have n	ot elapsed since the arc lamp turned on.
Inspection will star	t automatically after 30 minutes.
here a	
Waiting (rema	aining time: 20 min46 sec)
	I have a second a second se
"lick the "Everyte"	button to every te immediately
Click the "Execute"	button to execute immediately.
Click the "Execute"	Execute Abort

[Waiting for instrument to stabilize] Window

1

Set distilled water or a PTFE block onto the cell holder according to the displayed message, and click [OK].

Measurement starts and a spectrum and time-course graph are displayed in real time in the test result area.



Test Result Area (Test State Display)

13.5.4 Checking Test Results

The results of completed items can be checked during testing.

Click the title of the item for checking in the test item area.

In this case, click the [WL Accuracy] item for which testing has completed (indicated in blue).

Batch of Test	
Select All Clear All	Select Processing Finished
Batch of Test(s)	Result
S/N ratio	Passed
T Stability	Dascod
WL Accuracy	Passed
	r rocessing
WL Repeatability(USP)	Not executed
Resolution	Not executed
Results of Initialization	Not executed

Test Item Area

The test result of the selected item is displayed in the test result area.

Check the test result.

The spectrum can also be checked by switching between tabs.

Result						
	Ex/Em	WL(nm)	Tolerance(nm)	Peak(nm)	Error(nm)	Result
1	Ex.	253.7	+/-1.0	253.5	-0.2	Passed
2	Ex.	365.0	+/-1.0	365.1	0.1	Passed
3	Ex.	435.8	+/-1.0	435.5	-0.3	Passed
4	Ex.	546.1	+/-1.0	545.8	-0.3	Passed
5	Em.	253.7	+/-1.0	253.7	0.0	Passed
6	Em.	365.0	+/-1.0	364.9	-0.1	Passed
7	Em.	435.8	+/-1.0	435.8	0.0	Passed
8	Em.	546.1	+/-1.0	546.1	0.0	Passed
Result Measurement Parameters		Ex Spec	trum Em	Spectrum		

Test Result Area (Test Result Display Mode)

3

2

Click [View Test] on the main toolbar.



Main Toolbar

This returns to the window that displays the current state of testing.

13.5.5 Printing



Click [Print] on the main toolbar.

The [Print] window is displayed.



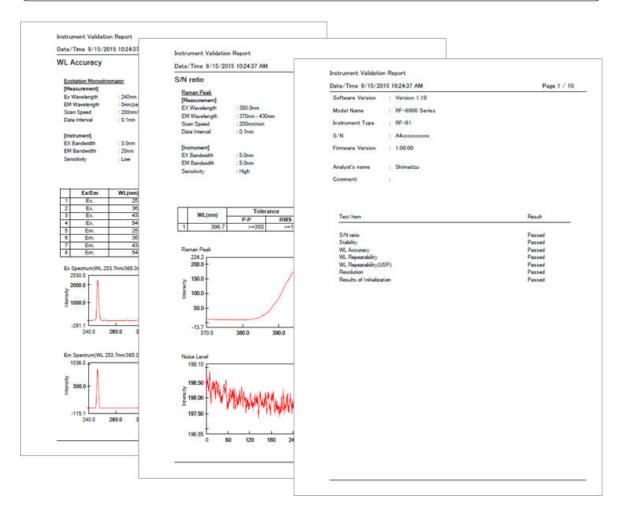
Main Toolbar

2

Confirm that the printer for output is correct and click [OK].

Summary information and test results of the test result file are printed.

NOTE The layout of printed results cannot be changed.



Example of Printed Test Results

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