



ISC MetaScan

User's Guide

Mar. 14, 2025

Contents



- [**Introduction**](#)
- [**Perform a Scan**](#)
 - [Warm Up Before Starting a Scan](#)
 - [Quick Scan](#)
 - [Create a New Configuration and Scan](#)
 - [Multi-Device Scan](#)
 - [Normal Scan with Filename Prefix](#)
 - [Batch Scan with Sample ID](#)
 - [Auto Continuous Scan](#)
 - [Manual Continuous Scan](#)
 - [Device Button Scan](#)
- [**Configurations Operation**](#)
 - [Move Configurations](#)
 - [Copy Configurations](#)
 - [Set a Configuration as Device Default Config](#)
 - [Delete Configurations](#)
- [**Collect Spectrum Data**](#)
- [**Utility Functions Operation**](#)
 - [Update Reference Data](#)
 - [Update TIVA Firmware](#)
 - [Update DLPC150 Firmware](#)
 - [Factory Data Reset](#)
- [**Spectrophotometric Noise Test**](#)
 - [High Flux Light Test](#)
 - [Low Flux Light Test](#)
- [**Wavelength Uncertainty Test**](#)
 - [Wavelength Accuracy Check](#)
 - [Wavelength Calibration](#)
- [**Performance Verification**](#)

Introduction

Application Outline

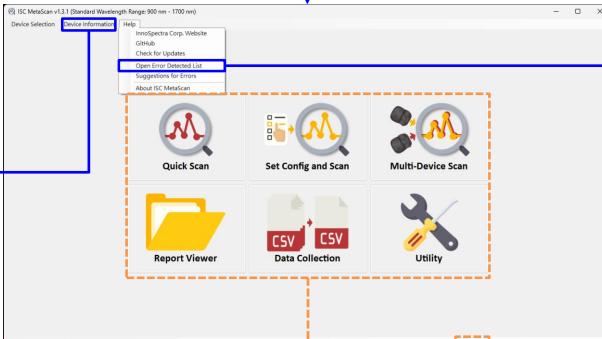


2 seconds after

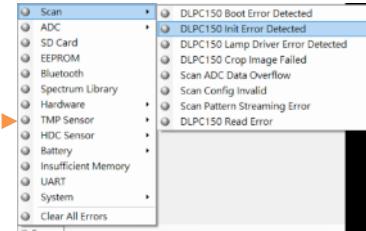
About ISC MetaScan



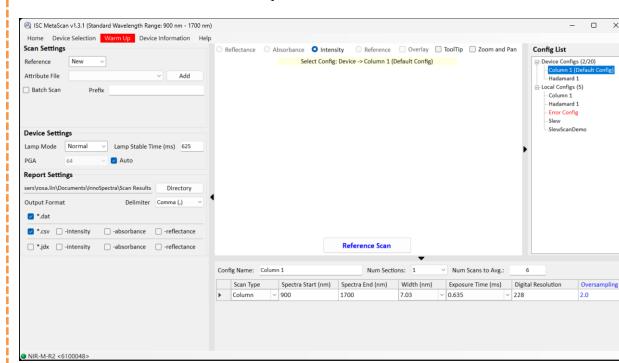
Device Information



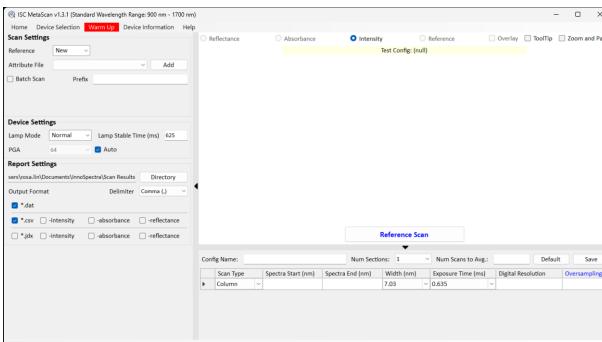
Error Status



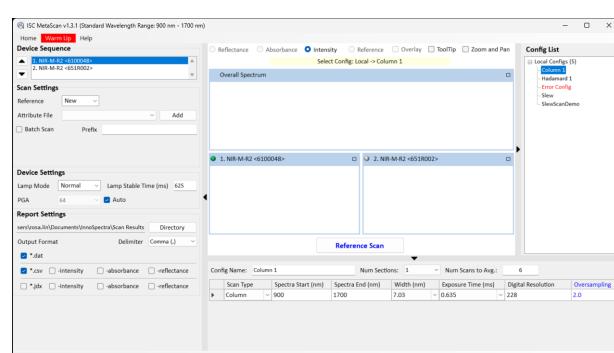
Quick Scan



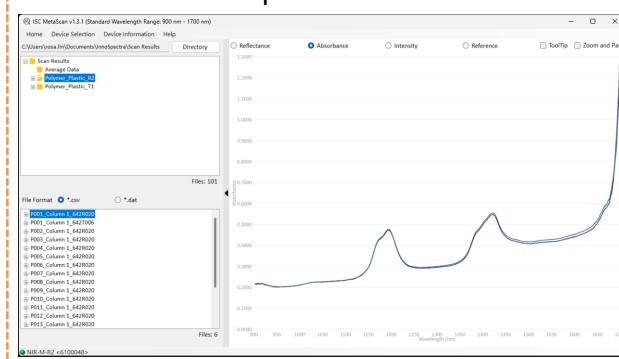
Set Config and Scan



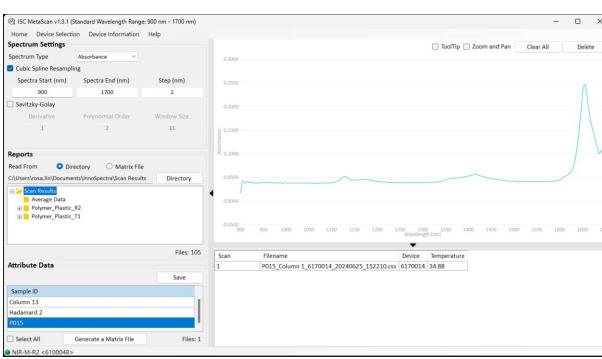
Multi-Device Scan



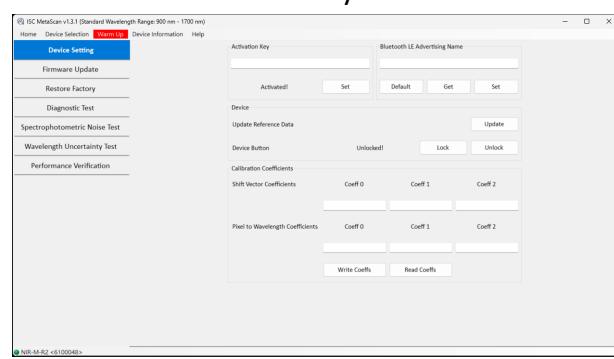
Report Viewer



Data Collection



Utility

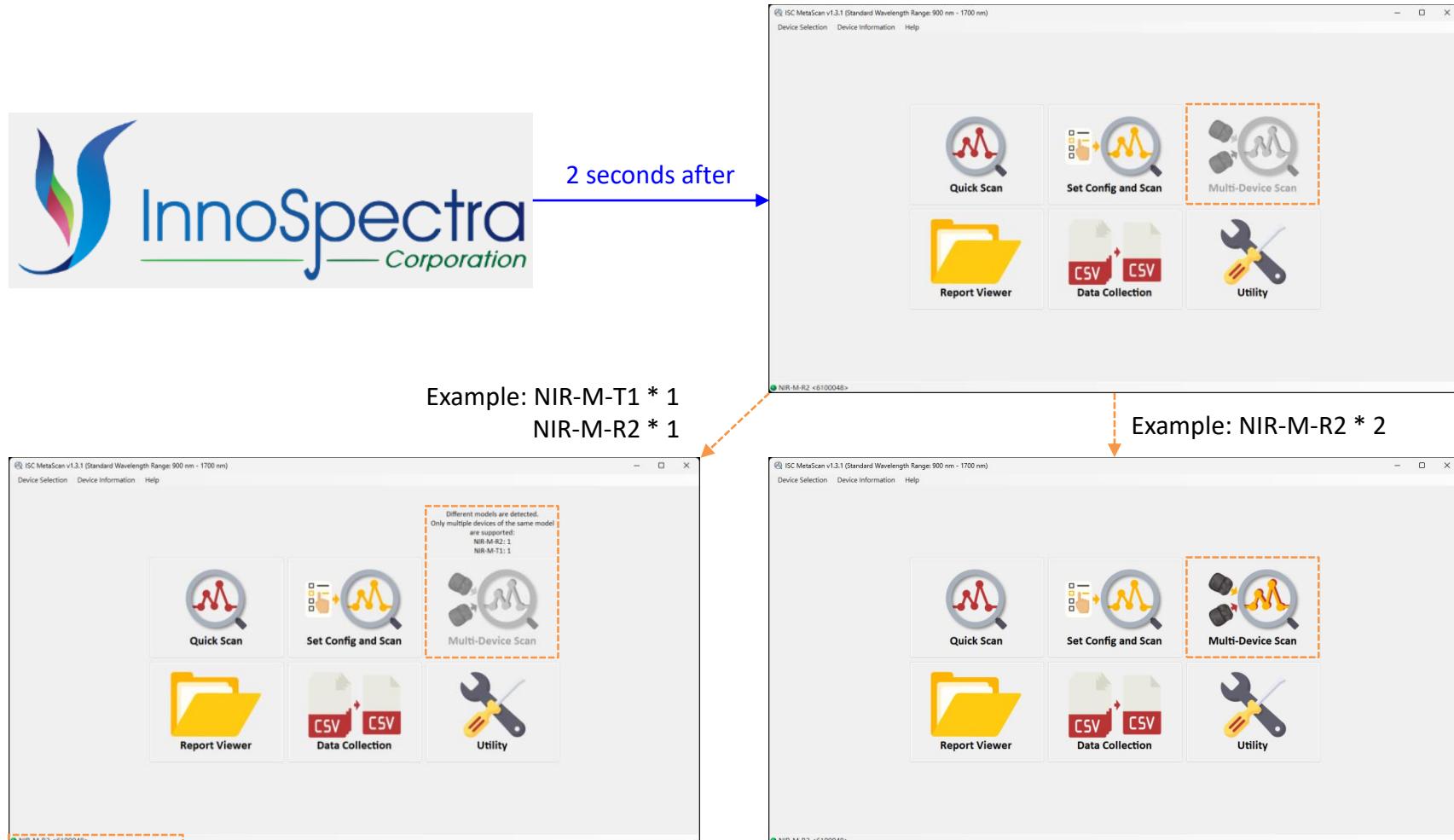


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Application Start



- The application starts from the splash screen and goes to the main menu after 2 seconds.
- The device will automatically connect after entering the main menu.
- Connectable devices are detected every 2 seconds. If multiple devices of the same model are detected, the multi-device scan button is enabled.

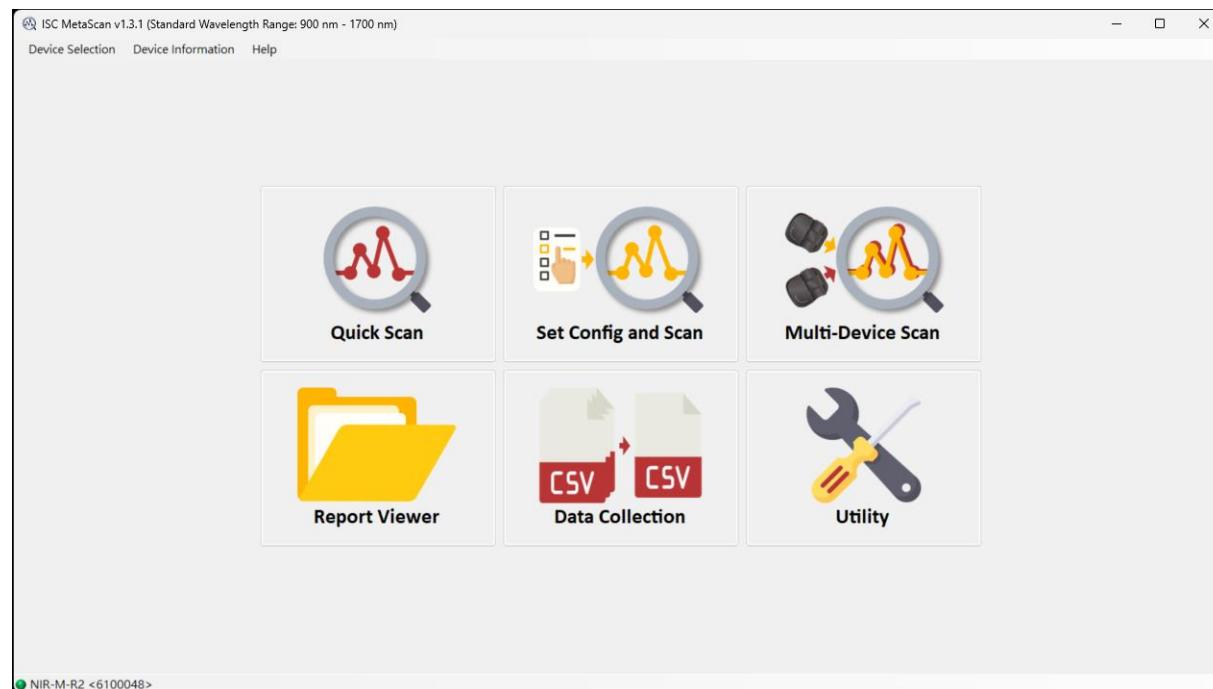


If the device is not activated, it will display "(Advanced Functions Locked!)" at the end.

Menu

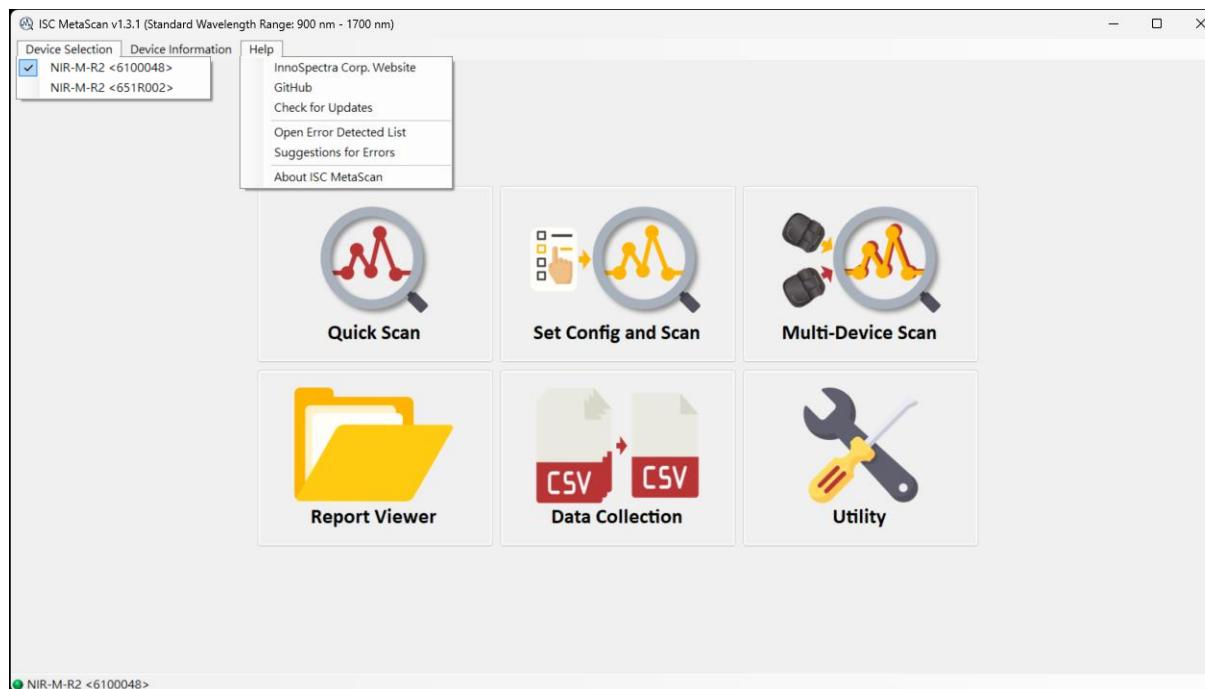


- **Quick Scan:** Direct to scan view with device default scan configuration.
- **Set Config and Scan:** Direct to scan view which needs to set a config before scanning. It supports saving new configuration or updating exist configuration to device or local.
- **Multi-Device Scan:** Direct to scan view which only supports multiple devices of one model.
- **Report Viewer:** Direct to report view which supports average scan data and delete reports.
- **Data Collection:** Direct to data collection view where preprocessed data is loaded. It also supports generating a matrix file for model building.
- **Utility:** Direct to utility view that contains device setting, firmware update, restore factory, diagnostic test, spectrophotometric noise test, wavelength uncertainty test, and performance verification.



Menu Bar

- **Device Selection:** Select one device and connect it directly. The connected device shows a tick.
- **Device Information:** Direct to information view which shows the device related information.
- **Help:**
 - **InnoSpectra Corp. Website:** Go to ISC website.
 - **GitHub:** Go to ISC GitHub.
 - **Check for Updates:** Check online to see if there is a newer version on GitHub.
 - **Open Error Detected List:** Open the error detected list for connected device. This option will not appear if the device has not experienced errors yet.
 - **Suggestions for Errors:** Provide the suggestions for errors that have occurred. This option will not appear if the device has not experienced errors yet.
 - **About ISC MetaScan:** Direct to information view which includes GUI version, built time and license agreement.



Quick Scan



After entering the page, the warm up reminder will be displayed.

After entering the page, the device default configuration will be selected.

The screenshot shows the ISC MetaScan v1.3.1 software interface. The window title is "ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)". The menu bar includes Home, Device Selection, Warm Up (highlighted in red), Device Information, and Help. The main area is divided into several sections:

- Scan Settings:** Reference dropdown set to "New", Attribute File dropdown, "Batch Scan" checkbox, and "Prefix" input field.
- Device Settings:** Lamp Mode dropdown set to "Normal", Lamp Stable Time (ms) input field set to 625, PGA dropdown set to 64, and Auto checkbox checked.
- Report Settings:** Directory set to "users\rosa.lin\Documents\InnoSpectra\Scan Results", Output Format dropdown set to "Comma (,)".
 - File extensions listed: *.dat (checked), *.csv (checked), *.intensity (unchecked), *.absorbance (unchecked), *.reflectance (unchecked).
 - File extensions listed: *.jdx (unchecked), *.intensity (unchecked), *.absorbance (unchecked), *.reflectance (unchecked).
- Scan Result Option:** Radio buttons for Reflectance, Absorbance, Intensity (selected), Reference, Overlay, ToolTip, and Zoom and Pan. A yellow box highlights the "Select Config: Device > Column 1 (Default Config)" button.
- Config List:** A tree view showing "Device Configs (2/20)" with "Column 1 (Default Config)" selected, and "Local Configs (5)" including "Column 1", "Hadamard 1", "Error Config", "Slew", and "SlewScanDemo".
- Scan Result:** A large empty area labeled "Scan Result".
- Scan Control:** Buttons for "Scan Control" and "Reference Scan".
- Selected Configuration Information:** A table with the following data:

	Scan Type	Spectra Start (nm)	Spectra End (nm)	Width (nm)	Exposure Time (ms)	Digital Resolution	Oversampling
Column 1	Column	900	1700	7.03	0.635	228	2.0
- Bottom Status Bar:** Shows "NIR-M-R2 <6100048>".

Settings Before Scanning

Selected Configuration Information

All
Configurations

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Set Configuration and Scan



After entering the page, the warm up reminder will be displayed.

The screenshot shows the ISC MetaScan v1.3.1 software interface. The left side is labeled "Settings Before Scanning" and contains sections for "Scan Settings" (Reference set to "New", Attribute File dropdown, Batch Scan checkbox), "Device Settings" (Lamp Mode "Normal", Lamp Stable Time "625 ms", PGA "64", Auto checkbox checked), and "Report Settings" (Output Format "*.dat", Delimiter "Comma (,), *.csv, *-intensity, *-absorbance, *-reflectance, *.jdx, *-intensity, *-absorbance, *-reflectance). The right side is labeled "Scan Result Option" and "Configuration Setting Area". "Scan Result Option" includes radio buttons for Reflectance, Absorbance, Intensity (selected), Reference, Overlay, ToolTip, and Zoom and Pan, with "Test Config: (null)" below. "Configuration Setting Area" includes "Scan Control" (Reference Scan button) and "Default" (button highlighted with a red arrow), "Config Name:" input, "Num Sections:" dropdown (set to 1), "Num Scans to Avg:" input, and "Save" button. Below is a table with columns: Scan Type, Spectra Start (nm), Spectra End (nm), Width (nm), Exposure Time (ms), Digital Resolution, and Oversampling. A single row is shown with "Column" selected in the Scan Type dropdown, "7.03" in the Width (nm) input, and "0.635" in the Exposure Time (ms) input. A note at the bottom says "The user can click "Default" button to load the default configuration." A dashed orange box encloses the "Scan Result Option" and "Configuration Setting Area" sections.

ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)

Home Device Selection Warm Up Device Information Help

Scan Settings

Reference New

Attribute File Add

Batch Scan Prefix

Device Settings

Lamp Mode Normal Lamp Stable Time (ms) 625

PGA 64 Auto

Report Settings

sers\rosa.lin\Documents\InnoSpectra\Scan Results Directory

Output Format Comma (,) Delimiter

*.dat

*.csv -intensity -absorbance -reflectance

*.jdx -intensity -absorbance -reflectance

Scan Result Option

Reflectance Absorbance Intensity Reference Overlay ToolTip Zoom and Pan

Test Config: (null)

Scan Result

Scan Control Reference Scan

Config Name: Num Sections: 1 Num Scans to Avg.: Default Save

Scan Type	Spectra Start (nm)	Spectra End (nm)	Width (nm)	Exposure Time (ms)	Digital Resolution	Oversampling
Column			7.03	0.635		

The user can click "Default" button to load the default configuration.

Settings Before Scanning

Configuration Setting Area

NIR-M-R2 <6100048>

Multi-Device Scan



After entering the page, the warm up reminder will be displayed.

After entering the page, the first valid configuration will be selected.

The screenshot shows the ISC MetaScan v1.3.1 software interface with the following sections highlighted:

- Settings Before Scanning (Left Panel):** Includes Device Sequence (with two devices selected), Scan Settings (Reference set to New, Attribute File dropdown, Batch Scan checkbox), Device Settings (Lamp Mode Normal, Lamp Stable Time 625 ms, PGA 64, Auto checkbox), and Report Settings (Output Format CSV, Delimiter Comma, *.dat checkbox, *.csv checkbox, *.wdx checkbox).
- Scan Result Option (Top Center):** Shows radio buttons for Reflectance, Absorbance, Intensity (selected), Reference, Overlay, ToolTip, and Zoom and Pan. Below it is a dropdown menu "Select Config: Local -> Column 1".
- Overall Spectrum (Center):** A large plot area titled "Overall Spectrum".
- Scan Result for Each Device (Bottom Center):** Two smaller plots labeled "1. NIR-M-R2 <6100048>" and "2. NIR-M-R2 <651R002>".
- Scan Control (Bottom Left):** Buttons for "Scan Control" and "Reference Scan".
- Config List (Right Side):** A tree view showing "Local Configs (5)" with "Column 1" selected, along with other configurations like Hadamard 1, Error Config, Slew, and SlewScanDemo.
- Selected Configuration Information (Bottom Right):** A table showing configuration details:

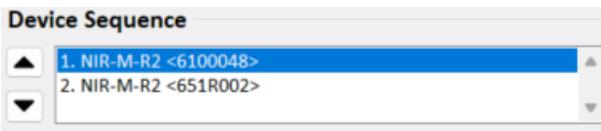
Config Name:	Column 1	Num Sections:	1	Num Scans to Avg.:	6
Scan Type:	Column	Spectra Start (nm):	900	Spectra End (nm):	1700
Width (nm):	7.03	Exposure Time (ms):	0.635	Digital Resolution:	228
Oversampling:	2.0				
- Annotations:** A dashed orange box encloses the "Scan Result Option" and "Overall Spectrum" areas. Another dashed orange box encloses the "Scan Result for Each Device" and "Scan Control" areas. A red annotation "ONLY Local Configurations" points to the "Config List" panel. Labels "Settings Before Scanning" and "Selected Configuration Information" are placed at the bottom of their respective sections.

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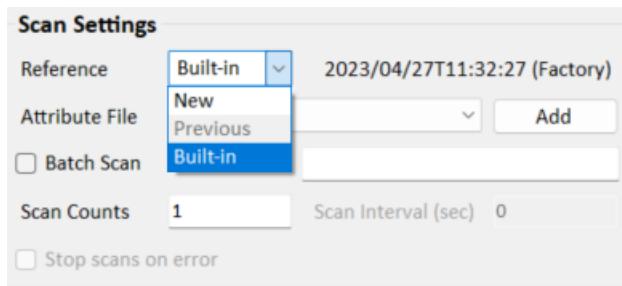
Multi-Device Scan – Device Sequence

- All devices of the same model are displayed.
- Provides up and down buttons to adjust the scanning order of devices.
- The current connected device will display white text on a blue background.



Scan Pages – Scan Settings

- **Reference Selection:** Provides the user to choose the reference for the absorbance or reflectance graph.
 - **New:** Place a white reference sample on the scan window and perform a new reference scan. This new scan is stored on the PC and can then be selected with the “Previous” reference radio button.
 - **Previous:** Choose the reference from the previous use of the “New” option.
 - **Built-In:** Interpolates the reference stored on TIVA EEPROM at the factory to match the current scan configuration parameters.
- **Attribute File:** If the user would like to use batch scan, the attribute file is required, and the file needs to be added. When user adds an attribute file, the system will automatically create a directory with the same name as the attribute file under the report directory, and copy the attribute file to this directory.
- **Enable/Disable Batch Scan:** Controls batch scan enable/disable. When the function is enabled, it needs to be used with attribute file. When the function is disabled, it is equivalent to a normal scan.
- **Continuous Scan:** Provides the user to do single scan, auto continuous scan and manual continuous scan. The system will calculate the average scan data based on the number of scans. The average scan test report will only be saved if the PGA is not set to auto.



Scan Pages – Normal Scan / Batch Scan



- Normal scan provides filename prefix input. Scan results are saved under the report directory.
- Batch scan provides sample ID selection. Scan results are saved to a directory with the same name as the attribute file under the report directory.

Scan Settings

Reference New

Attribute File

Batch Scan Prefix

Device Settings

Lamp Mode Normal

PGA 64 Auto

Report Settings

Output Format

Delimiter Comma (,)

*.dat

*.csv -intensity -absorbance -reflectance

*.idx -intensity -absorbance -reflectance

Scan Settings

Reference New

Attribute File Polymer_Plastic_R2

Batch Scan Sample ID

Batch Scan

P001

P002

P003

P004

P005

P006

P007

P008

P009

P010

Device Settings

Lamp Mode Normal

PGA 64 Auto

Report Settings

Output Format

Delimiter Comma (,)

*.dat

*.csv -intensity -absorbance -reflectance

*.idx -intensity -absorbance -reflectance

Scan Pages – Single Scan / Auto Continuous Scan / Manual Continuous Scan



Single Scan Mode: Scan Counts = 1

Scan Settings

Reference: Built-in | Date: 2023/04/27T11:32:27 (Factory)

Attribute File: Polymer_Plastic_R2 | Add

Batch Scan | Prefix: []

Scan Counts: **1** | Scan Interval (sec): 0

Stop scans on error

Device Settings

Lamp Mode: Normal | Lamp Stable Time (ms): 625

PGA: 64 | Auto (Ref.: 64, FixedPGA)

Report Settings

Output Format: sers\rosa.lin\Documents\InnoSpectra\Scan Results | Directory

Delimiter: Comma (,)

*.dat

*.csv | -intensity | -absorbance | -reflectance

*.jdx | -intensity | -absorbance | -reflectance

Scan

Auto Continuous Scan Mode: Scan Counts > 1 & Scan Interval > 0

Scan Settings

Reference: Built-in | Date: 2023/04/27T11:32:27 (Factory)

Attribute File: Polymer_Plastic_R2 | Add

Batch Scan | Prefix: []

Scan Counts: **5** | Scan Interval (sec): **1**

Stop scans on error

Device Settings

Lamp Mode: Normal | Lamp Stable Time (ms): 625

PGA: 64 | Auto (Ref.: 64, FixedPGA)

Report Settings

Output Format: sers\rosa.lin\Documents\InnoSpectra\Scan Results | Directory

Delimiter: Comma (,)

*.dat

*.csv | -intensity | -absorbance | -reflectance

*.jdx | -intensity | -absorbance | -reflectance

Auto Continuous Scan Mode

Scan

Manual Continuous Scan Mode: Scan Counts > 1 & Scan Interval = 0

Scan Settings

Reference: Built-in | Date: 2023/04/27T11:32:27 (Factory)

Attribute File: Polymer_Plastic_R2 | Add

Batch Scan | Prefix: []

Scan Counts: **5** | Scan Interval (sec): **0**

Stop scans on error

Device Settings

Lamp Mode: Normal | Lamp Stable Time (ms): 625

PGA: 64 | Auto (Ref.: 64, FixedPGA)

Report Settings

Output Format: sers\rosa.lin\Documents\InnoSpectra\Scan Results | Directory

Delimiter: Comma (,)

*.dat

*.csv | -intensity | -absorbance | -reflectance

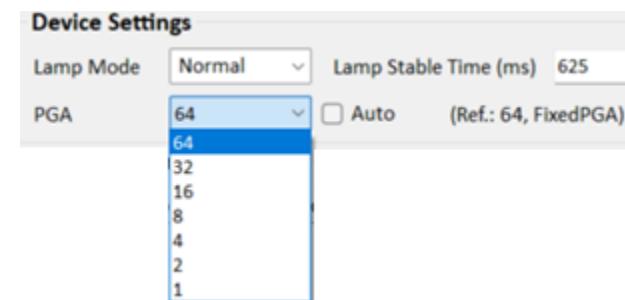
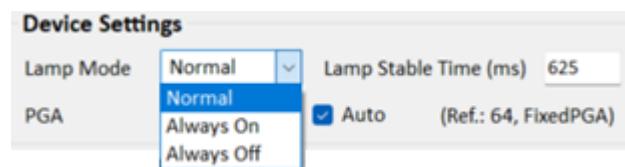
*.jdx | -intensity | -absorbance | -reflectance

Manual Continuous Scan Mode

Scan

Scan Pages – Device Settings

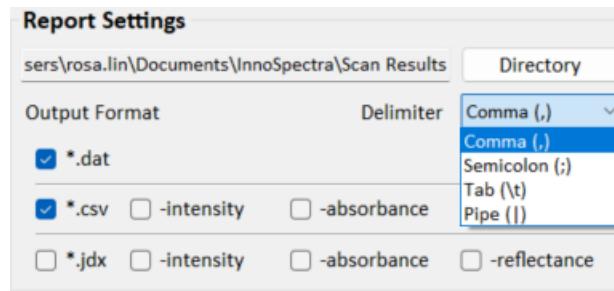
- **Lamp Mode:** Controls lamp normal and always on/off. When “Normal” is selected, user can set lamp stable time to extend lamp stabilization. This allows the user to avoid any lamp stability issues and reduce lamp wear caused by turning on and off the lamps, as well as the additional time needed to wait for the lamps to stabilize before executing a scan.
- **PGA Gain Control:** Provides the user to choose the PGA gain setting for scan.
 - **Auto:** The system will calculate a suitable gain value.
 - **Fixed:** The user can select one gain value before starting a scan.



Scan Pages – Report Settings

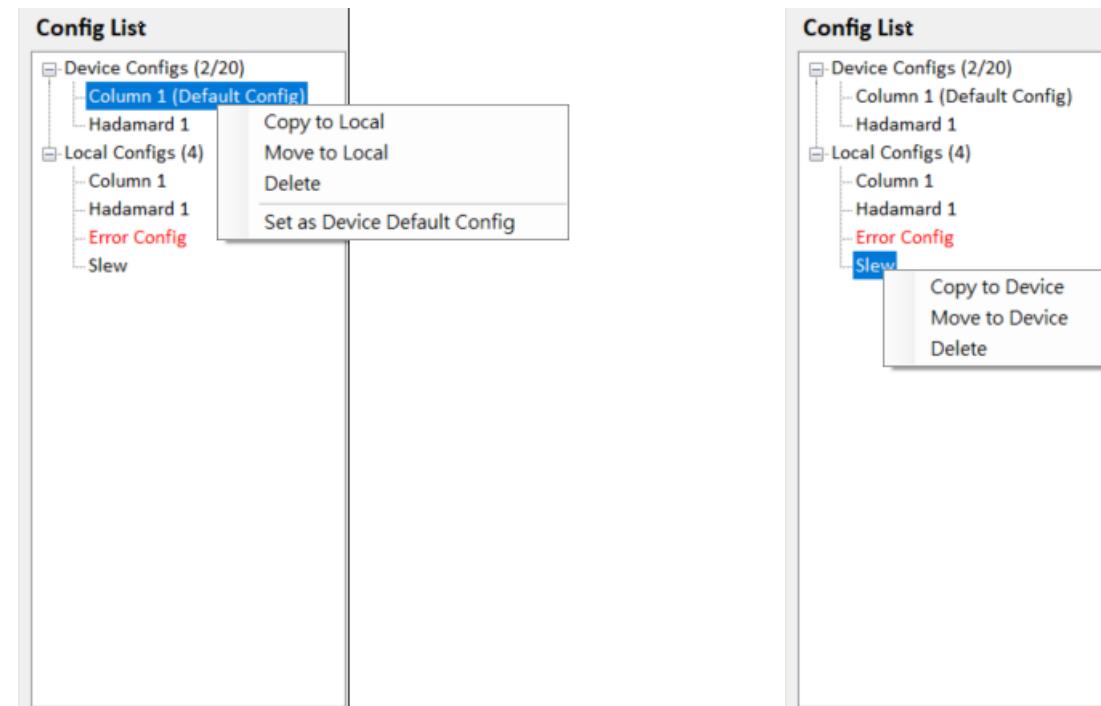


- **Directory:** Provides the user to choose where to store scan reports.
- **Output Format:** Provides the user to save which kind of file. The *.dat and *.csv files are always saved.
- **File Delimiter:** Provides the user to select the delimiter type for the scan report.



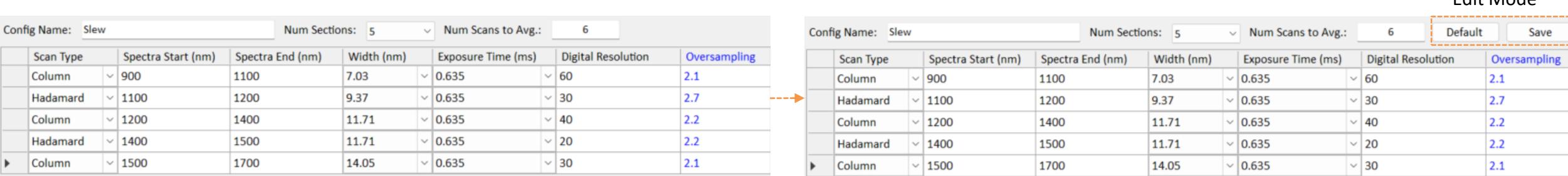
Scan Pages – Configuration List

- The config list includes device configurations and local configurations. Only display local configurations in Multi-Device Scan.
- Device configurations are saved on the device at most 20 sets.
- Local configurations are saved on the PC.
- If the configuration is invalid, it will display the **red text**.
- The config list control functions are placed on the right mouse button.
 - **Set as Device Default Configuration:** Set the configuration as device default configuration for Quick Scan default use.
 - **Copy/Move:** Provides the user to copy/move configuration(s) between device and PC. Configuration(s) can optionally be overwritten based on the same configuration name.
 - **Delete:** Provides the user to delete configuration(s).



Scan Pages – Scan Configuration

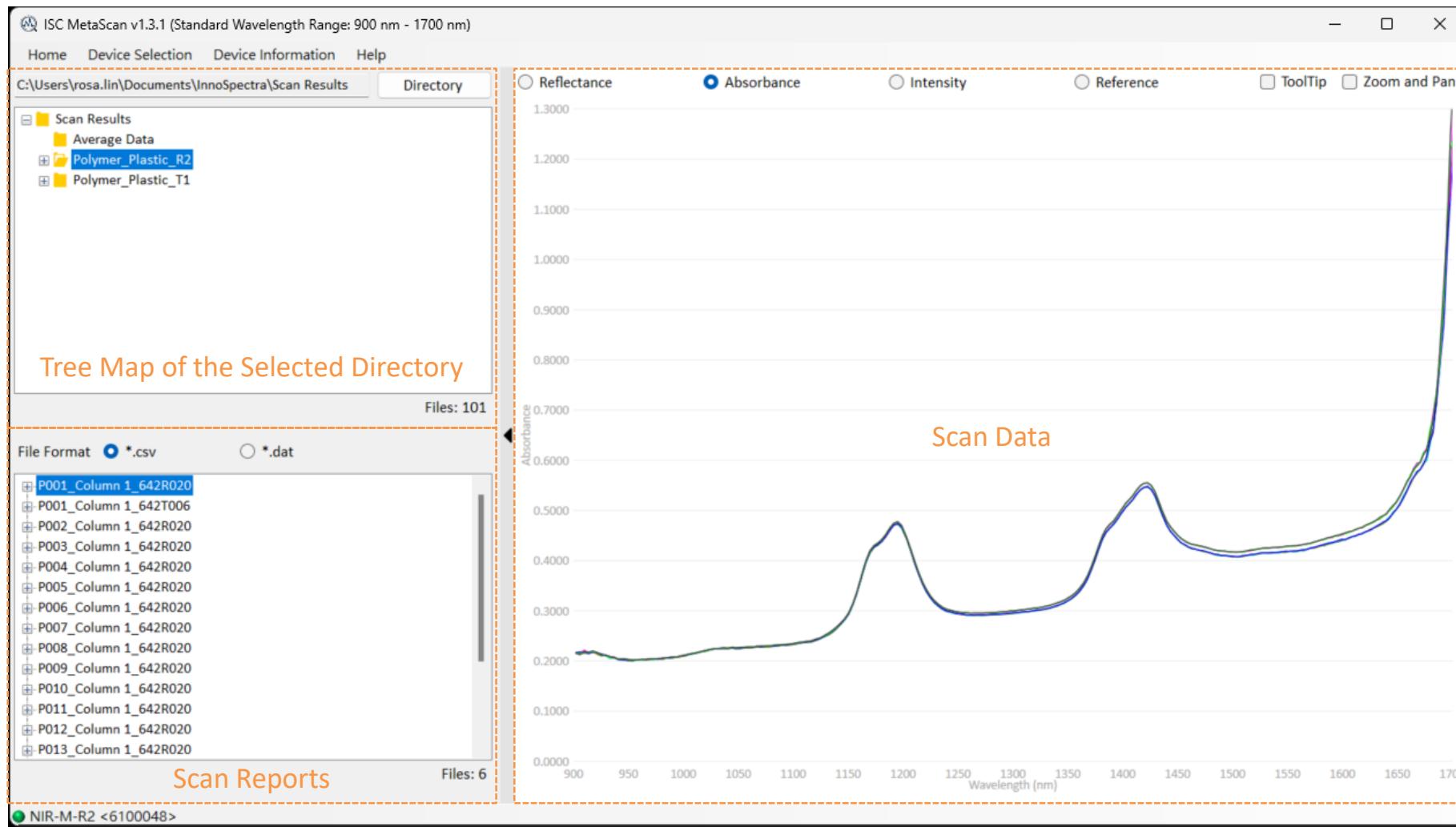
- The information of scan configuration items are as follows:
 - Config Name:** Configuration name which display to the list.
 - Number of Scans to Average:** This is the repeated continuous scans that are averaged together.
 - Number of Sections:** A scan can be broken up into 1 ~ 5 sections. Each section can have individual set of the following parameters:
 - Scan Type:**
 - Column:** Selects one wavelength at a time.
 - Hadamard:** Creates a set with several wavelengths multiplexed at a time and then decodes the individual wavelengths.
 - Spectra Range (nm):** Start and End wavelengths or spectral range of interest for the scan.
 - Width (nm):** This number selects the width of the groups of pixels in the generated Column or Hadamard patterns.
 - Exposure Time (ms):** The exposure time can be individually set for each section in the range of 0.635ms to 60.960ms.
 - Digital Resolution:** This number defines how many wavelength points are captured across the defined spectral range. Each wavelength point corresponds to a pattern that is displayed on the DMD.
 - Oversampling:** This number displays the oversampling rate for the section pattern width setting.
- The user can directly click on the content to enter the edit mode for modification.
- In edit mode, the system provides “Default” button to quickly input the configuration.



Config Name: Slew		Num Sections: 5	Num Scans to Avg.: 6	Edit Mode				
Scan Type	Spectra Start (nm)	Spectra End (nm)	Width (nm)	Exposure Time (ms)	Digital Resolution	Oversampling	Default	Save
Column	900	1100	7.03	0.635	60	2.1		
Hadamard	1100	1200	9.37	0.635	30	2.7		
Column	1200	1400	11.71	0.635	40	2.2		
Hadamard	1400	1500	11.71	0.635	20	2.2		
Column	1500	1700	14.05	0.635	30	2.1		

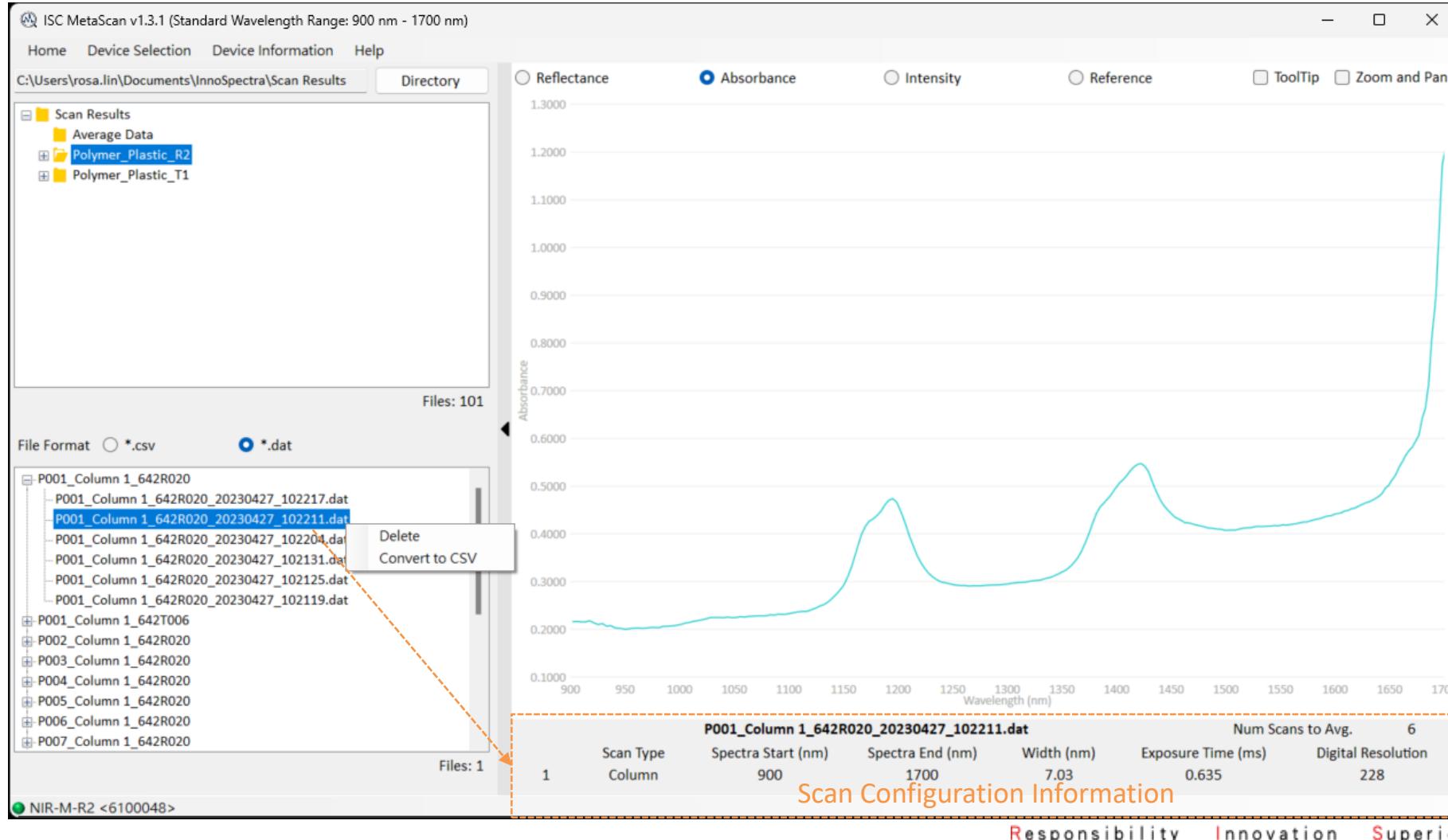
Report Viewer

- All subdirectories under the selected directory are displayed. All the readable files in the selected directory are displayed.
- The file control functions are placed on the right mouse button which contains delete files, average scan data, and convert to CSV with *.dat.
- The “Average Scan Data” function is only available for selected multiple scan reports.



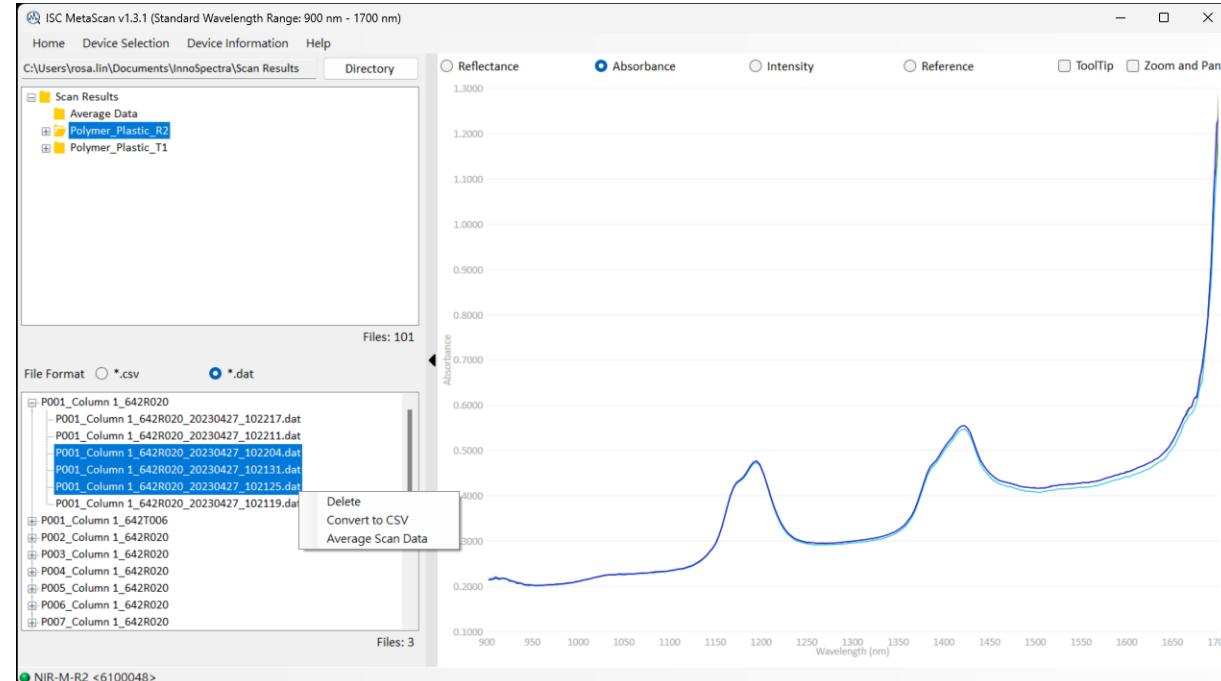
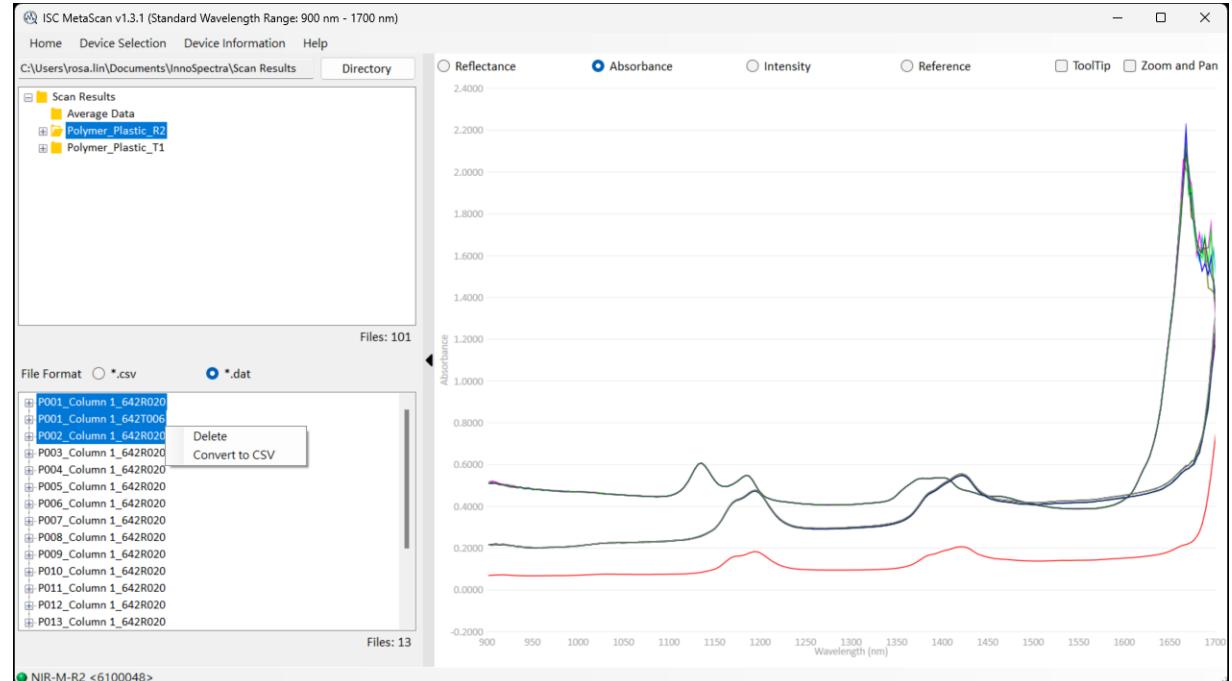
Report Viewer (Cont.)

- The scan configuration information is displayed only when ONE file is selected.



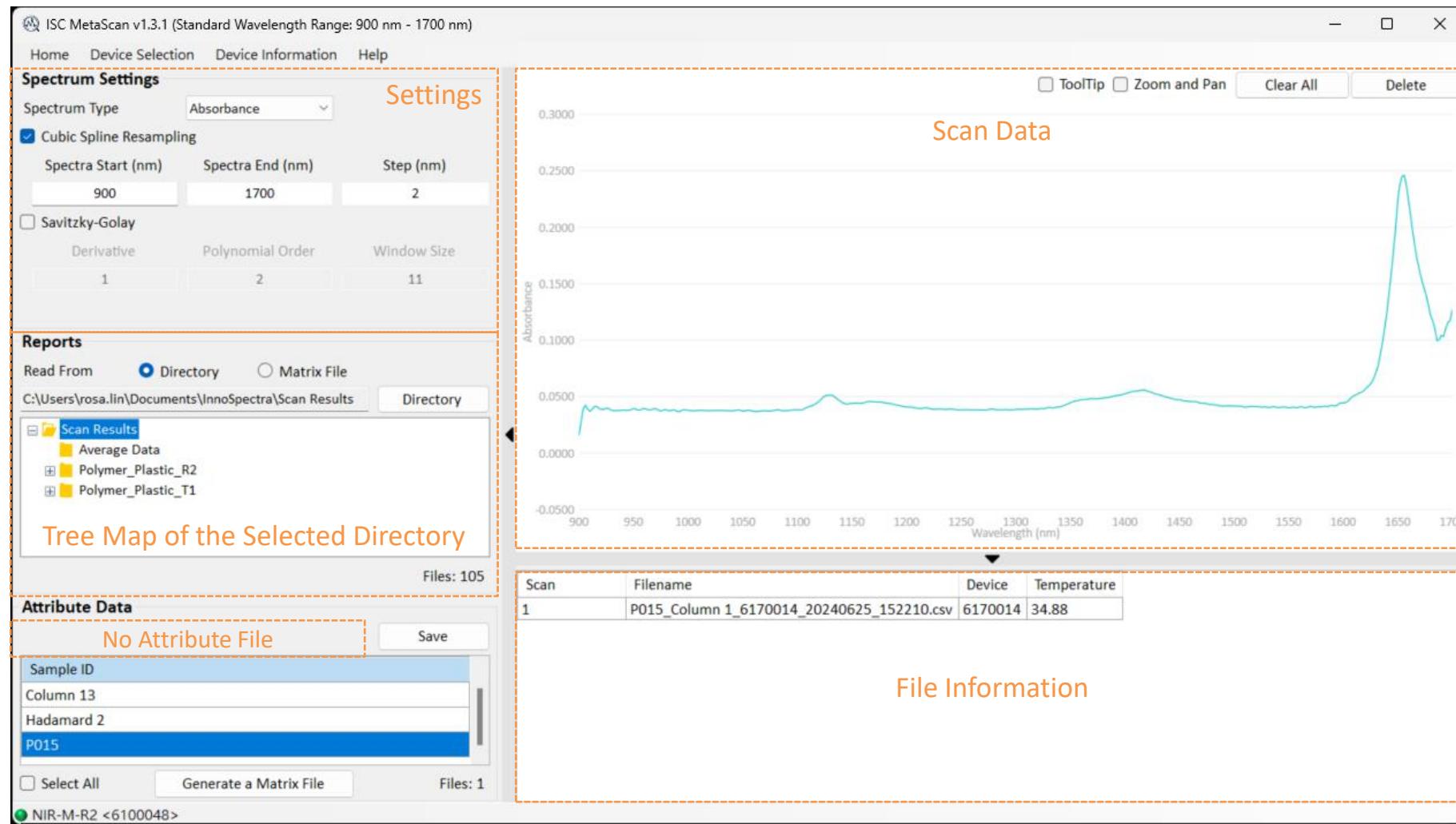
Report Viewer – Multiple Selection

- The system supports multiple selection of files using “Ctrl” or “Shift” key.



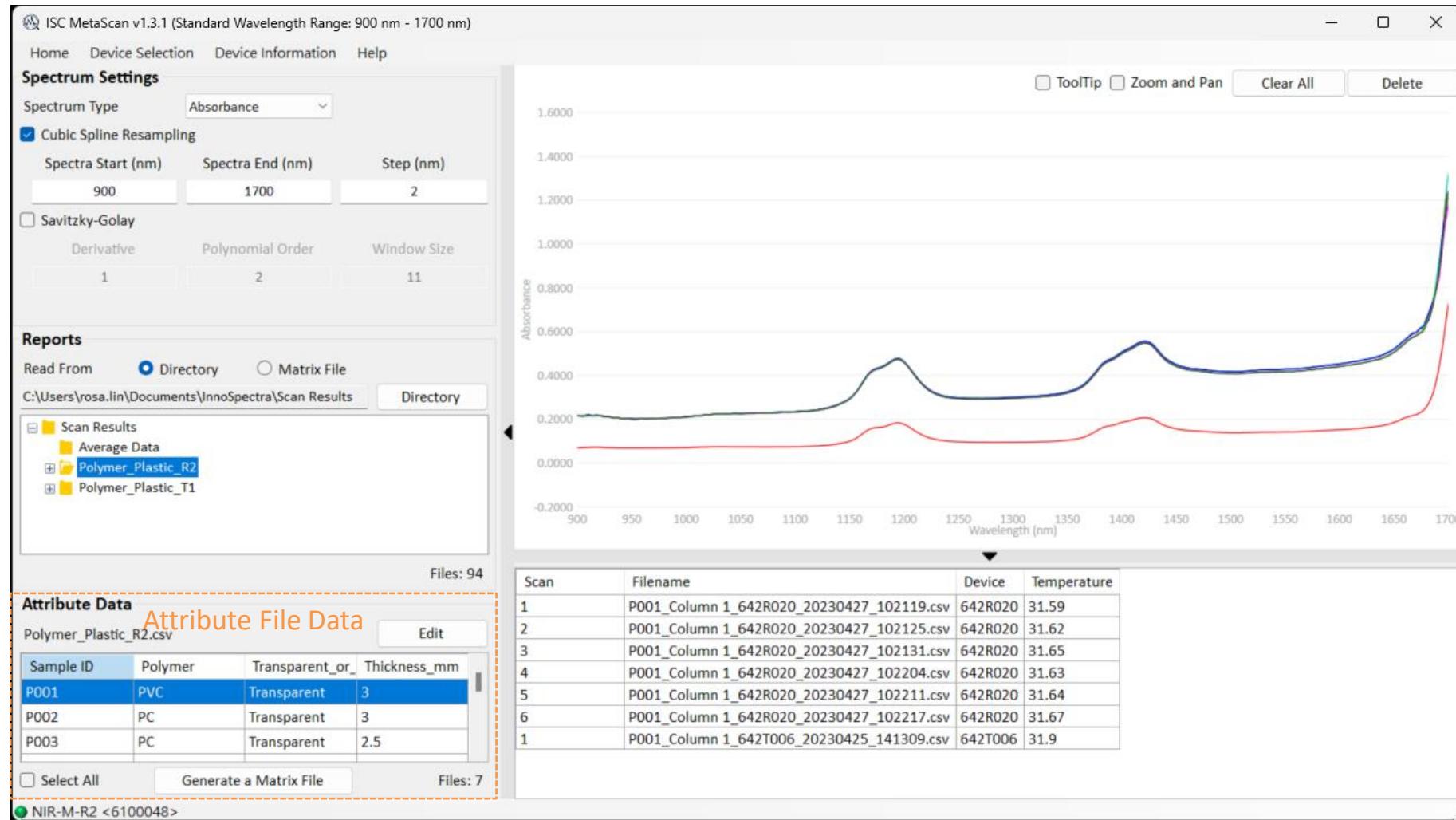
Data Collection

- All subdirectories under the selected directory are displayed.
- Classify data according to sample ID or file name.
- If the attribute file does not exist, the system will classify by file name as the sample id.



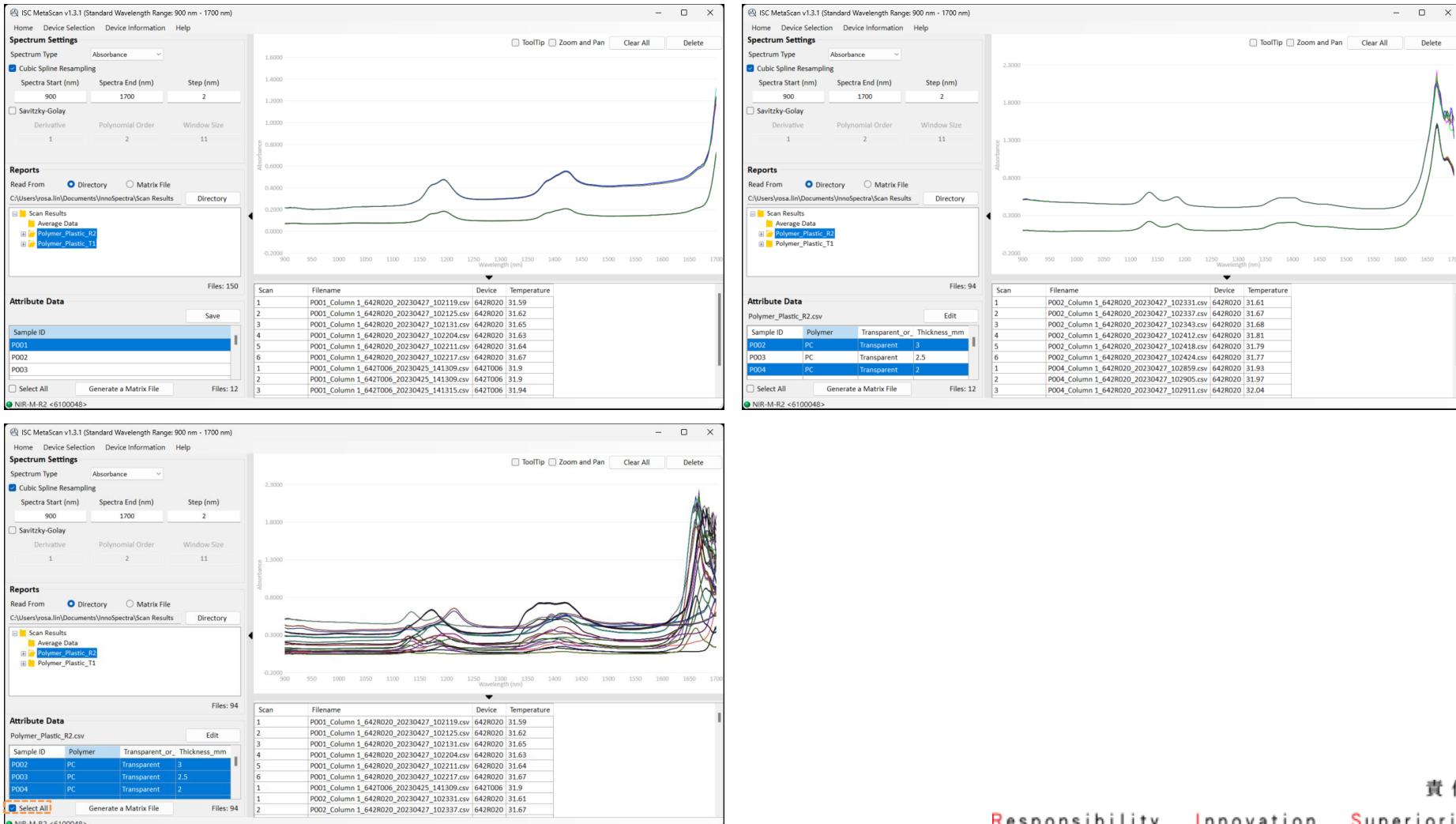
Data Collection (Cont.)

- If the attribute file exists, the system will display the file data.
- The sample ID without data displays a gray background.



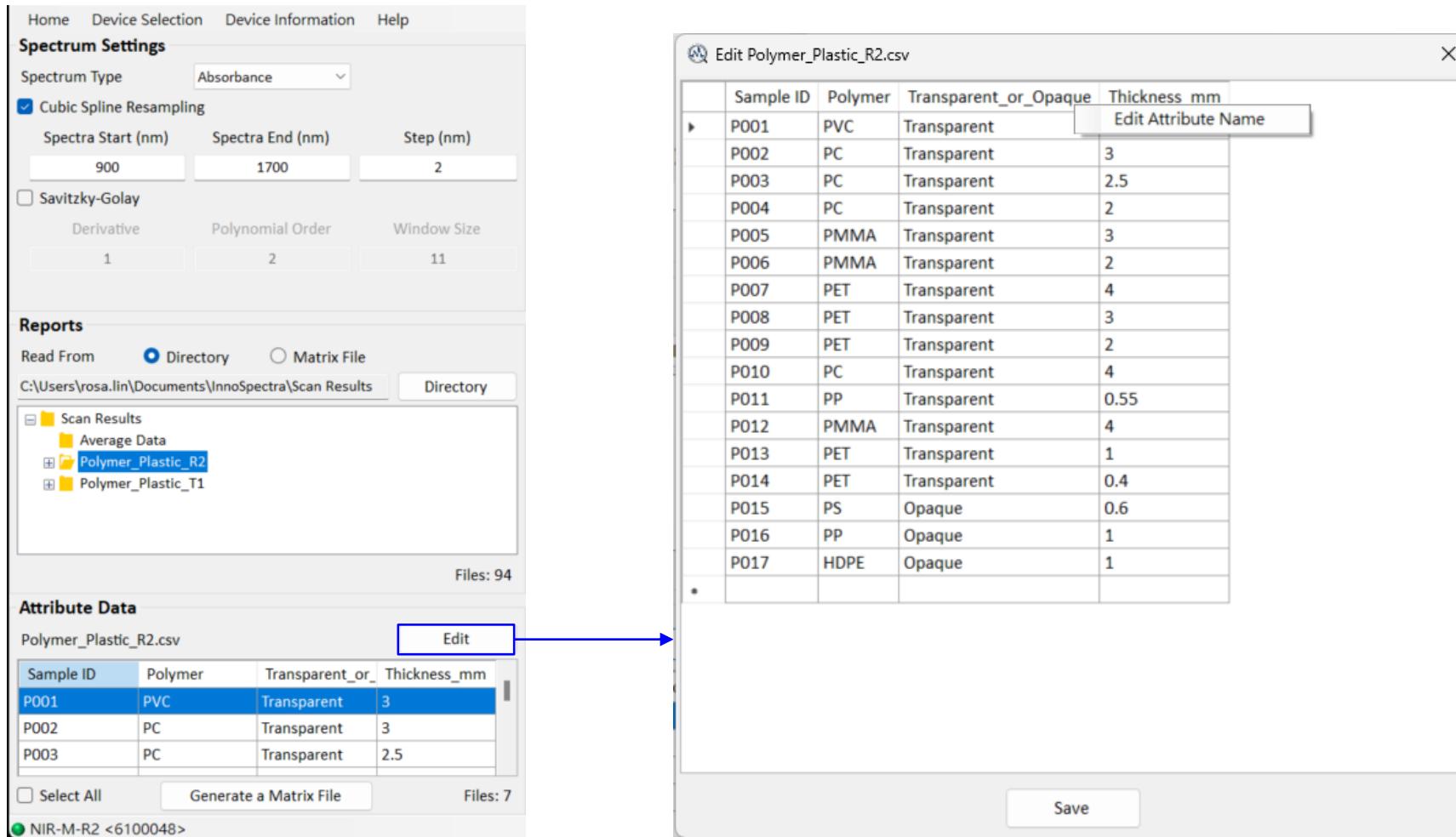
Data Collection – Multiple Selection

- The system provides multiple selection of directories using “Ctrl” key. Attribute data only displays the sample ID and no other attributes.
- The system supports multiple selection of attribute data using “Ctrl” or “Shift” key.
- The user can also check "Select All" to display all data.



Data Collection – Attribute File

- The system provides simple editing functions for attribute files: adding row, editing attribute name, and modifying content.
- “Sample ID” is required field, and the scan data is classified according to this.

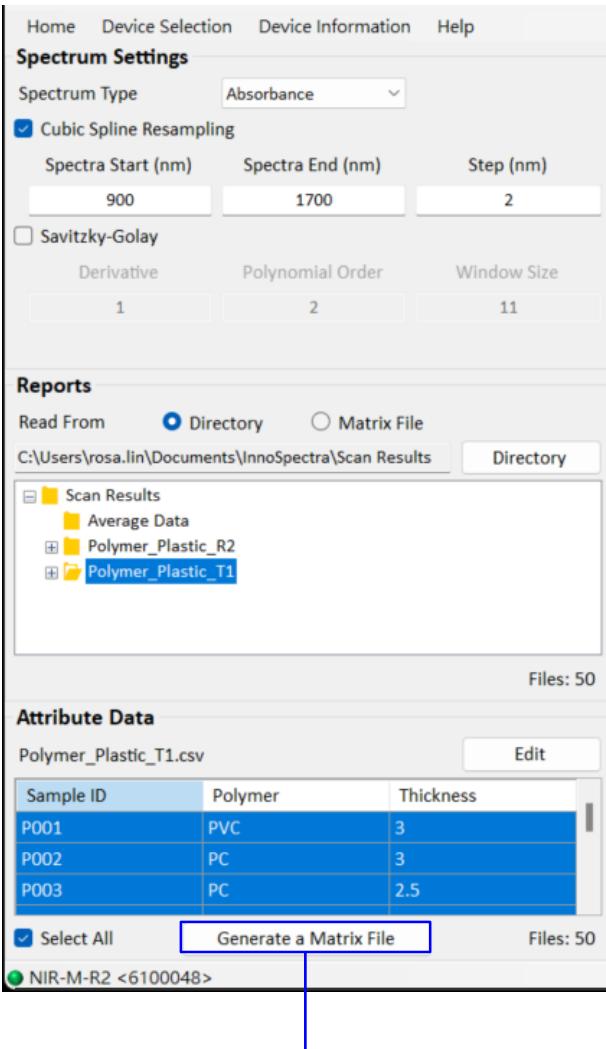


The image shows two windows from the InnoSpectra software. The left window is the main application interface with tabs for Home, Device Selection, Device Information, and Help. It includes sections for Spectrum Settings (Spectrum Type: Absorbance, Cubic Spline Resampling checked, Spectra Start: 900 nm, Spectra End: 1700 nm, Step: 2 nm), Reports (Read From: Directory selected, C:\Users\rosa.lin\Documents\InnoSpectra\Scan Results), and Attribute Data (Polymer_Plastic_R2.csv). The Attribute Data table shows three rows: P001 (PVC, Transparent, 3 mm), P002 (PC, Transparent, 3 mm), and P003 (PC, Transparent, 2.5 mm). An 'Edit' button is highlighted with a blue arrow pointing to the right window. The right window is a modal titled 'Edit Polymer_Plastic_R2.csv' containing a table with 17 rows of data. The columns are Sample ID, Polymer, Transparent_or_Opaque, and Thickness_mm. The 'Transparent_or_Opaque' column has a tooltip 'Edit Attribute Name'. The data includes various polymers like PVC, PC, PMMA, PET, PP, PS, HDPE, and their respective thicknesses ranging from 0.4 to 4 mm. A 'Save' button is at the bottom right of the edit window.

Sample ID	Polymer	Transparent_or_Opaque	Thickness_mm
P001	PVC	Transparent	3
P002	PC	Transparent	3
P003	PC	Transparent	2.5
P004	PC	Transparent	2
P005	PMMA	Transparent	3
P006	PMMA	Transparent	2
P007	PET	Transparent	4
P008	PET	Transparent	3
P009	PET	Transparent	2
P010	PC	Transparent	4
P011	PP	Transparent	0.55
P012	PMMA	Transparent	4
P013	PET	Transparent	1
P014	PET	Transparent	0.4
P015	PS	Opaque	0.6
P016	PP	Opaque	1
P017	HDPE	Opaque	1

Data Collection – Generate a Matrix File

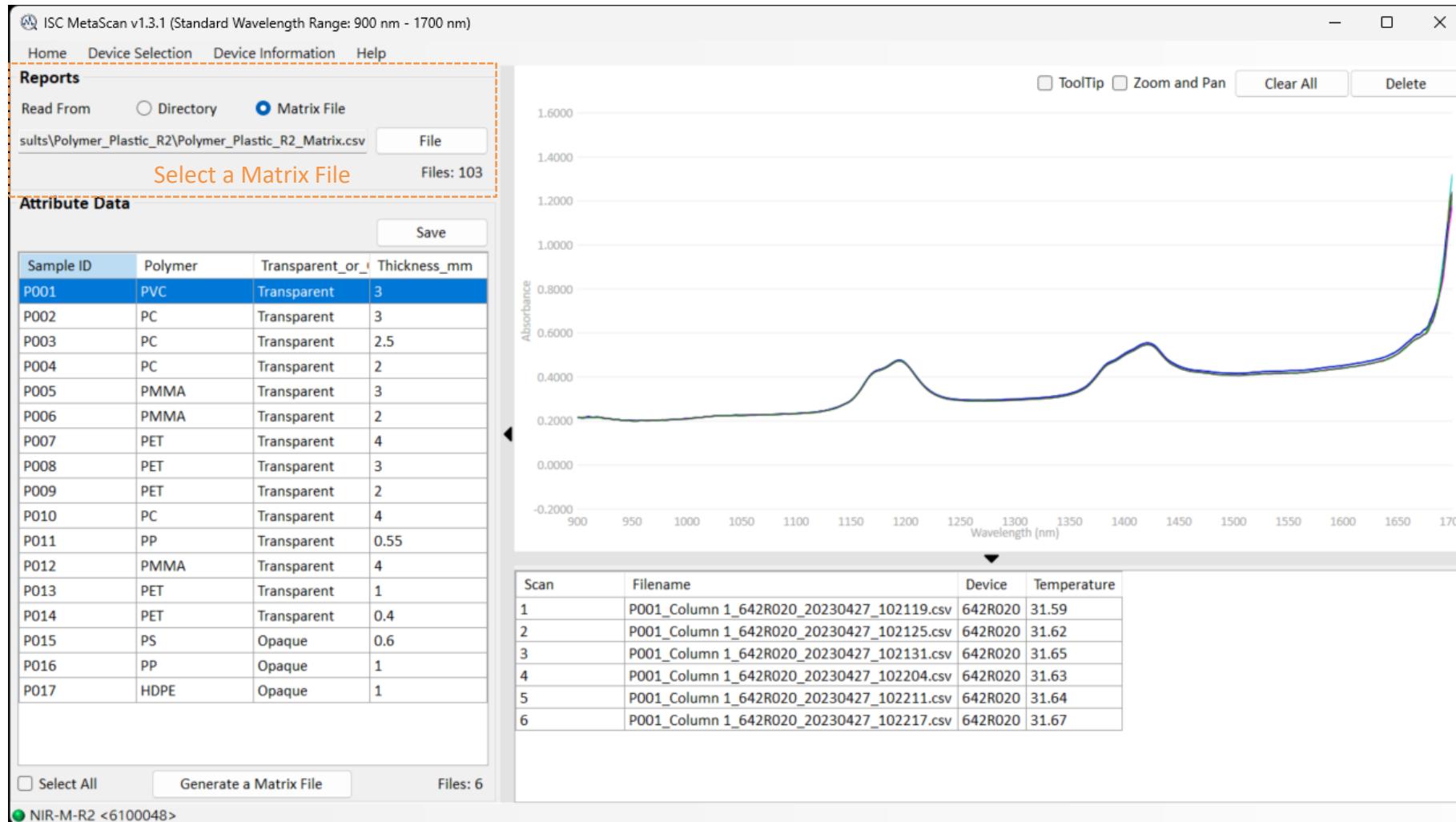
- The system provides generating a matrix file for modeling.



Scan Sequ	Sample ID	Polymer	Thickness	Filename	Device	Temperatu	900	902	904
1	P001	PVC	3	P001_Col	642T006	31.9	0.068833	0.069401	0.069943
2	P001	PVC	3	P001_Col	642T006	31.94	0.069941	0.070456	0.070947
3	P001	PVC	3	P001_Col	642T006	31.99	0.071208	0.071587	0.071974
4	P001	PVC	3	P001_Col	642T006	32.06	0.072363	0.072907	0.073428
5	P001	PVC	3	P001_Col	642T006	32.1	0.070309	0.070813	0.071318
1	P002	PC	3	P002_Col	642T006	32.16	0.207686	0.207872	0.208013
2	P002	PC	3	P002_Col	642T006	32.2	0.208691	0.208883	0.209027
3	P002	PC	3	P002_Col	642T006	32.25	0.209174	0.209266	0.209323
4	P002	PC	3	P002_Col	642T006	32.3	0.208522	0.20886	0.209133
5	P002	PC	3	P002_Col	642T006	32.35	0.210387	0.210529	0.210631
1	P003	PC	2.5	P003_Col	642T006	32.58	0.055994	0.056335	0.056653
2	P003	PC	2.5	P003_Col	642T006	32.62	0.055206	0.055691	0.056131
3	P003	PC	2.5	P003_Col	642T006	32.65	0.054909	0.055273	0.055615
4	P003	PC	2.5	P003_Col	642T006	32.7	0.054999	0.055343	0.055664
5	P003	PC	2.5	P003_Col	642T006	32.74	0.05432	0.054748	0.055144
1	P004	PC	2	P004_Col	642T006	32.73	0.050778	0.051288	0.051762
2	P004	PC	2	P004_Col	642T006	32.77	0.052468	0.053018	0.053525
3	P004	PC	2	P004_Col	642T006	32.82	0.055838	0.056415	0.056942
4	P004	PC	2	P004_Col	642T006	32.87	0.059141	0.059602	0.060031
5	P004	PC	2	P004_Col	642T006	32.91	0.066654	0.067062	0.067443
1	P005	PMMA	3	P005_Col	642T006	32.92	0.044095	0.043974	0.043778
2	P005	PMMA	3	P005_Col	642T006	32.95	0.044174	0.04397	0.043721
3	P005	PMMA	3	P005_Col	642T006	32.99	0.044419	0.044112	0.043774
4	P005	PMMA	3	P005_Col	642T006	33.03	0.044519	0.044261	0.043955
5	P005	PMMA	3	P005_Col	642T006	33.08	0.045055	0.044711	0.044336

Data Collection – Read a Matrix File

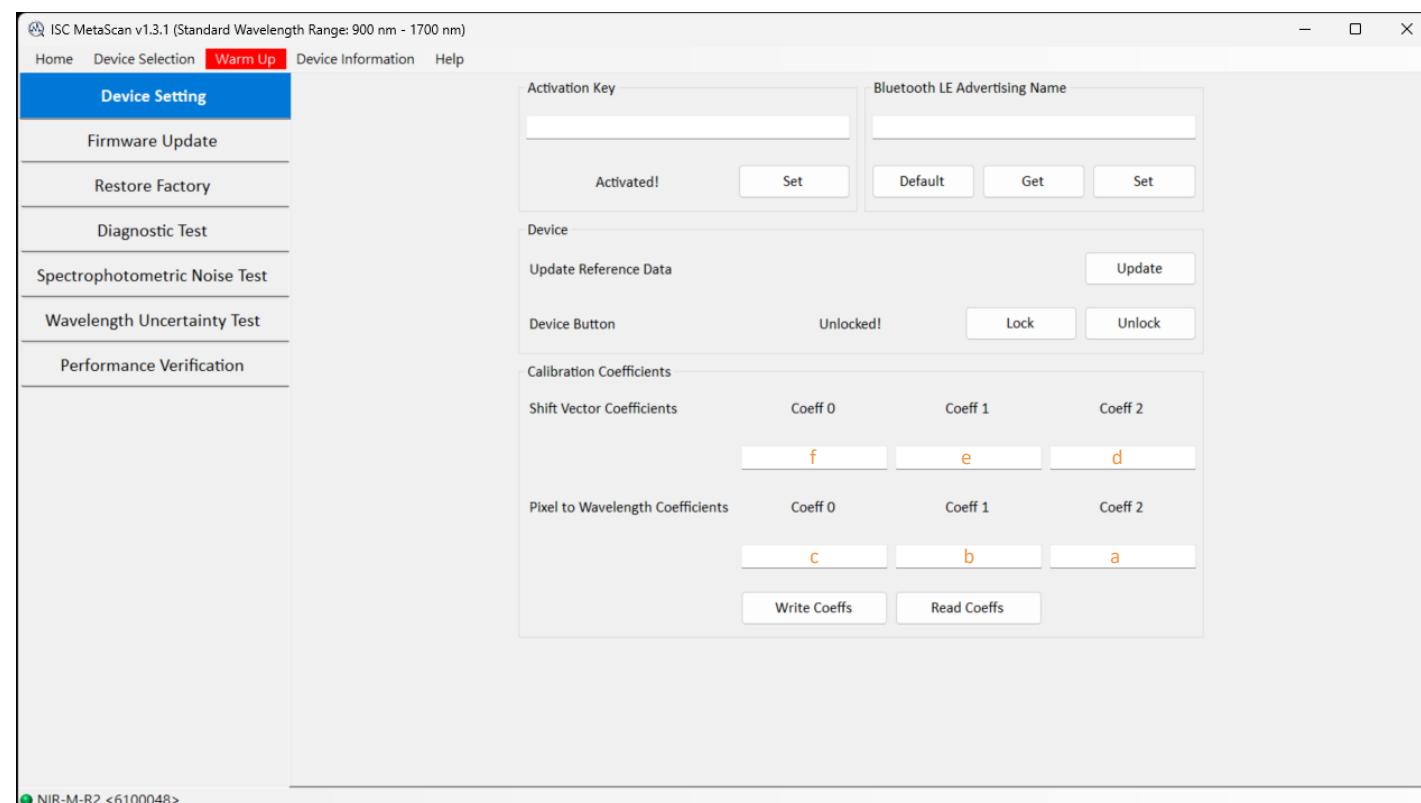
- The system provides reading a matrix file for viewing and organizing.



Utility – Device Setting



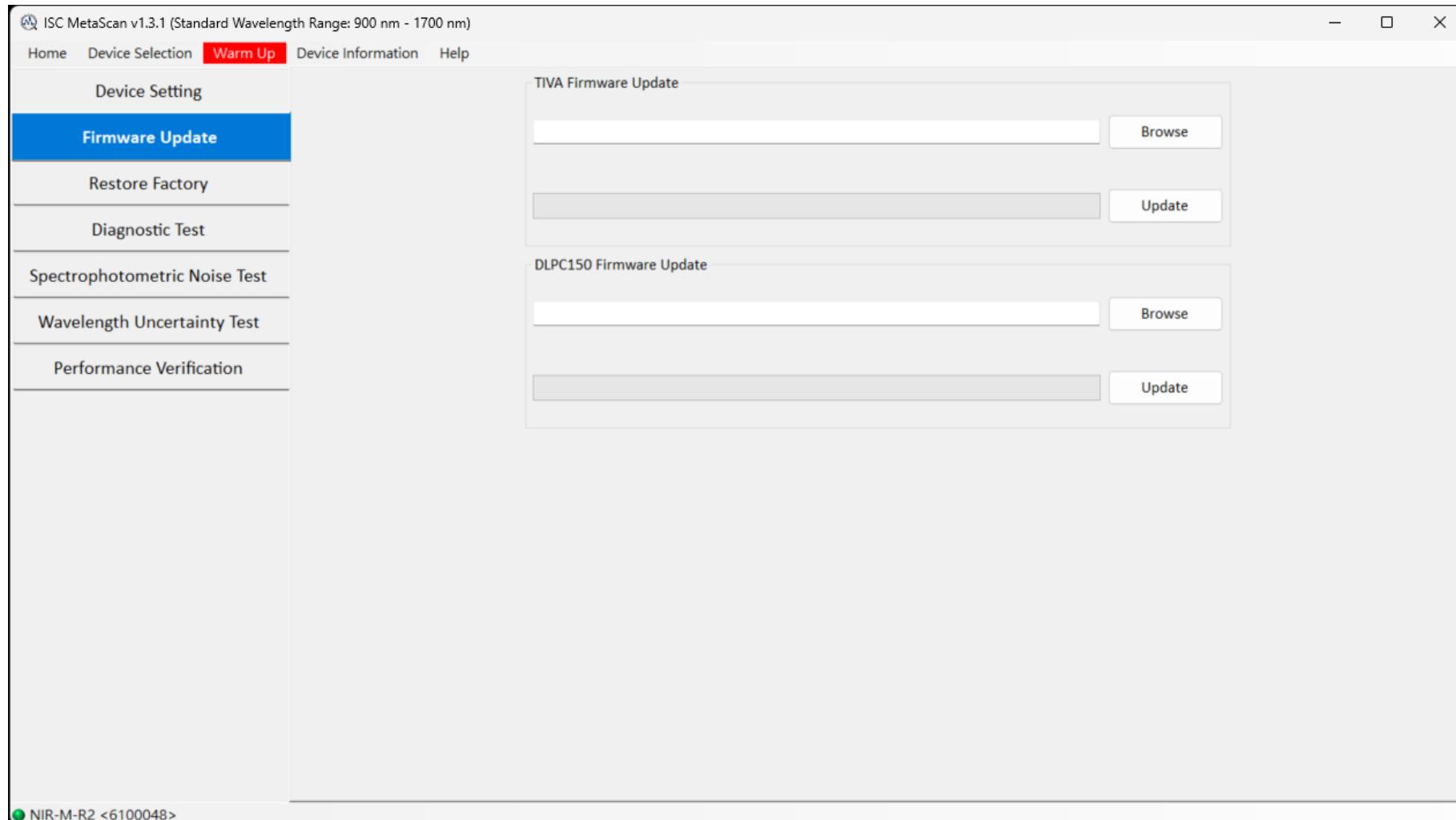
- Activation Key:**
 - Key Activated Functions: Lamp Usage Time, Bluetooth LE Advertising Name Default/Get/Set, Lock/Unlock Device Button, Restore Calibration Data.
 - Key Not Activated: None.
- Bluetooth LE Advertising Name:** Sets to the default advertising name, sets the customized advertising name to the device, or gets the current advertising name of the device.
- Device:**
 - Update Reference Data:** Replace factory reference data to customized reference data.
 - Device Button:** Lock or unlock the button on the device.
- Calibration Coefficients:**
 - Calibration Coefficient Parameter Mapping
 - Shift Vector: $Y = d \times X^2 + e \times X + f$
 - Pixel to Wavelength: $Wavelength = a \times Pixel^2 + b \times Pixel + c$
 - Write Coeffs:** Write coefficients to the device.
 - Read Coeffs:** Read coefficients from the device.



Utility – Firmware Update

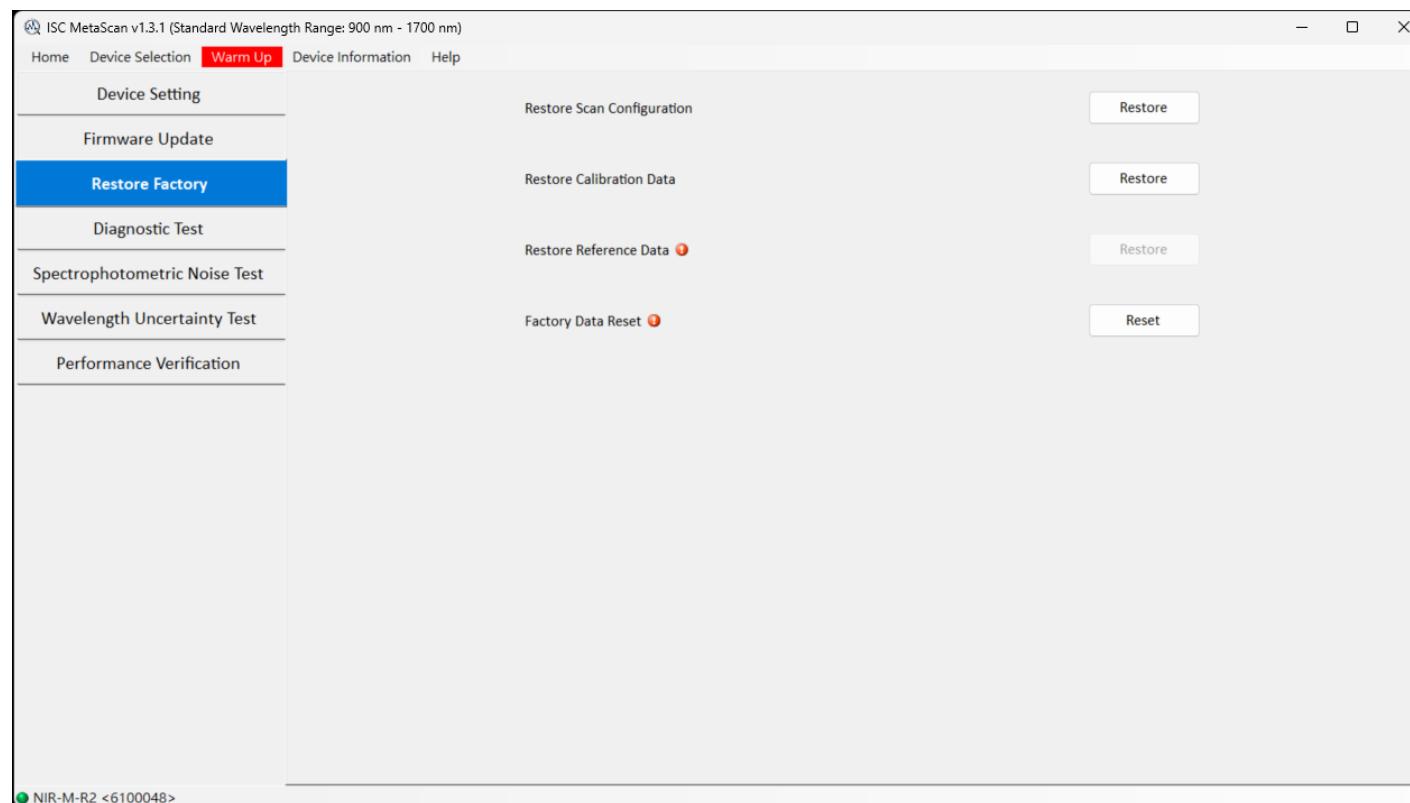


- **TIVA Firmware Update:** Binary File for main board.
- **DLPC150 Firmware Update:** Image File for detector board.



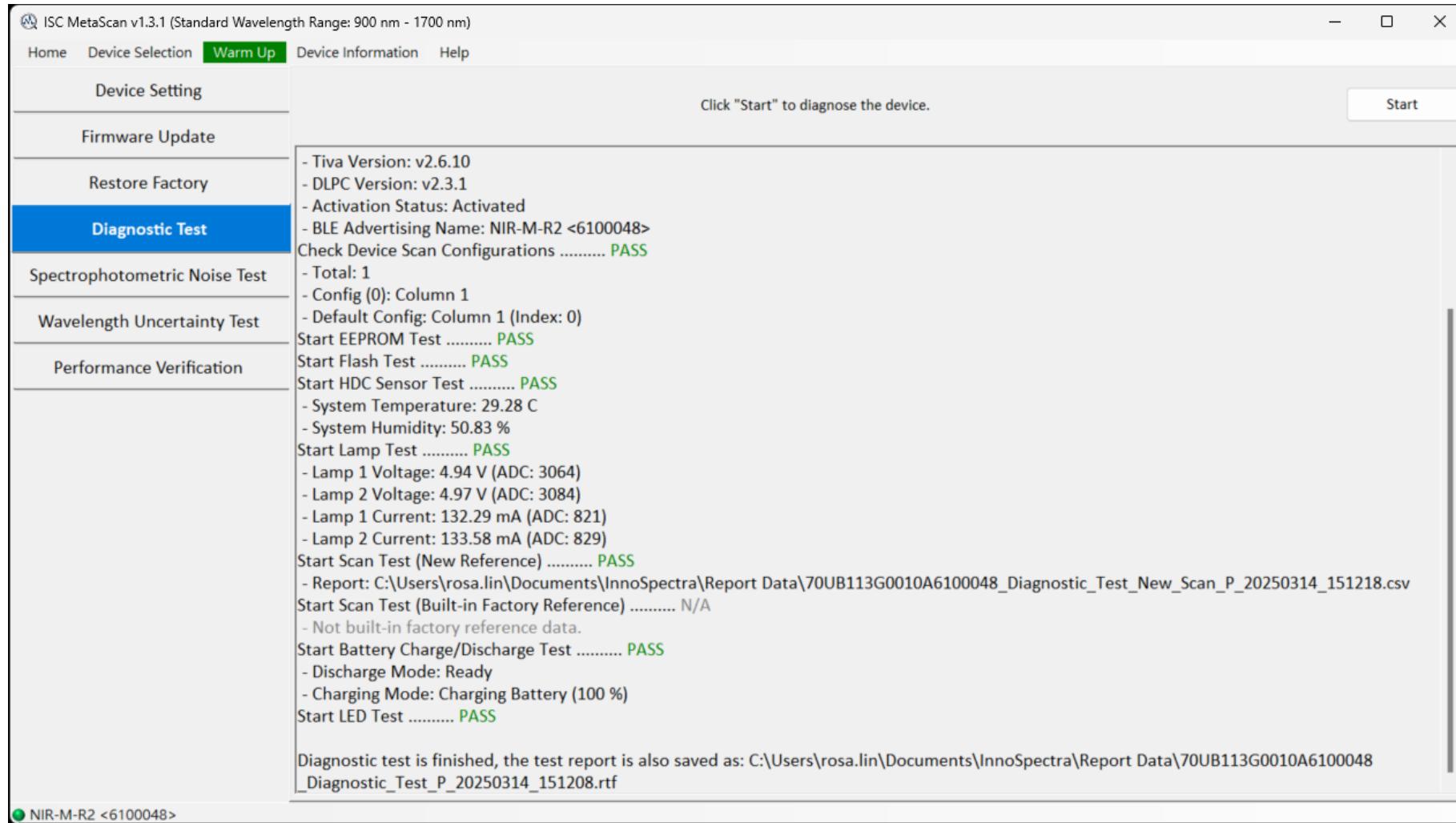
Utility – Restore Factory

- **Restore Scan Configuration:** This function will delete all configurations on the device and restore the default configuration.
- **Restore Calibration Data:** The three conditions should be reached.
 - The Tiva version of device \geq 2.1.0.67.
 - The device is activated.
 - The factory calibration data has saved in the device.
- **Restore Reference Data:** This function only restores the factory reference data and cannot be performed without the backed-up data. The factory reference data is automatically backed up to the PC after the device is connected to the GUI. Non-factory reference data is not backed up.
- **Factory Data Reset:** Restores **ALL** the factory data from external EEPROM or factory test report.



Utility – Diagnostic Test

- The system provides to test the device functionality.



Utility – Spectrophotometric Noise Test



- The system provides performing photometric noise testing using high and low reflectivity materials such as SRS99 and SRS10.
- This function currently provides testing for R2 and G1 models.

ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)

Home Device Selection Warm Up Device Information Help

Device Setting

Firmware Update

Restore Factory

Diagnostic Test

Spectrophotometric Noise Test

Wavelength Uncertainty Test

Performance Verification

1. Select the test item, prepare the relevant photometric standards, and check or enter the wavelength range and segment length.

2. Click "Start" to check the RMS noise value.

Start

Select	Test Item	Photometric Standard	Wavelength Start (nm)	Wavelength End (nm)	Segment Length (nm)
<input checked="" type="checkbox"/>	High Flux Light Test	99% Reflectance Standard	950	1650	100
<input checked="" type="checkbox"/>	Low Flux Light Test	10% Reflectance Standard	950	1650	100

High Flux Light Test Report: C:\Users\rosa.lin\Documents\InnoSpectra\Report Data\70UB113G0010A6100048_High_Flux_Light_Test_P_20250314_151357.csv

Segment	Wavelength Range	RMS Noise	Criteria	Result
Segment 1	952.22 - 1047.04	0.000096	0.0008	PASS
Segment 2	1053.27 - 1145.29	0.000058	0.0008	PASS
Segment 3	1150.12 - 1249.91	0.000038	0.0008	PASS
Segment 4	1255.75 - 1347.53	0.000039	0.0008	PASS
Segment 5	1352.04 - 1445.04	0.000048	0.0008	PASS
Segment 6	1450.47 - 1549.37	0.000033	0.0008	PASS
Segment 7	1553.53 - 1648.22	0.000068	0.0008	PASS
Overall Average	952.22 - 1648.22	0.000069	0.0003	PASS

Low Flux Light Test Report: C:\Users\rosa.lin\Documents\InnoSpectra\Report Data\70UB113G0010A6100048_Low_Flux_Light_Test_P_20250314_151423.csv

Segment	Wavelength Range	RMS Noise	Criteria	Result
Segment 1	952.22 - 1047.04	0.000922	0.002	PASS
Segment 2	1053.27 - 1145.29	0.001101	0.002	PASS
Segment 3	1150.12 - 1249.91	0.000837	0.002	PASS
Segment 4	1255.75 - 1347.53	0.000475	0.002	PASS
Segment 5	1352.04 - 1445.04	0.000491	0.002	PASS
Segment 6	1450.47 - 1549.37	0.000761	0.002	PASS
Segment 7	1553.53 - 1648.22	0.001201	0.002	PASS
Overall Average	952.22 - 1648.22	0.000887	0.001	PASS

NIR-M-R2 <6100048>

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Utility – Wavelength Uncertainty Test

- The system provides to check and recalibrate wavelength accuracy using standard reference materials such as SRS99 and SRM2036.
- This function currently provides testing for R2 and G1 models.

ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)

Home Device Selection Warm Up Device Information Help

Device Setting

Firmware Update

Restore Factory

Diagnostic Test

Spectrophotometric Noise Test

Wavelength Uncertainty Test

Performance Verification

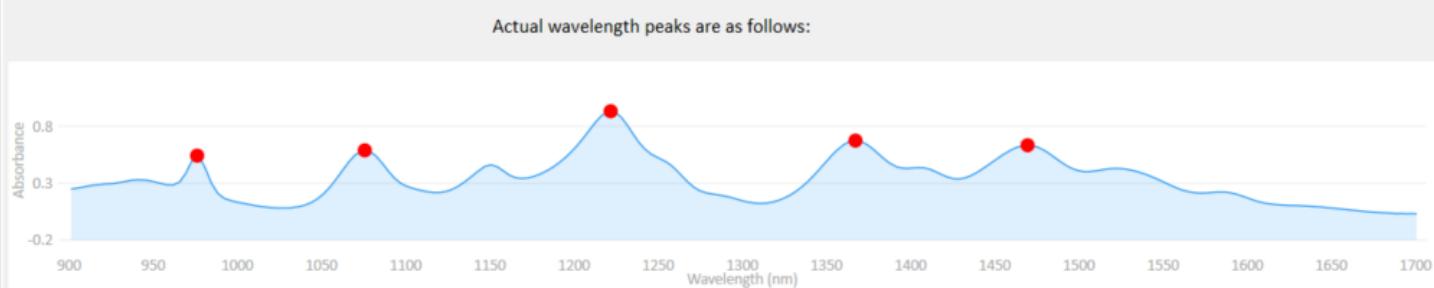
1. Select the test item, and prepare reference sample and standard material.

2. Click "Start" to check the wavelength accuracy.

Wavelength Accuracy Check

Wavelength Calibration

Actual wavelength peaks are as follows:



Wavelength accuracy is checked as follows:

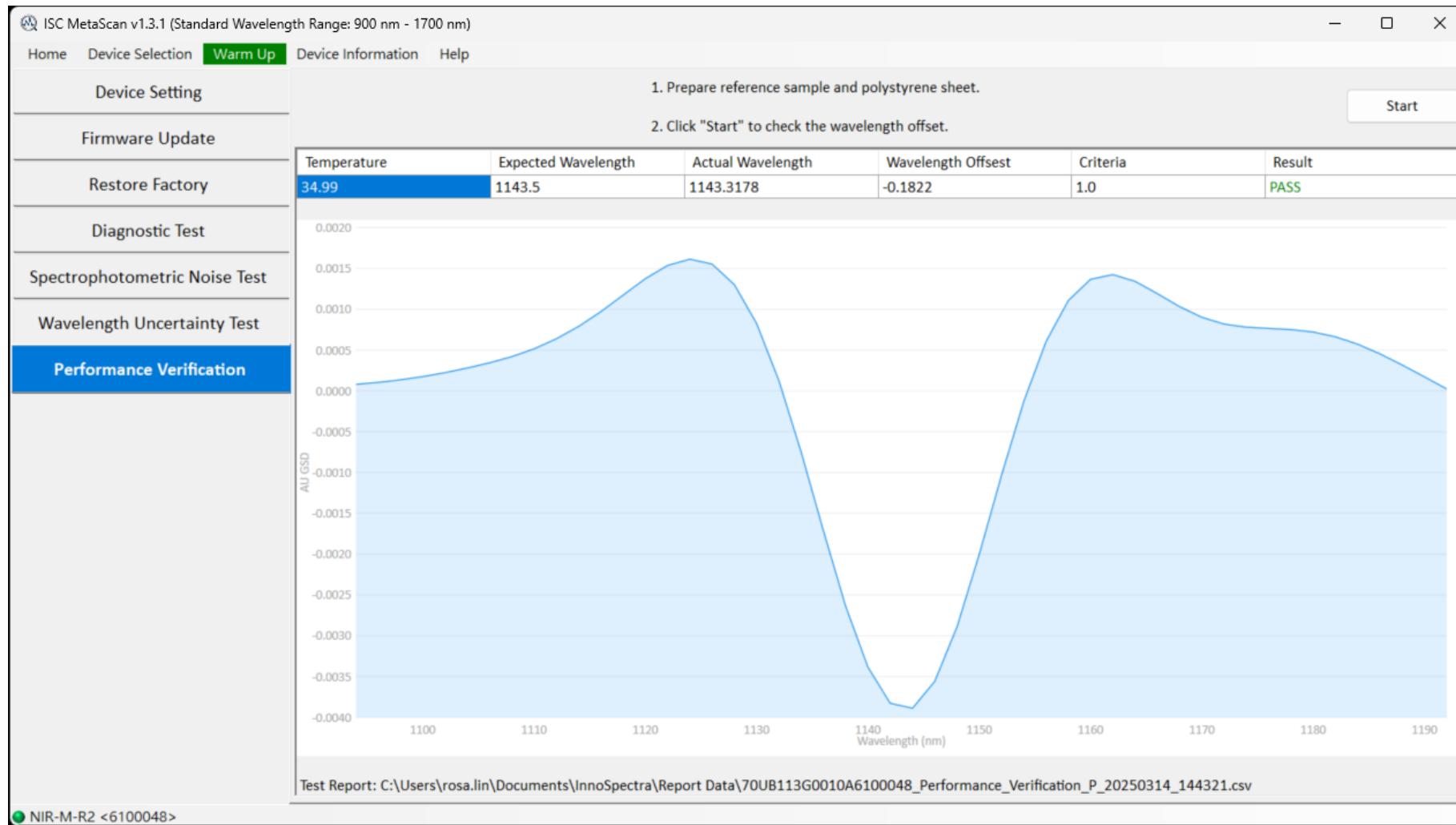
	Expected Wavelength	Actual Wavelength	Wavelength Offset	Criteria	Result
1	975.9	976.096983	0.196983	1.0	PASS
2	1075.8	1075.666705	-0.133295	1.0	PASS
3	1222.1	1221.778536	-0.321464	1.0	PASS
4	1367.3	1367.219211	-0.080789	1.0	PASS
5	1469.5	1469.485071	-0.014929	1.0	PASS

Test Report: C:\Users\rosa.lin\Documents\InnoSpectra\Report Data\70UB113G0010A6100048_Wavelength_Accuracy_Check_P_20250314_131115.csv

NIR-M-R2 <6100048>

Utility – Performance Verification

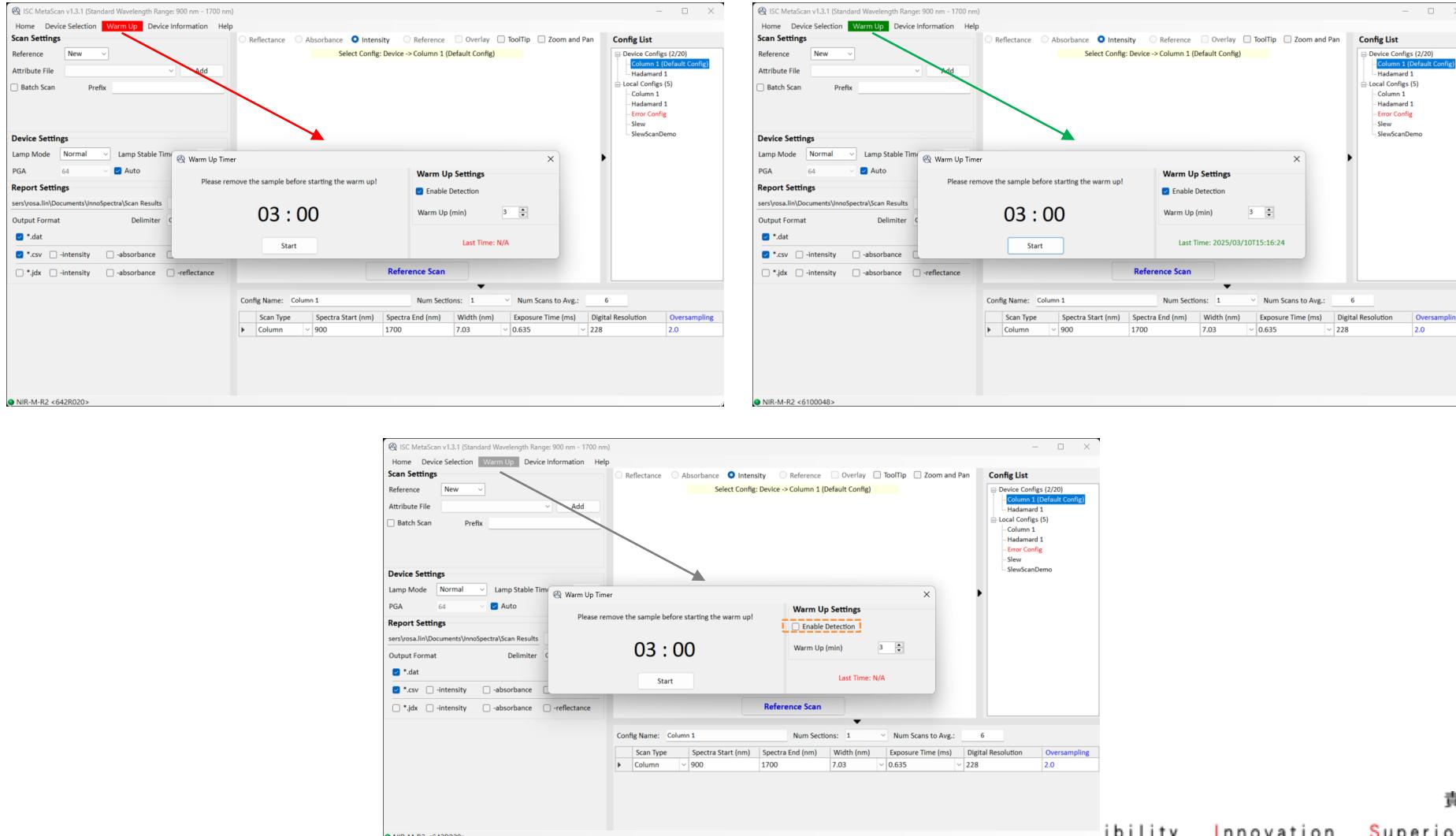
- The system provides to verify wavelength accuracy by scanning a standard sample such as polystyrene.
- This function currently provides testing for R2 and G1 models.



Warm Up Reminder

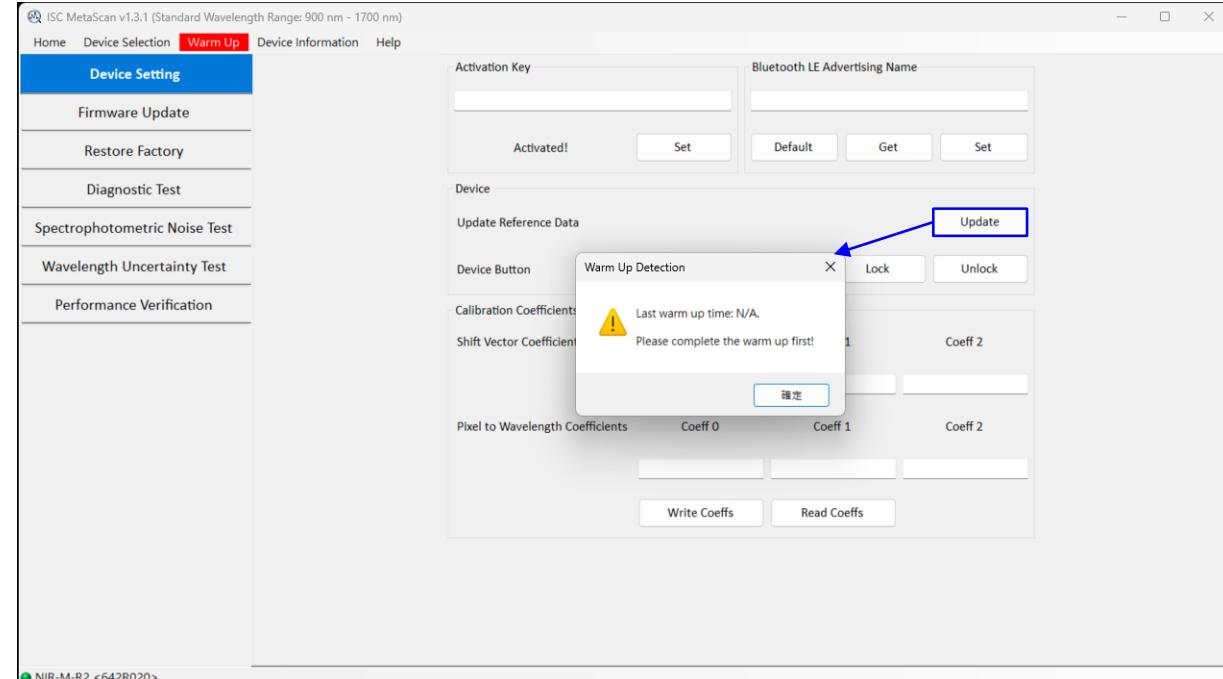
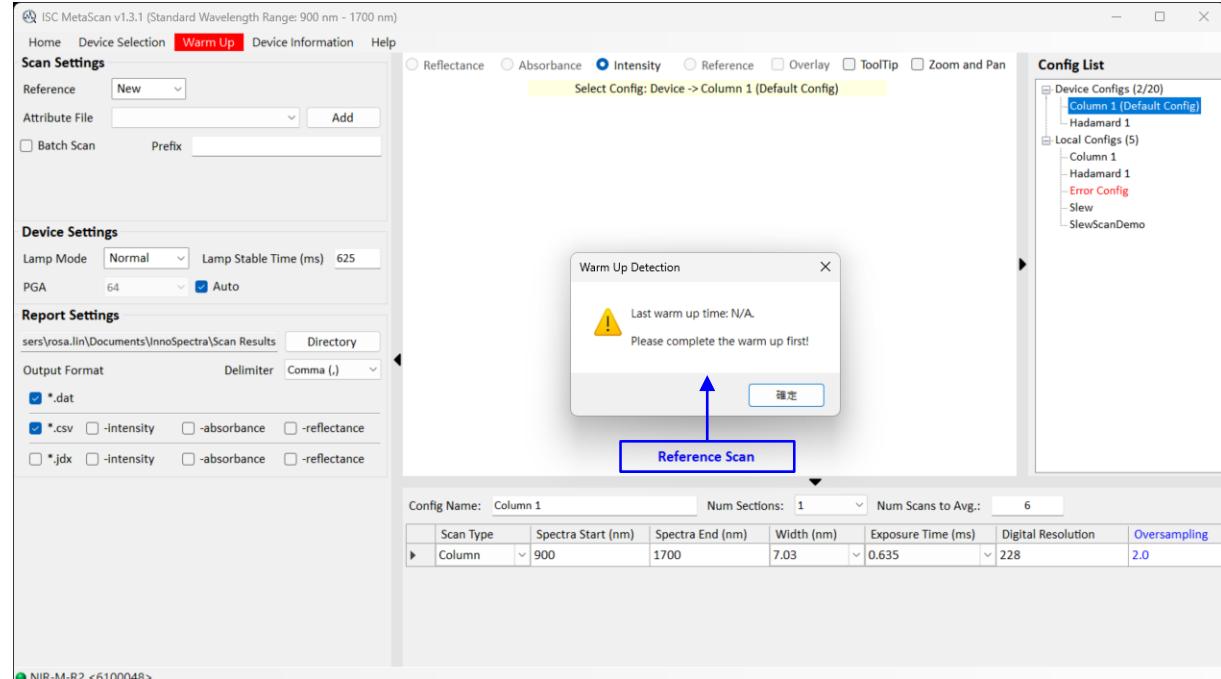


- If the system detects that the warm up is required, the "Warm Up" button will flash a **red background**.
- If the system detects that the warm up is not required, the "Warm Up" button will have a **green background**.
- If the warm up detection is canceled, the "Warm Up" button will have a **gray background**.

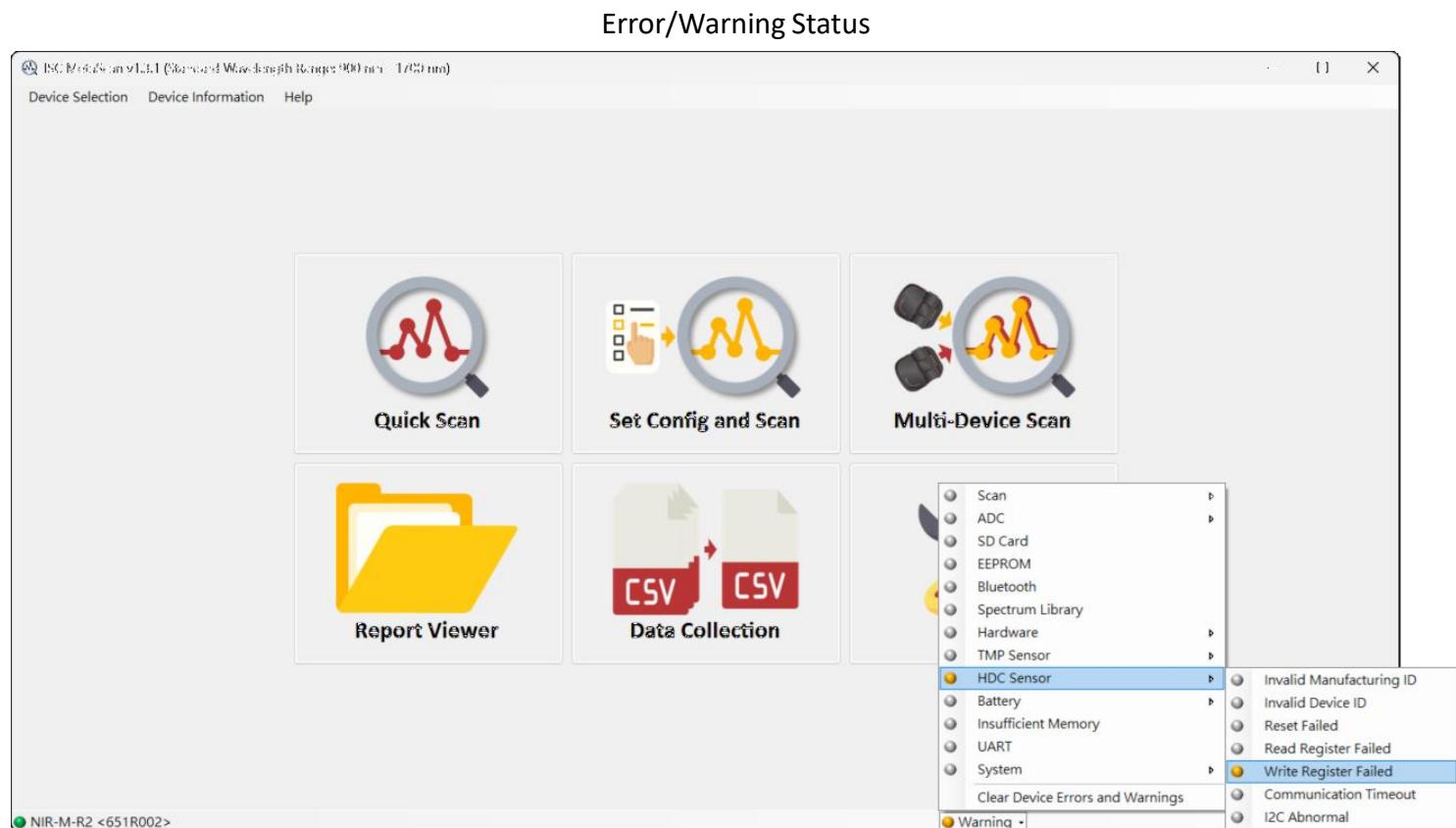
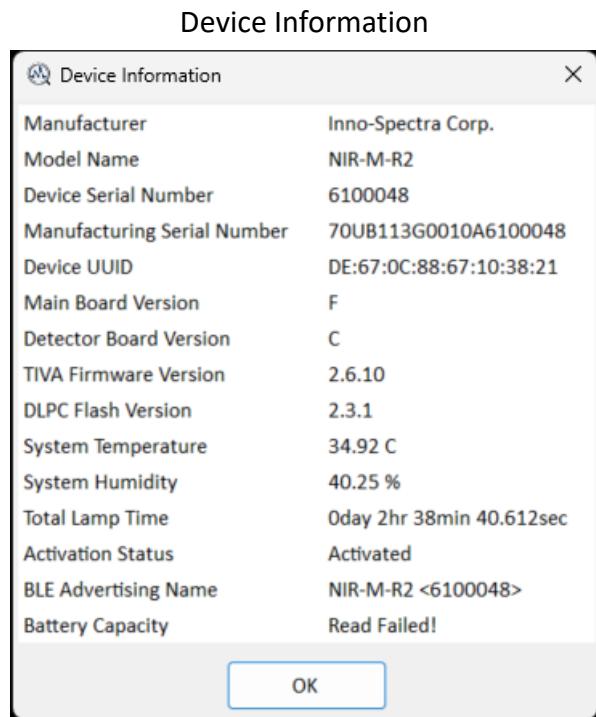


Warm Up Reminder (Cont.)

- If the lamp has not been used for more than 30 minutes, the lamp must be warmed up before scanning, including scan and update reference data.



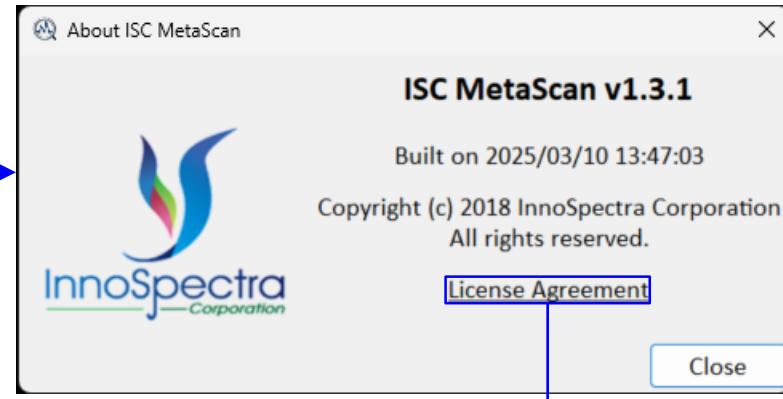
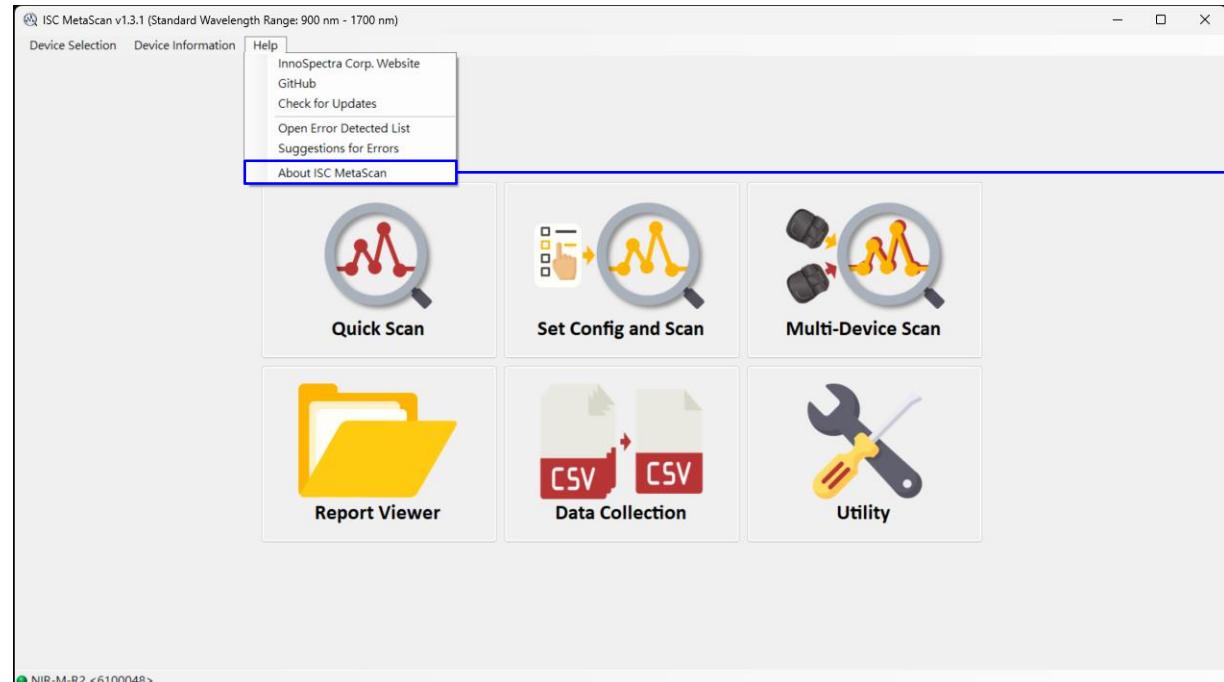
Device Information & Error/Warning Status



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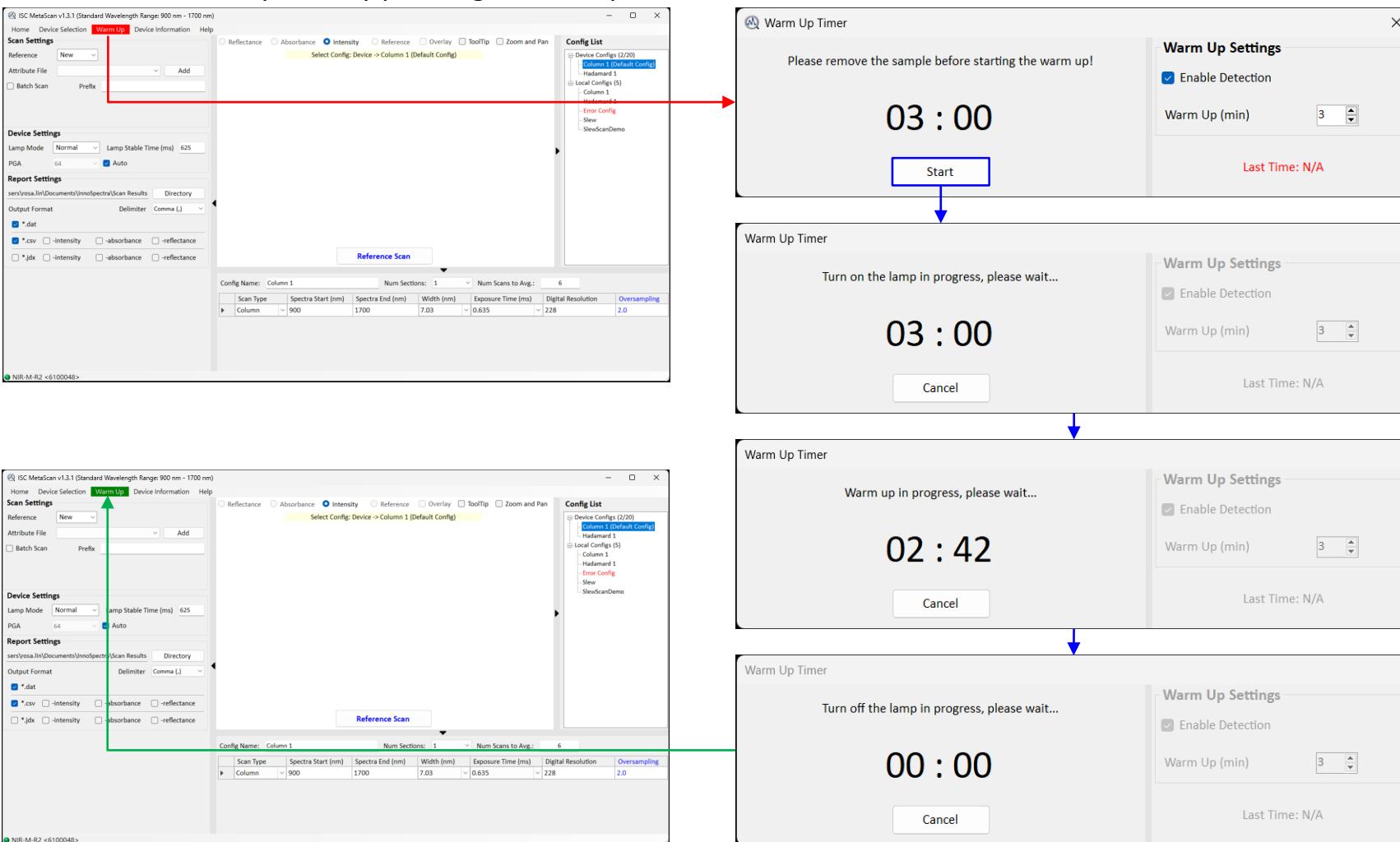
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Perform a Scan

Warm Up Before Starting a Scan



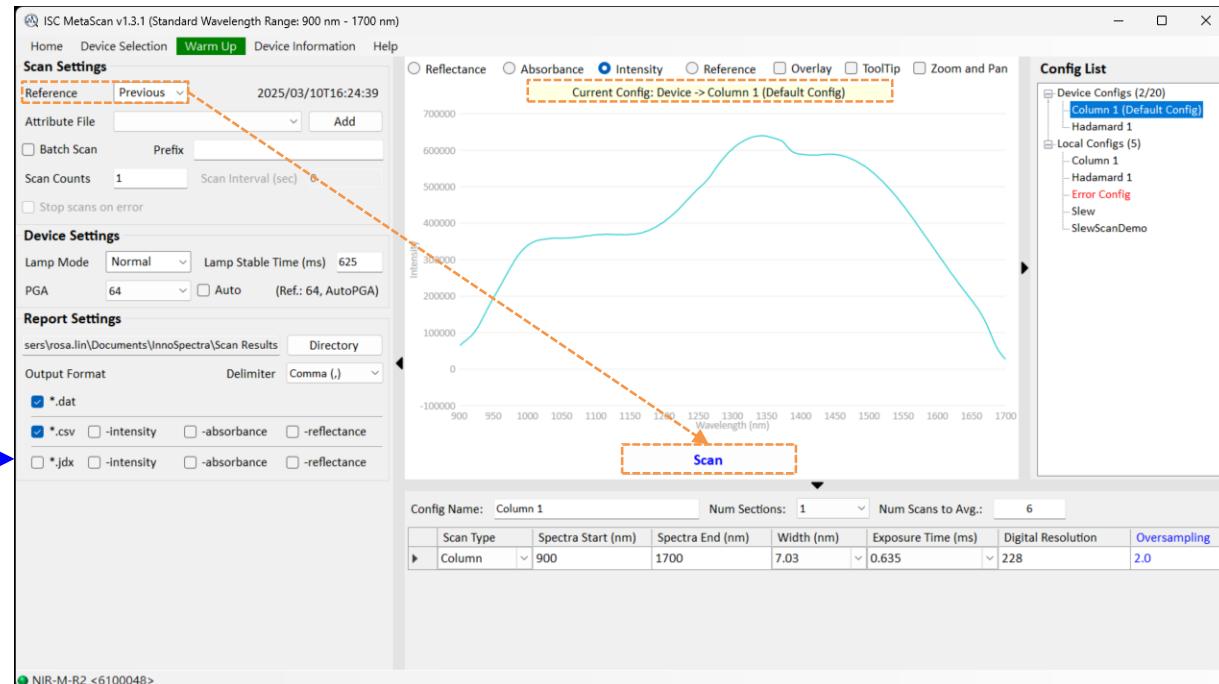
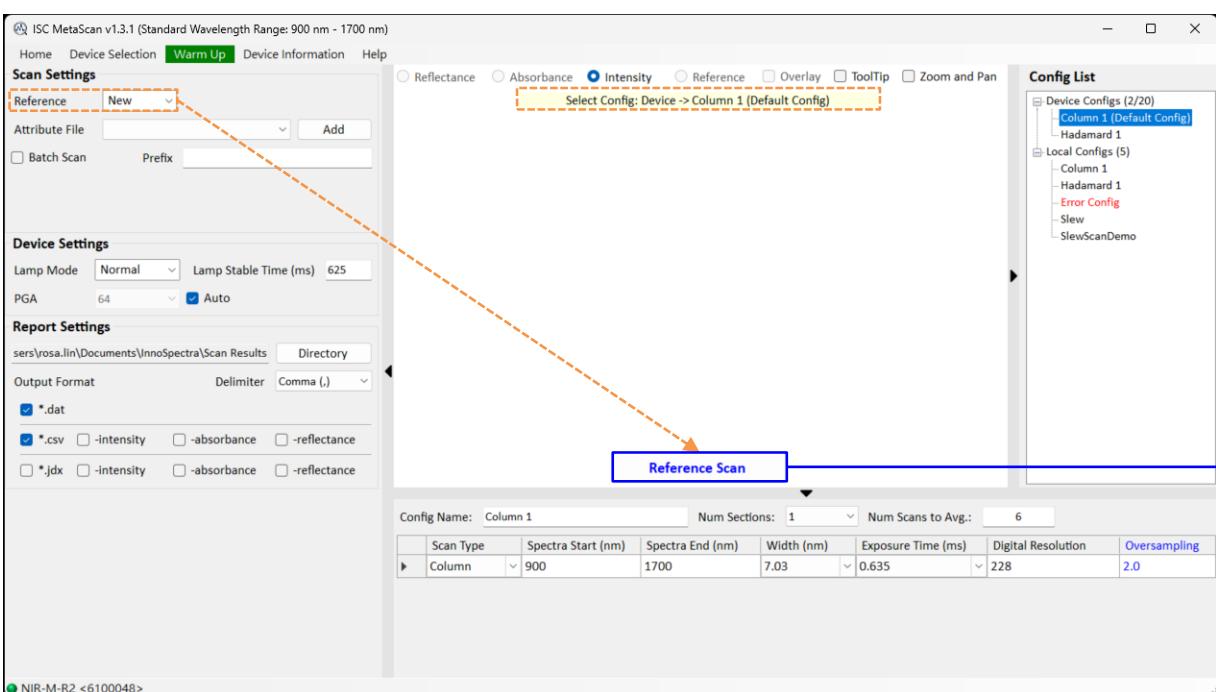
1. Enter one of scan pages, the “Warm Up” button will display on the top menu.
2. Click “Warm Up” button, and it will enter the setting dialog. All settings will be recorded locally.
3. After warm up finished, the dialog closes automatically and the “Warm Up” button will have a **green background**.
4. The warm-up dialog can be entered at any time by pressing “Warm Up” button.



Quick Scan – Scan a Local Reference



- Enter “Quick Scan” page and select a configuration from the list of device or local configurations.
- To perform a reference scan, the operation process is as follows:
 - Select “New” reference to perform a scan. This scan result is stored on the local PC as a “Local Reference” and then you can select it with the “Previous” reference combo box for sample scan.
 - The scan plot will draw the intensity of reference scan result.
 - The “New” reference doesn’t provide continuous scan selection.



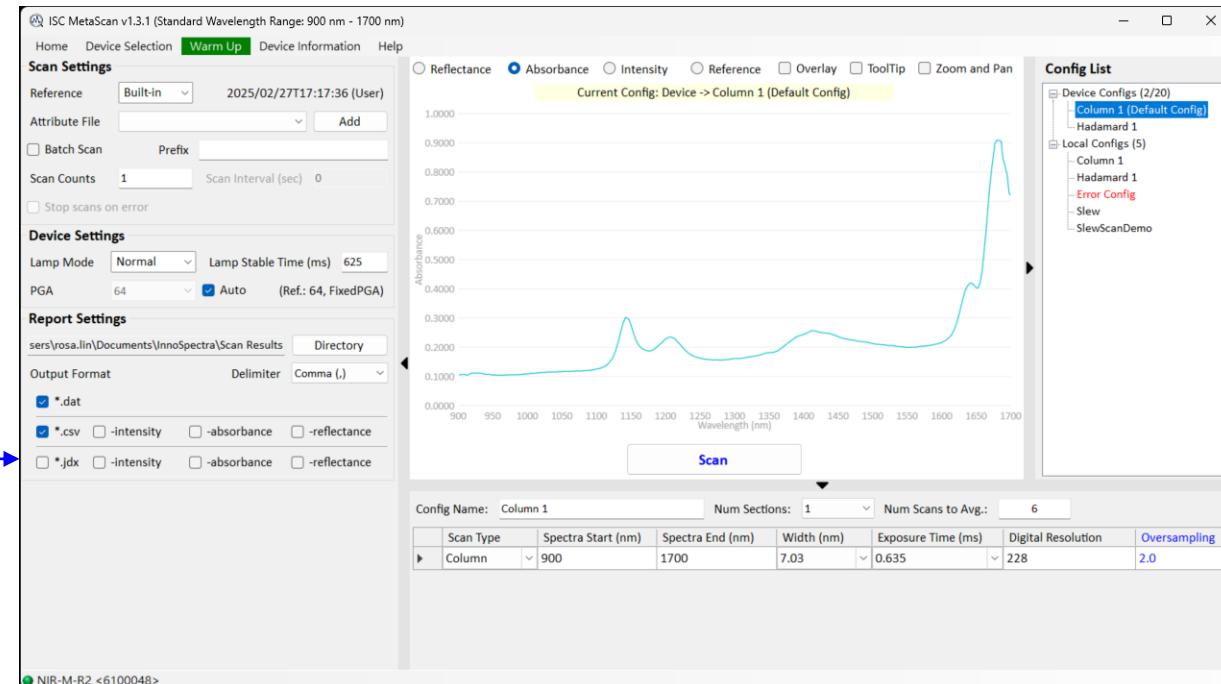
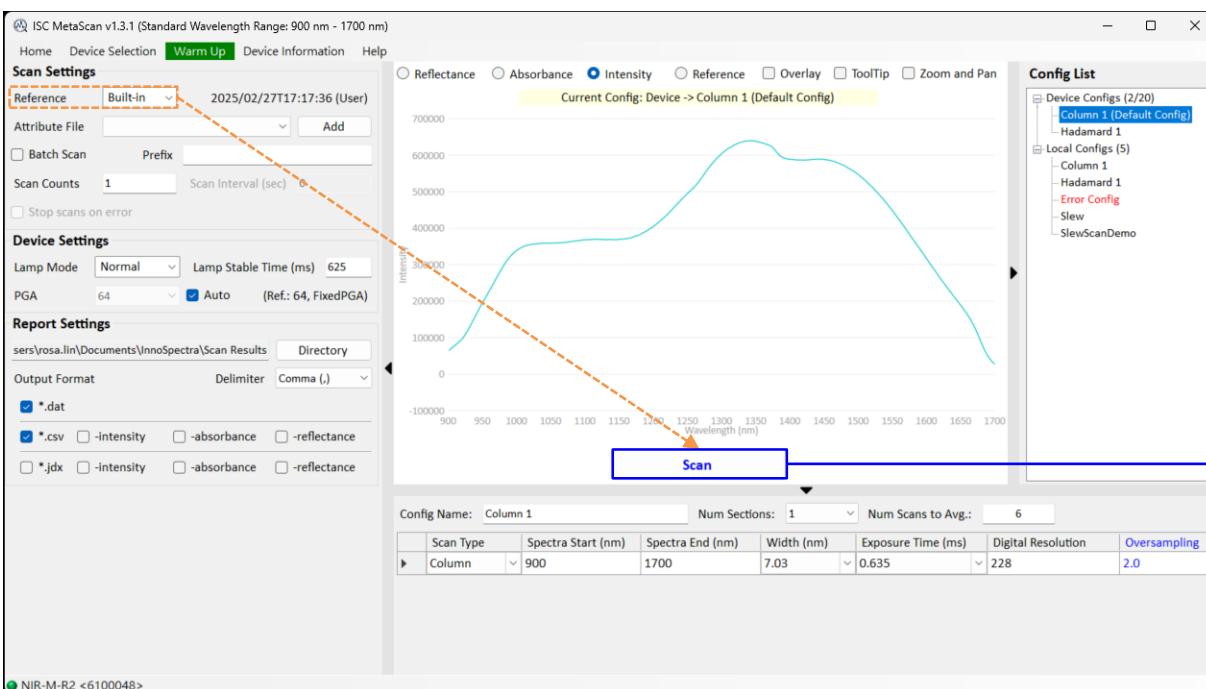
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Quick Scan – Scan a Sample

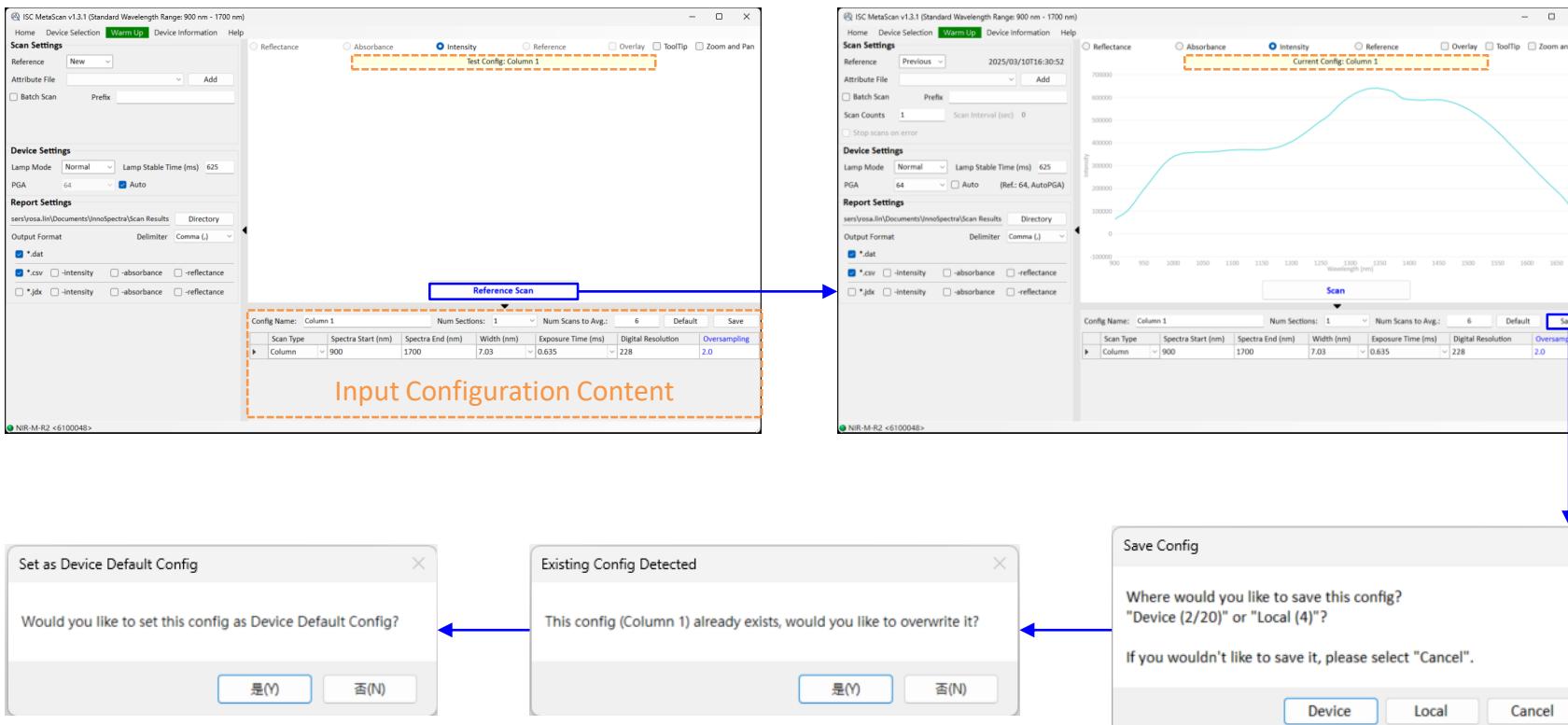


- Enter “Quick Scan” page and select a configuration from the list of device or local configurations.
- To perform a scan, the operation process is as follows:
 - Select the reference from built-in or previous. Select “Built-in” will use the **factory made reference (SRS99)** as sample scan reference.
 - Lamp control and gain control can be set before scanning.
 - The location of the scan is saved under the report directory.
 - Click “Scan” button to perform a new scan.
 - The scan result will be plotted by one of the reflectance, absorbance, intensity or reference selection.



Create a New Configuration and Scan

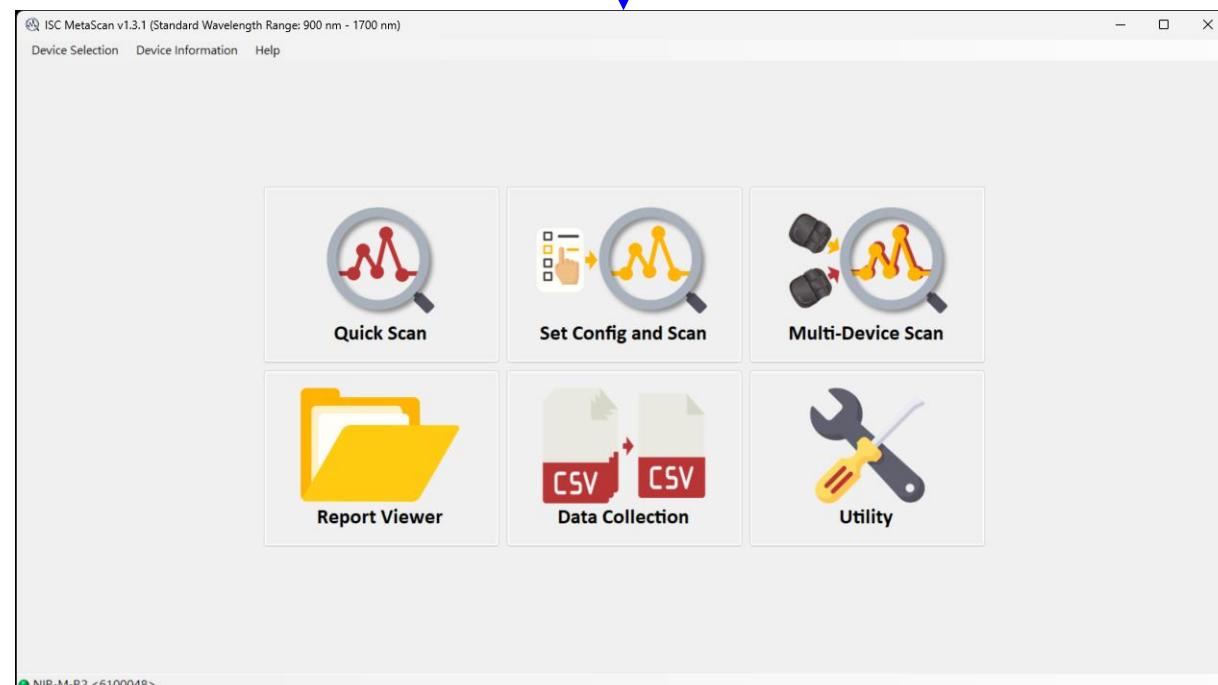
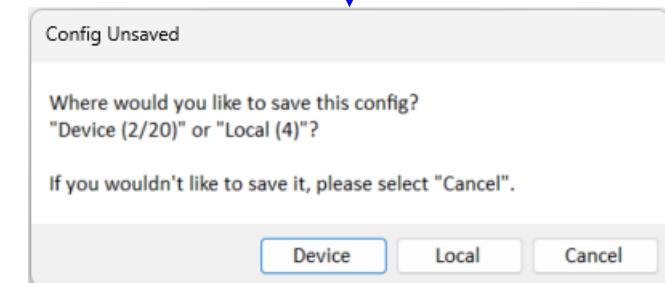
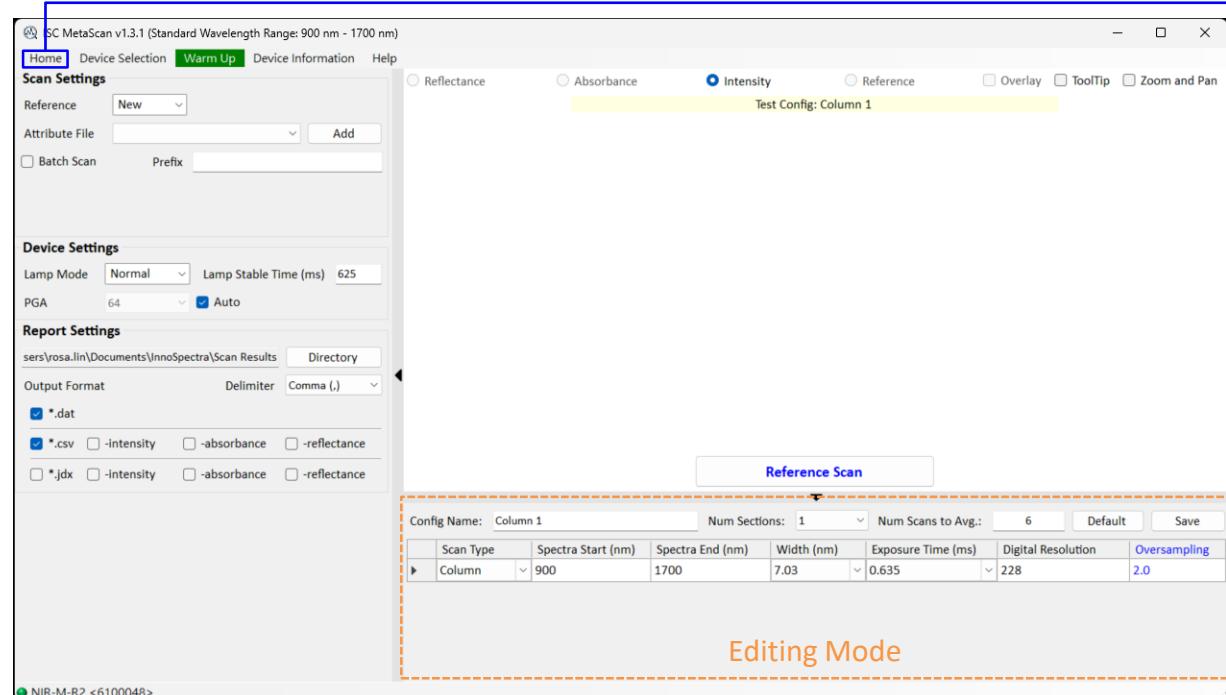
- Enter “Set Config and Scan” page. This page provides to create new configurations or replace the exist configurations.
- The created configuration can be saved to device or local, or not saved for testing only.
- To perform a scan, the operation process is as follows:
 - Input the configuration content, and the system will check whether the content is valid.
 - Select “New” reference to perform a reference scan, and then select “Previous” reference to perform a sample scan.
 - If the configuration test is ok and wants to save it, click “Save” button.
 - If the configuration name already exists, the system will ask whether to replace its content.
 - If the configuration is to be saved in the device, the system will ask whether to set it as the default configuration.



Create a New Configuration and Scan (Cont.)

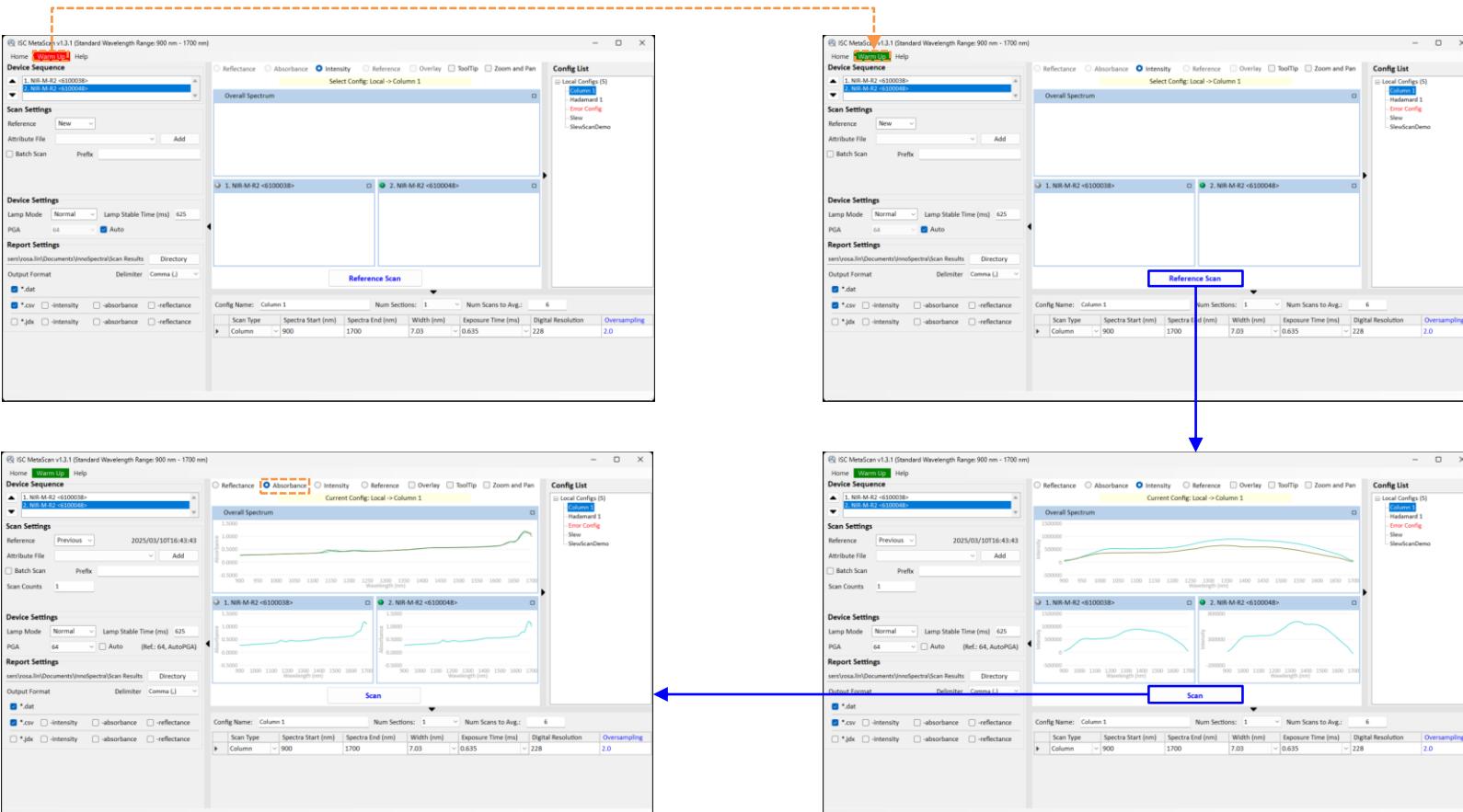


- If the user leaves this page without saving the configuration, a dialog will pop up to ask user where to save it.



Multi-Device Scan

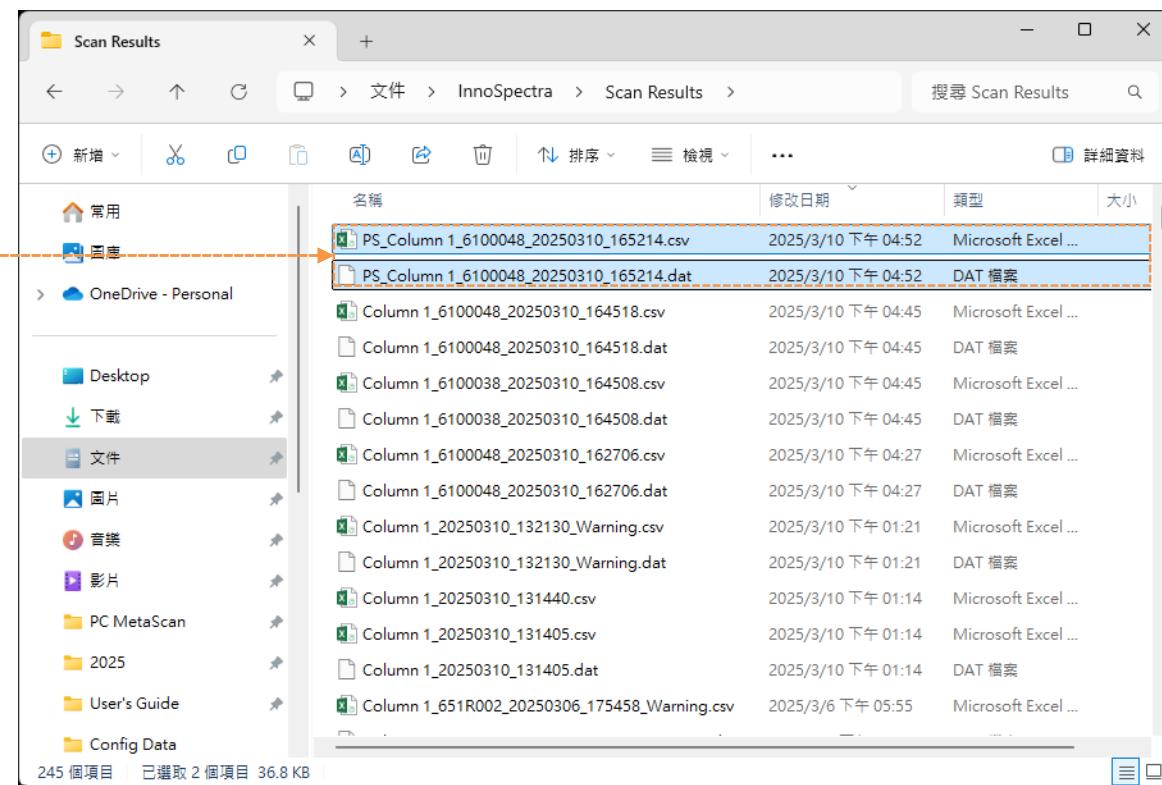
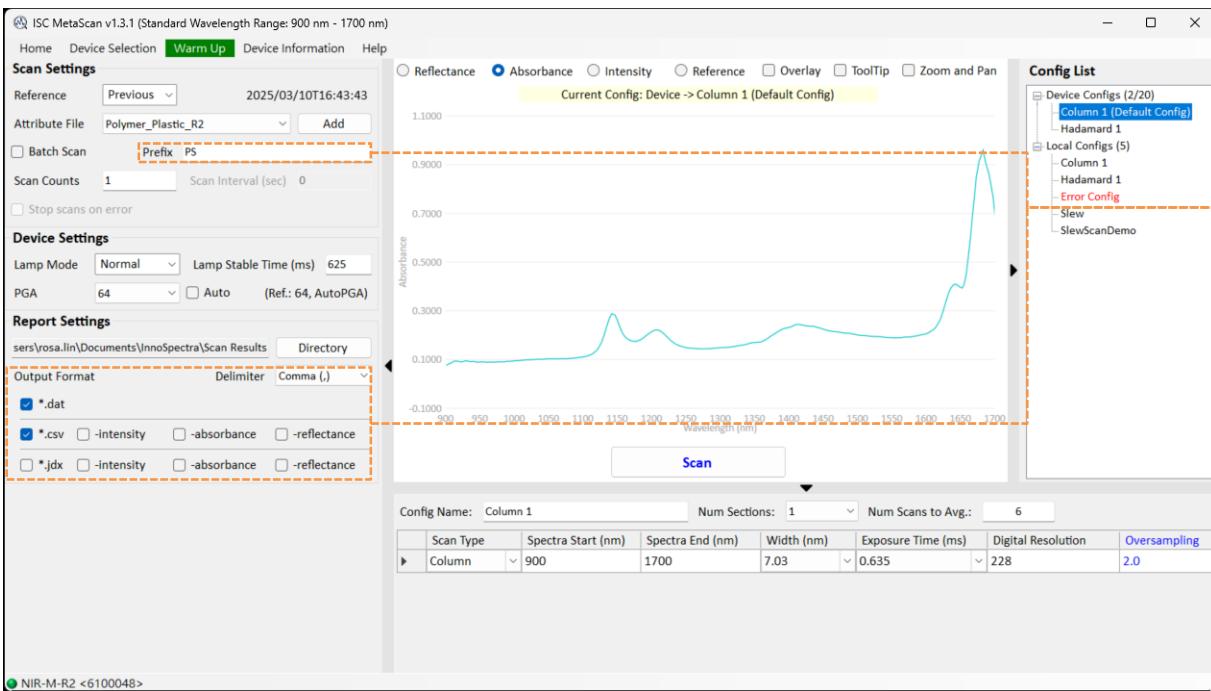
- Enter “Multi-Device Scan” page. This page only supports multiple devices of one model.
- To perform a scan, the operation process is as follows:
 - Check multiple devices whether the warm up needs to be executed.
 - Check whether the device sequence is correct.
 - Set scan settings, device settings, or report settings if needs.
 - Select a configuration in the configuration list.
 - Select “New” reference to perform a reference scan, and then select “Previous” reference to perform a sample scan.



Normal Scan with Filename Prefix



1. The user can select the configuration to be scanned.
2. Disable “Batch Scan” option, and input the prefix before scanning.
3. The location of the scan is saved under the report directory.
4. Click “Scan” button to perform a scan.
5. The scan result will be plotted by one of the reflectance, absorbance, intensity or reference selection.
6. This function is provided in the scan pages.



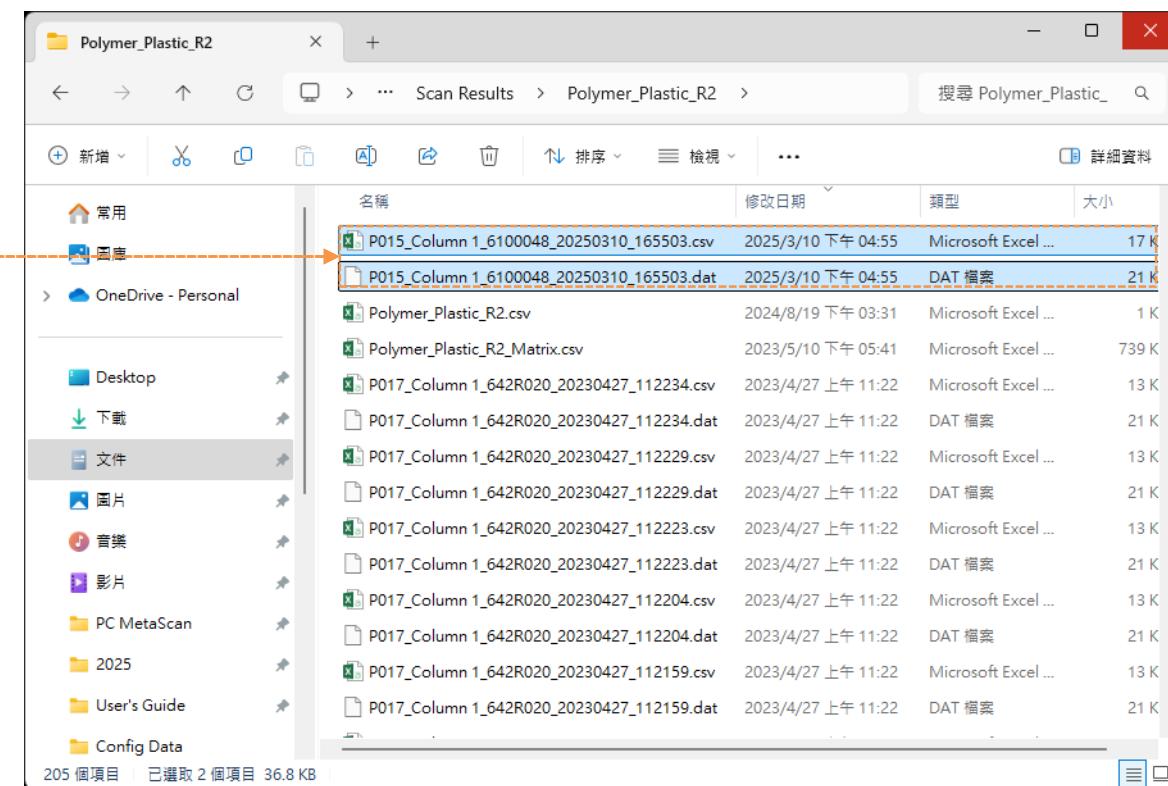
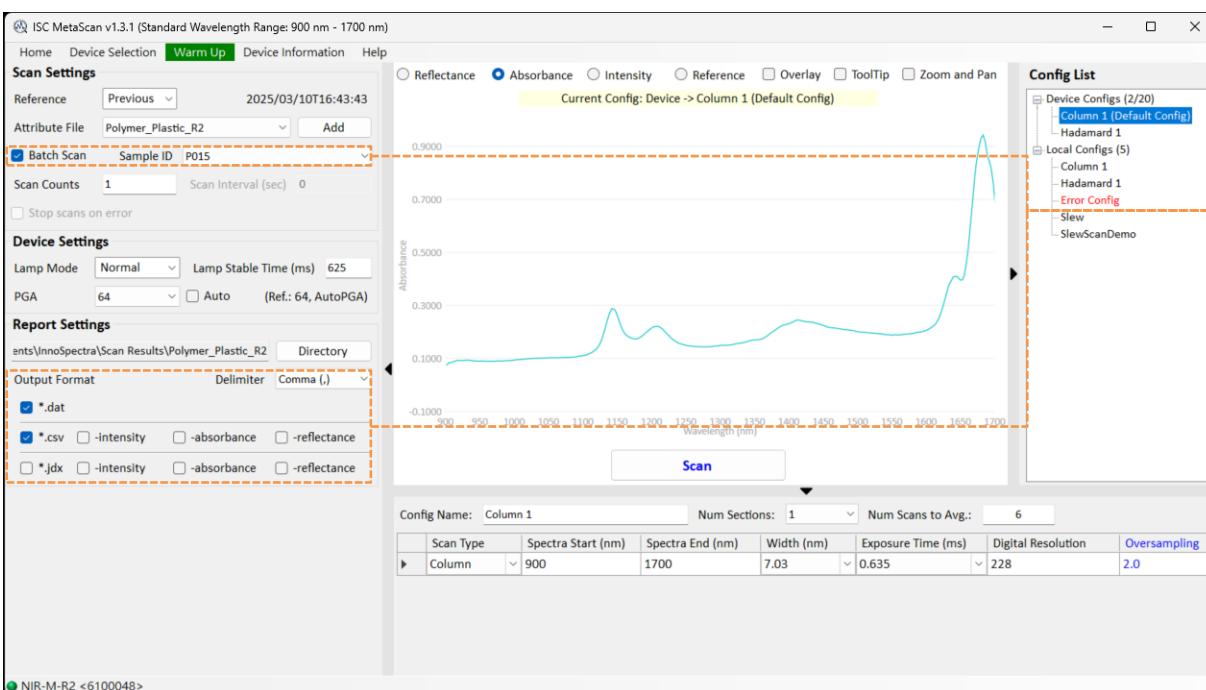
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Batch Scan with Sample ID



1. The user can select the configuration to be scanned.
2. Add or select one attribute file before starting batch scan.
3. Enable “Batch Scan” option, and select one sample ID before scanning.
4. The location of the scan is saved in the directory with the same name as the attribute file under the report directory.
5. Click “Scan” button to perform a new scan.
6. The scan result will be plotted by one of the reflectance, absorbance, intensity or reference selection.
7. This function is provided in the scan pages.

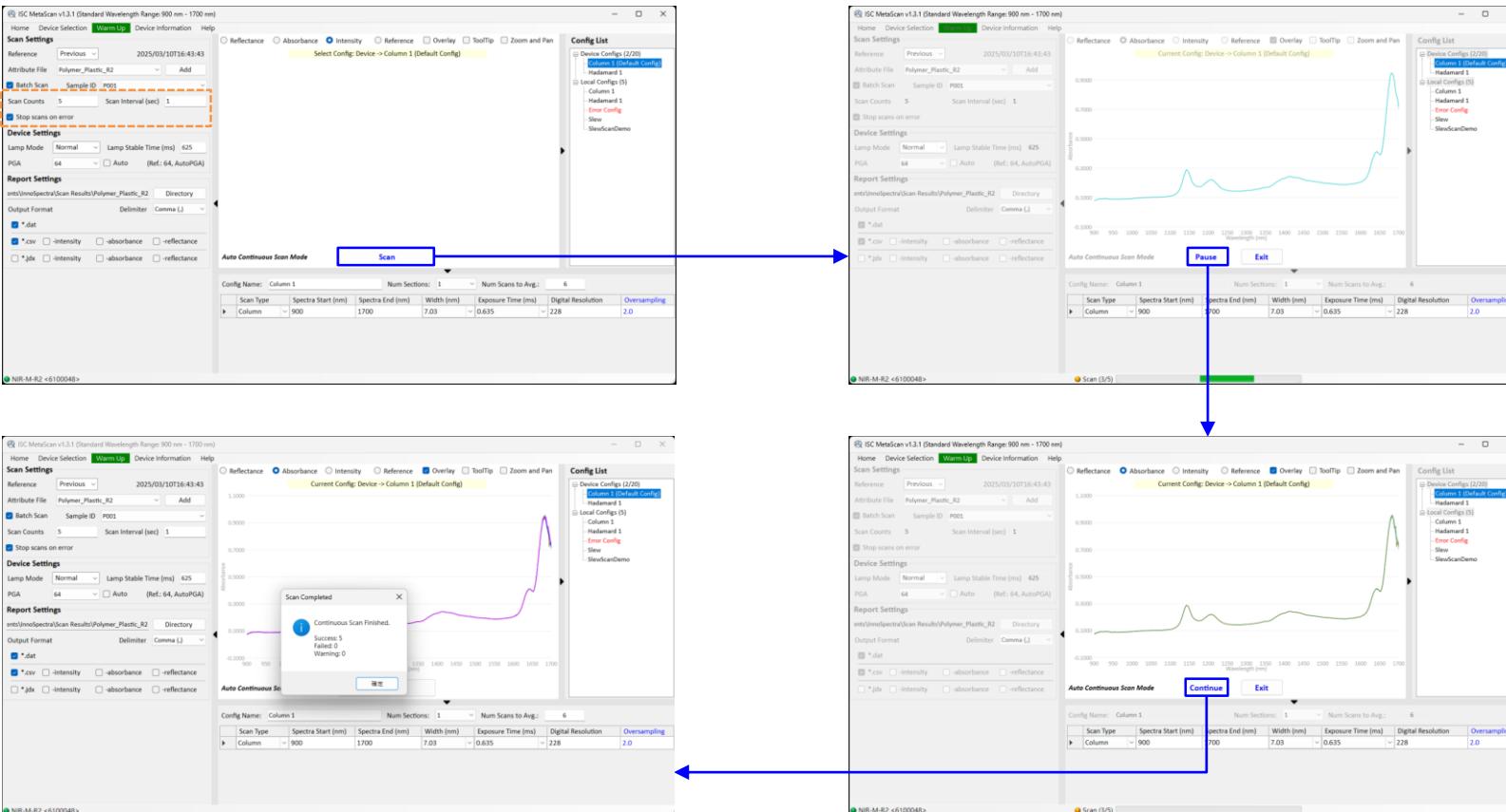


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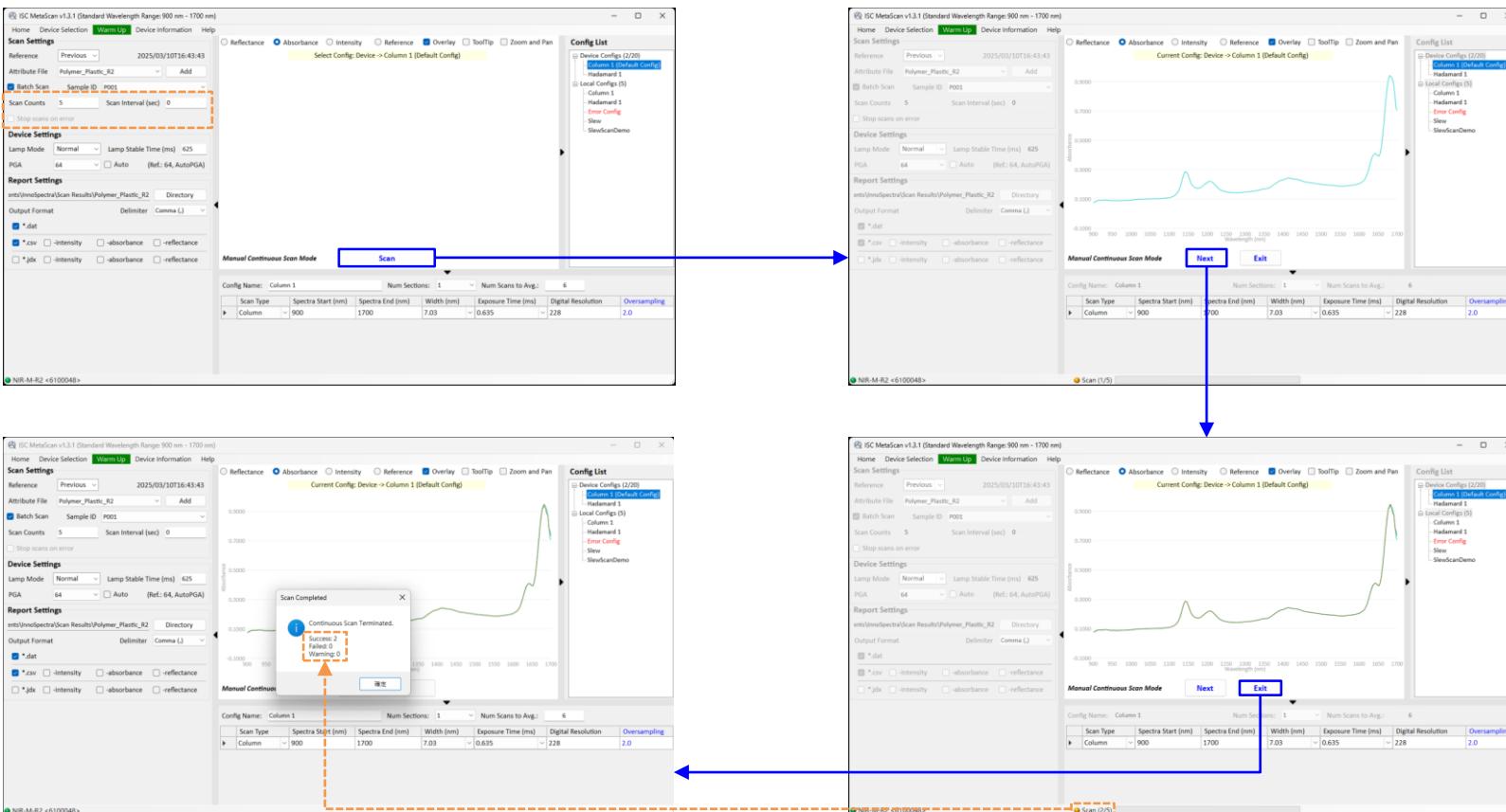
Auto Continuous Scan

1. Input a scan count greater than 1 and a scan interval greater than 0 seconds.
2. Click “Scan” button to perform scans.
3. Click “Pause” to temporarily stop continuous scanning, and click “Continue” to resume continuous scanning.
4. If the user would like to stop continuous scanning directly, click “Exit”.
5. The scan result will be plotted by one of the reflectance, absorbance, intensity or reference selection.
6. The system will calculate the average scan data based on the number of scans.
7. This function is provided in the scan pages.



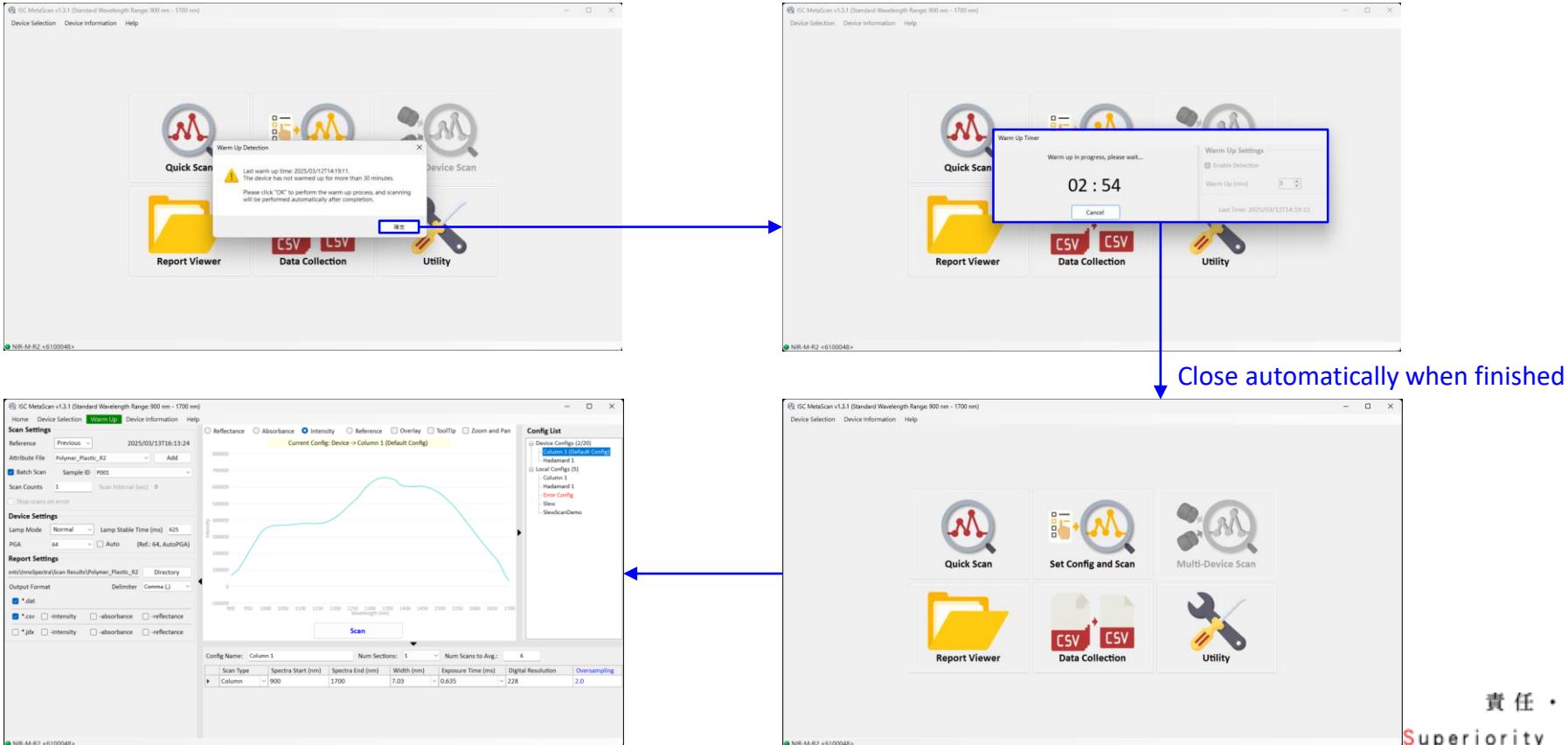
Manual Continuous Scan

1. Input a scan count greater than 1 and a scan interval equal to 0 seconds.
2. Click “Scan” button to perform scans.
3. Click “Next” to start the next scan.
4. If the user would like to stop continuous scanning directly, click “Exit”.
5. The scan result will be plotted by one of the reflectance, absorbance, intensity or reference selection.
6. The system will calculate the average scan data based on the number of scans.
7. This function is provided in the scan pages.



Device Button Scan

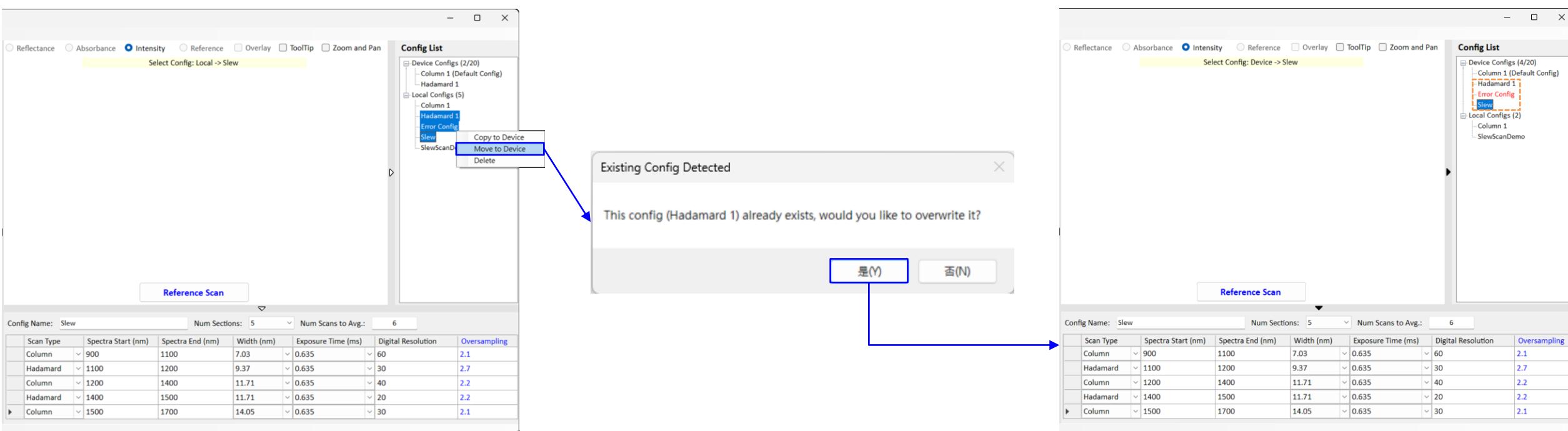
- This function only supports devices with physical button.
- To perform a scan, the operation process is as follows:
 - Press the device button will trigger the scan process.
 - Check whether the warm up needs to be executed. If the device needs to warm up, a warning message will pop up to remind the user. After the warning message is confirmed, the warm up process will be performed automatically.
 - After the warm-up is completed, the scan will be performed automatically.



Configurations Operation

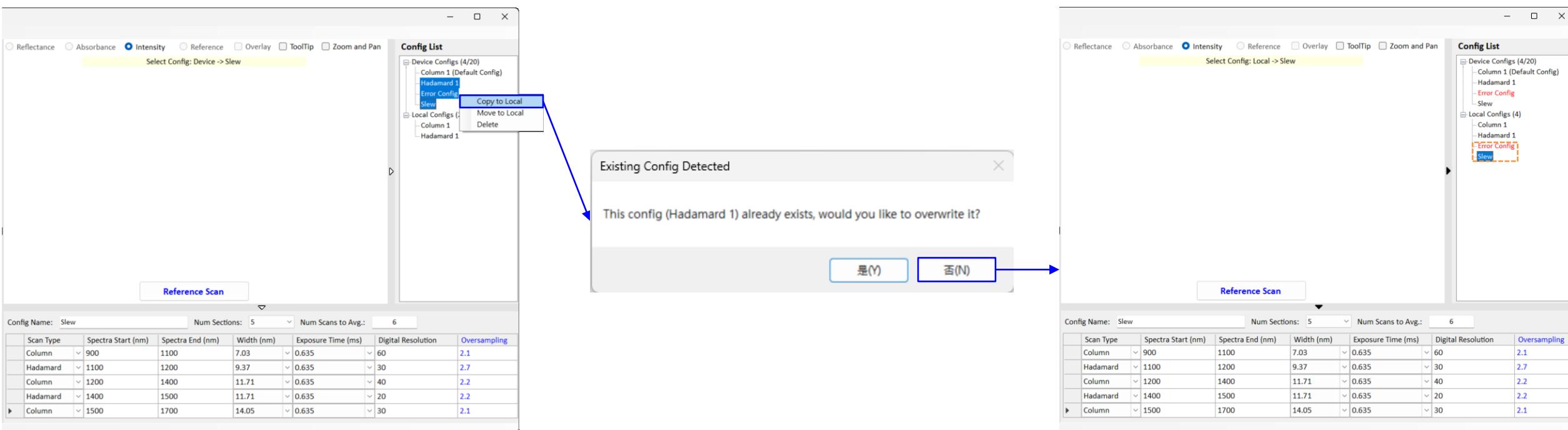
Move Configuration(s)

- This function is provided in the configuration list of the Quick Scan page.
- The capacity of device configurations is limited to 1~20 sets, and local configurations are unlimited.
- To move configuration(s), the operation process is as follows:
 1. Select one or more configurations in the configuration list.
 2. Click the right mouse button on the selected configuration(s), and select the “Move to Local” or “Move to Device” item.
 3. If the moved configurations contain the default configuration, the user can choose not to move it or change default configuration.
 4. If the name of the moving configuration is duplicated with one of the target lists, the name will be slightly modified.



Copy Configuration(s)

- This function is provided in the configuration list of the Quick Scan page.
- The capacity of device configurations is limited to 1~20 sets, and local configurations are unlimited.
- To copy configuration(s), the operation process is as follows:
 1. Select one or more configurations in the configuration list.
 2. Click the right mouse button on the selected configuration(s), and select the “Copy to Local” or “Copy to Device” item.
 3. If the name of the copying configuration is duplicated with one of the target lists, the name will be slightly modified.



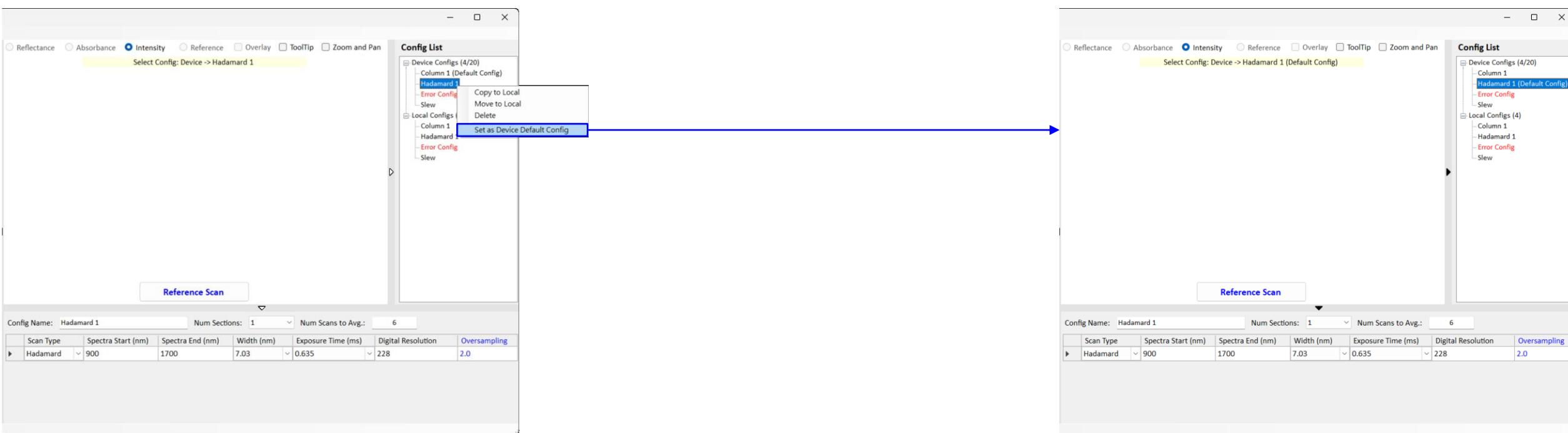
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Set a Configuration as Device Default Config

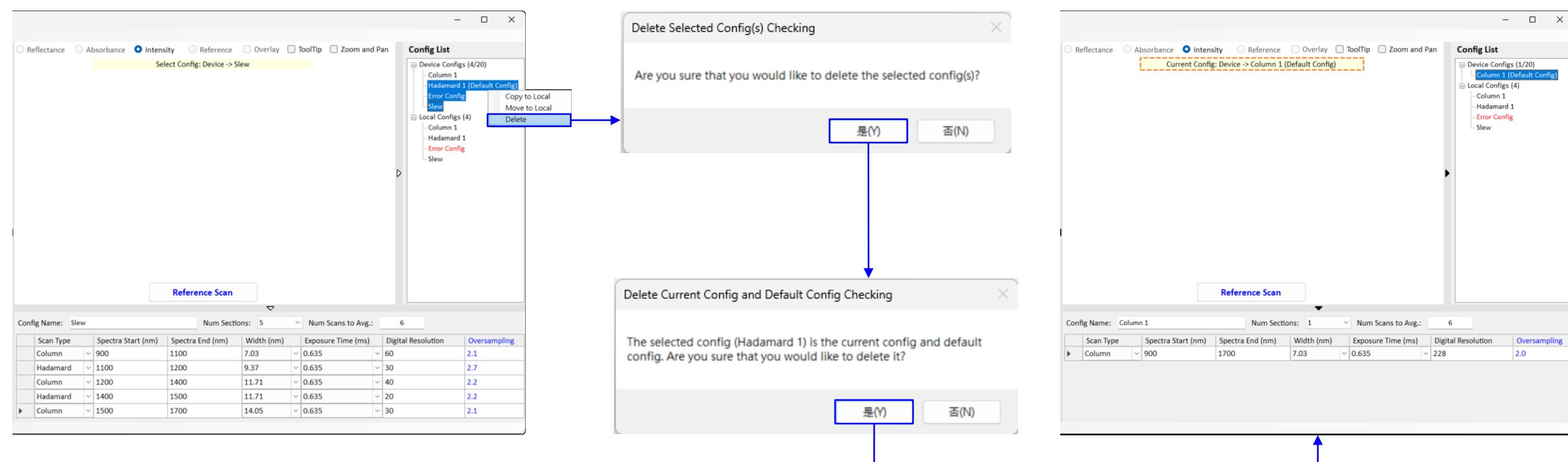


- This function is provided in the configuration list of the Quick Scan page.
- It is used to directly use the configuration to scan without selecting one.
- When entering the “Quick Scan” page, the system will set the device default configuration as the current configuration.
- To set the device default configuration, the operation process is as follows:
 1. Select a configuration in the configuration list.
 2. Click the right mouse button on the selected configuration, and select the “Set as Device Default Config” item.
 3. The configuration will be marked as the default configuration and ready for scan.



Delete Configuration(s)

- This function is provided in the configuration list of the Quick Scan page.
- Device configurations must retain at least one, and local configurations are unlimited.
- To delete configuration(s), the operation process is as follows:
 1. Select one or more configurations in the configuration list.
 2. Click the right mouse button on the selected configuration(s), and select the “Delete” item.
 3. If the deleted configurations contain the current configuration, the user can choose not to delete it or set default configuration as current configuration.
 4. If the deleted configurations contain the default configuration, the user can choose not to delete it or change default configuration.



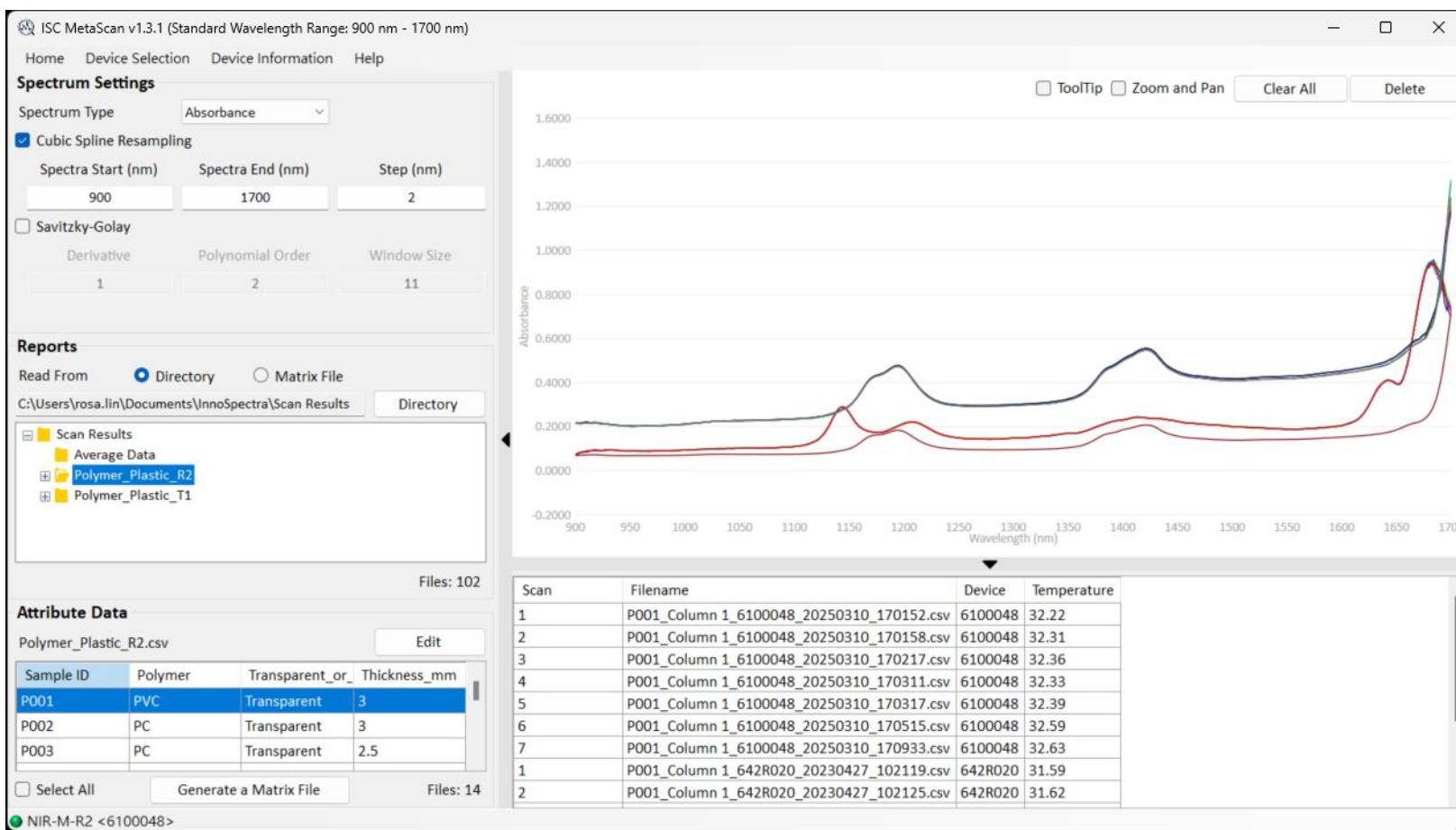
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Collect Spectrum Data

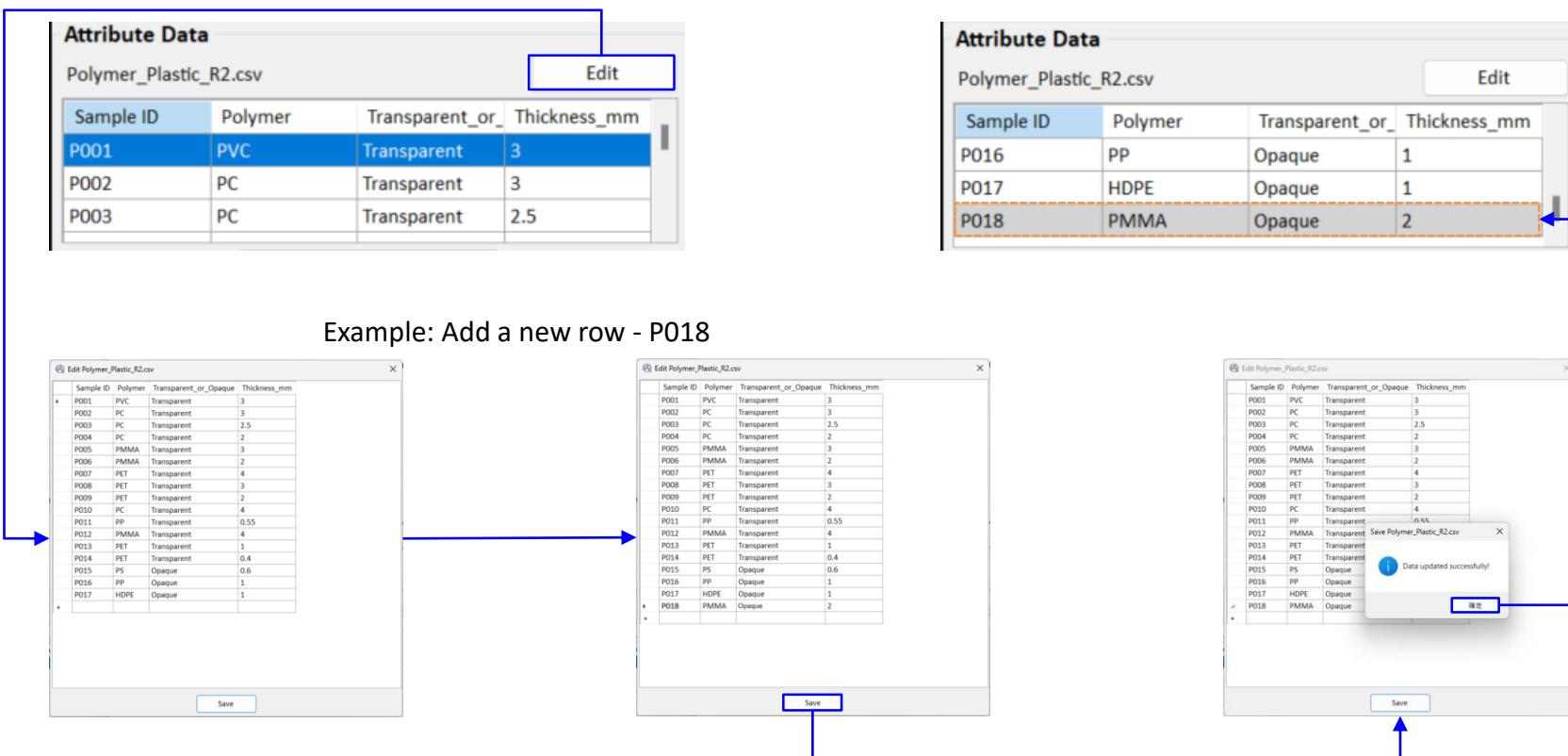
Load Spectrum Data

1. Set the spectrum settings for the data.
2. Select the directory, it will expand all the subdirectories below and count the number of all files that match the format.
3. Click a directory, if there is an attribute file with the same file name as the directory, its content will be displayed.
4. All files in the directory that match the format will be classified by sample id. If the sample id contains no files, it will be marked with a grey background.
5. If the spectrum data needs to be recalculated according to the settings, click “Re-Calculate” button to achieve it.



Edit Attribute File

1. The edit attribute file function only supports the attribute file that exists.
2. Click “Edit” to open a dialog to edit contents.
3. Provide editing attribute name, new / delete row, edit contents.
4. The “Sample ID” is the fixed header name and cannot be modified.
5. The attribute data will update after the dialog closed.



The screenshot sequence illustrates the process of editing an attribute file named "Polymer_Plastic_R2.csv".

Initial State: The first window shows the "Attribute Data" for "Polymer_Plastic_R2.csv" with three rows: P001 (PVC, Transparent, 3), P002 (PC, Transparent, 3), and P003 (PC, Transparent, 2.5). An "Edit" button is visible.

Editing a Row: The second window shows the same data with a new row P018 (PMMA, Opaque, 2) added at the bottom. This row is highlighted with an orange dashed border. A blue arrow points from the "Edit" button in the first window to the "Edit" button in the second window.

Adding a New Row: The third window shows the data after saving the changes. It includes the original rows and the new row P018. A blue arrow points from the "Save" button in the second window to the "Save" button in the third window.

Success Message: The fourth window displays a confirmation message: "Data updated successfully!" with a "OK" button. A blue arrow points from the "OK" button in the third window to the "OK" button in the fourth window.

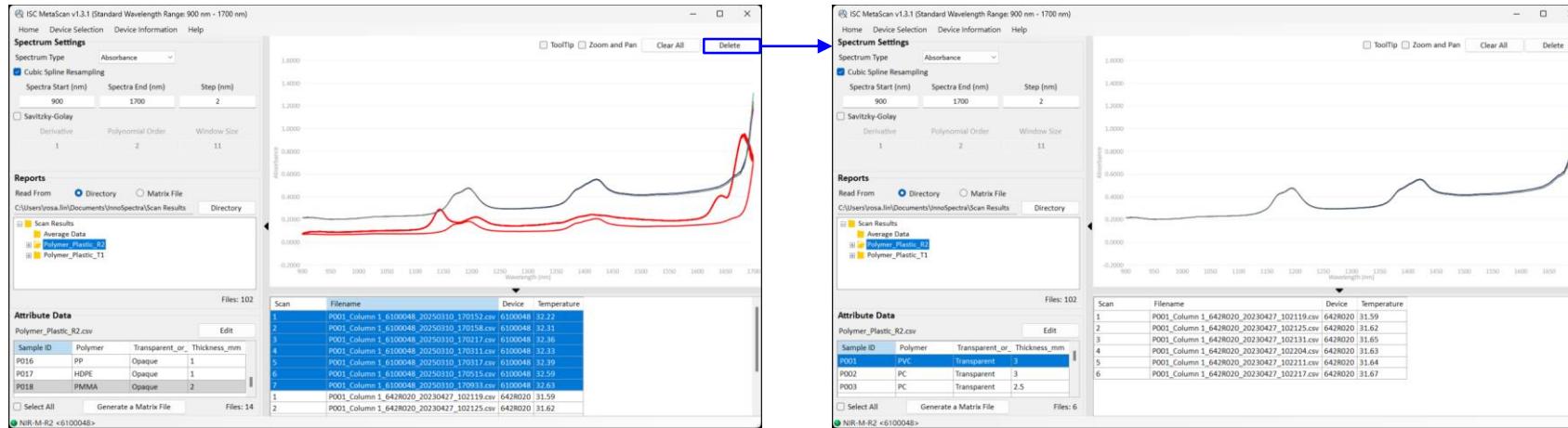
Final State: The fifth window shows the updated data with the new row P018 included. A blue arrow points from the "Save" button in the fourth window to the "Save" button in the fifth window.

Example: Add a new row - P018

Sample ID	Polymer	Transparent_or_Opaque	Thickness_mm
P001	PVC	Transparent	3
P002	PC	Transparent	3
P003	PC	Transparent	2.5
P004	PC	Transparent	2
P005	PMMA	Transparent	3
P006	PMMA	Transparent	2
P007	PET	Transparent	4
P008	PET	Transparent	3
P009	PET	Transparent	2
P010	PC	Transparent	4
P011	PP	Transparent	0.55
P012	PMMA	Transparent	4
P013	PET	Transparent	1
P014	PET	Transparent	0.4
P015	PS	Opaque	0.6
P016	PP	Opaque	1
P017	HDPE	Opaque	1
P018	PMMA	Opaque	2

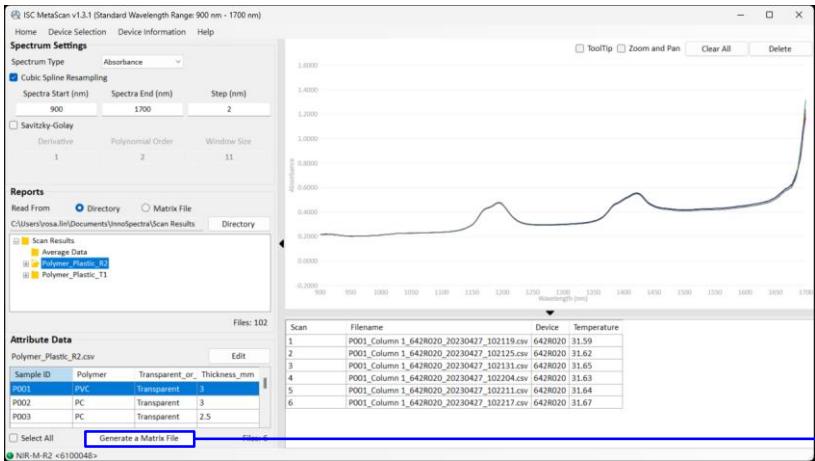
Delete Unnecessary Spectrum

1. Select the spectrum to delete from the chart or table. The selected spectrum will be displayed as red bold line and highlighted in the table.
2. Click “Delete” button that can delete the selected spectrum.



Generate a Matrix File

1. Use the Ctrl or Shift key to select the sample ID in Attribute Data. And check the loaded spectrum data are correct.
2. Check the unnecessary spectrum data has been deleted.
3. Check the attribute file contents are correct.
4. Click “Generate a Matrix File” to generate the arranged spectrum data.
5. If the sample ID doesn’t contain any files, the sample ID will not be written the exported file.



Scan Sequ	Sample ID	Polymer	Transarer	Thickness	Filename	Device	Temperatu	900
1	P001	PVC	Transparer	3	P001_Col	642R020	31.59	0.219901
2	P001	PVC	Transarer	3	P001_Col	642R020	31.62	0.214481
3	P001	PVC	Transarer	3	P001_Col	642R020	31.65	0.216045
4	P001	PVC	Transarer	3	P001_Col	642R020	31.63	0.216346
5	P001	PVC	Transarer	3	P001_Col	642R020	31.64	0.215676
6	P001	PVC	Transarer	3	P001_Col	642R020	31.67	0.21663

Spectrum Settings

Spectrum | Absorbance

Cubic Spline Enable

Spectra Start 900

Spectra End 1700

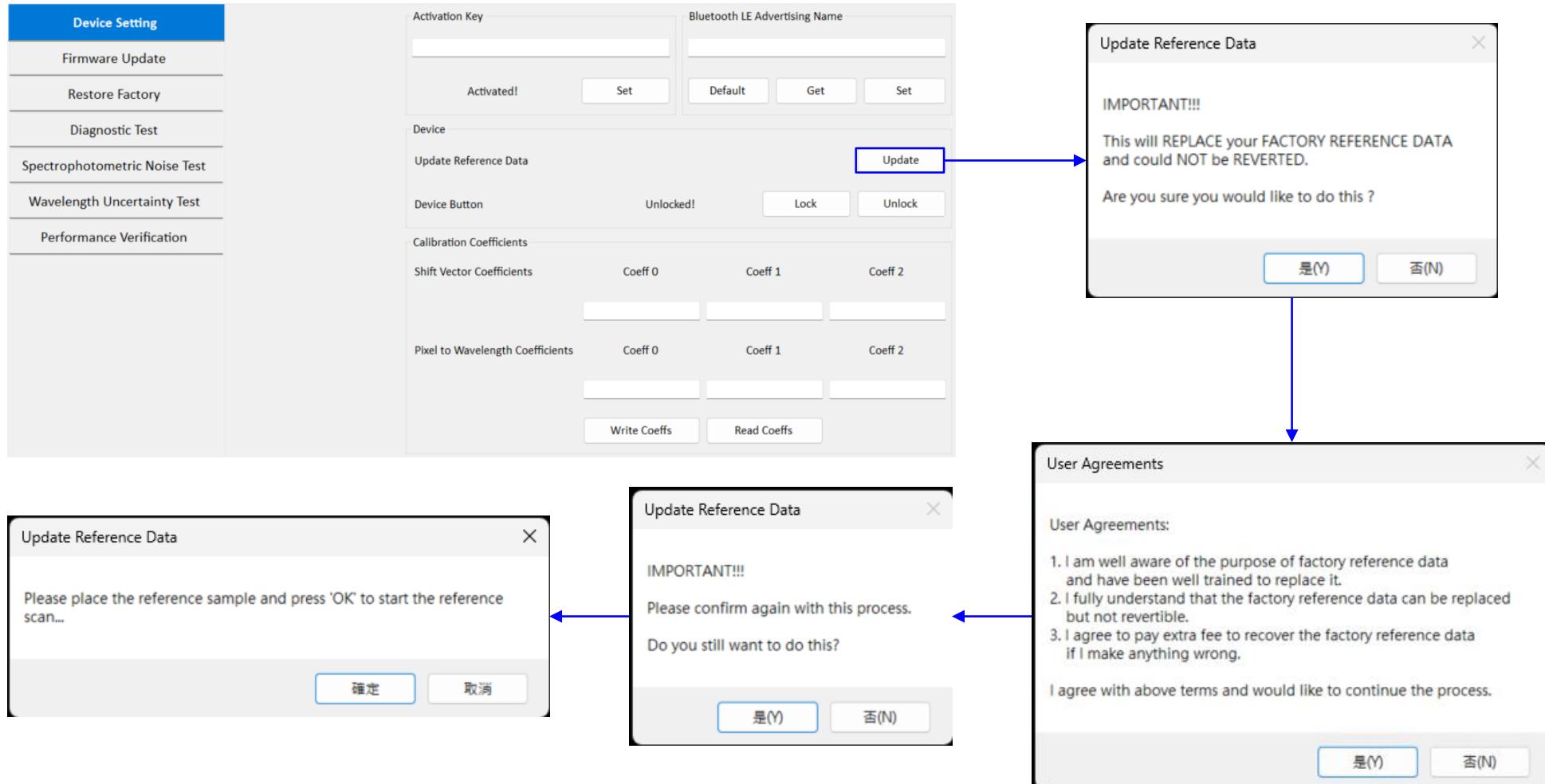
Spectra Step 2

Savitzky Golay Disable

Utility Functions Operation

Update Reference Data

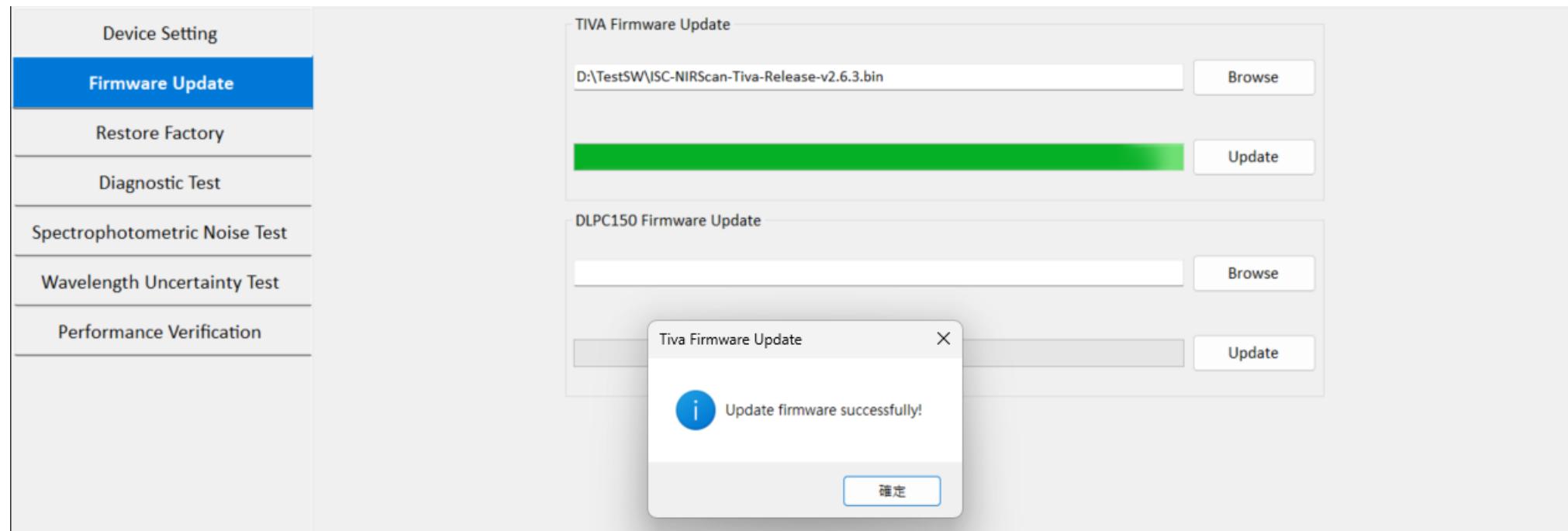
- Before replacing stored reference data, preparing a highly reflective material. A 99% reflective material can be created by coating a metal with Spectralon®.
- Before replacing stored reference data, user needs to read User Agreements to agree to bear the consequences as follows:



Update TIVA Firmware

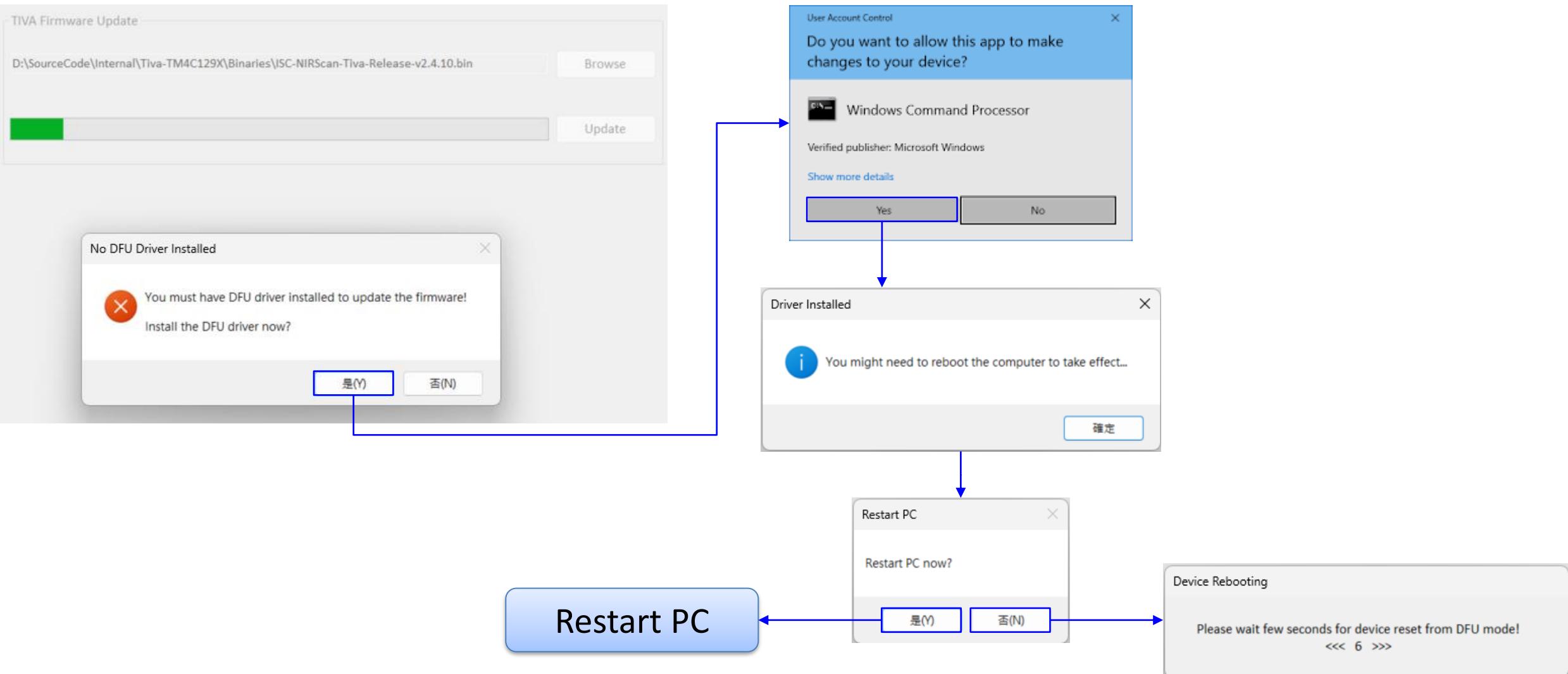


1. Click the “Browse” button to search for the TIVA FW file (for example, \\ISC-NIRScan-Tiva-Release-v2.6.3.bin).
2. Click the “Update” button. The firmware will be flashed on the TIVA internal Flash while the progress bar indicates the update process.
3. If the TIVA firmware update fails, it will display the corresponding error message.



Update TIVA Firmware (Cont.)

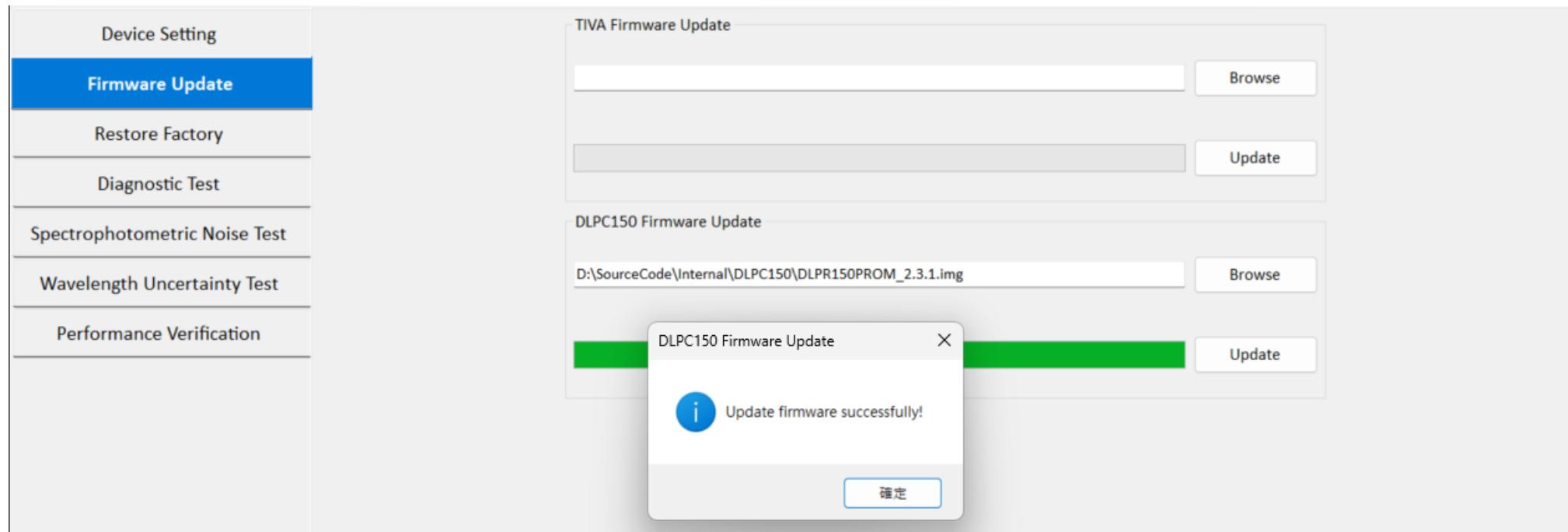
- If the system finds that the DFU driver is not installed, it will pop up the window before the firmware update.
- When the DFU driver installation is complete, please restart the PC.



Update DLPC150 Firmware



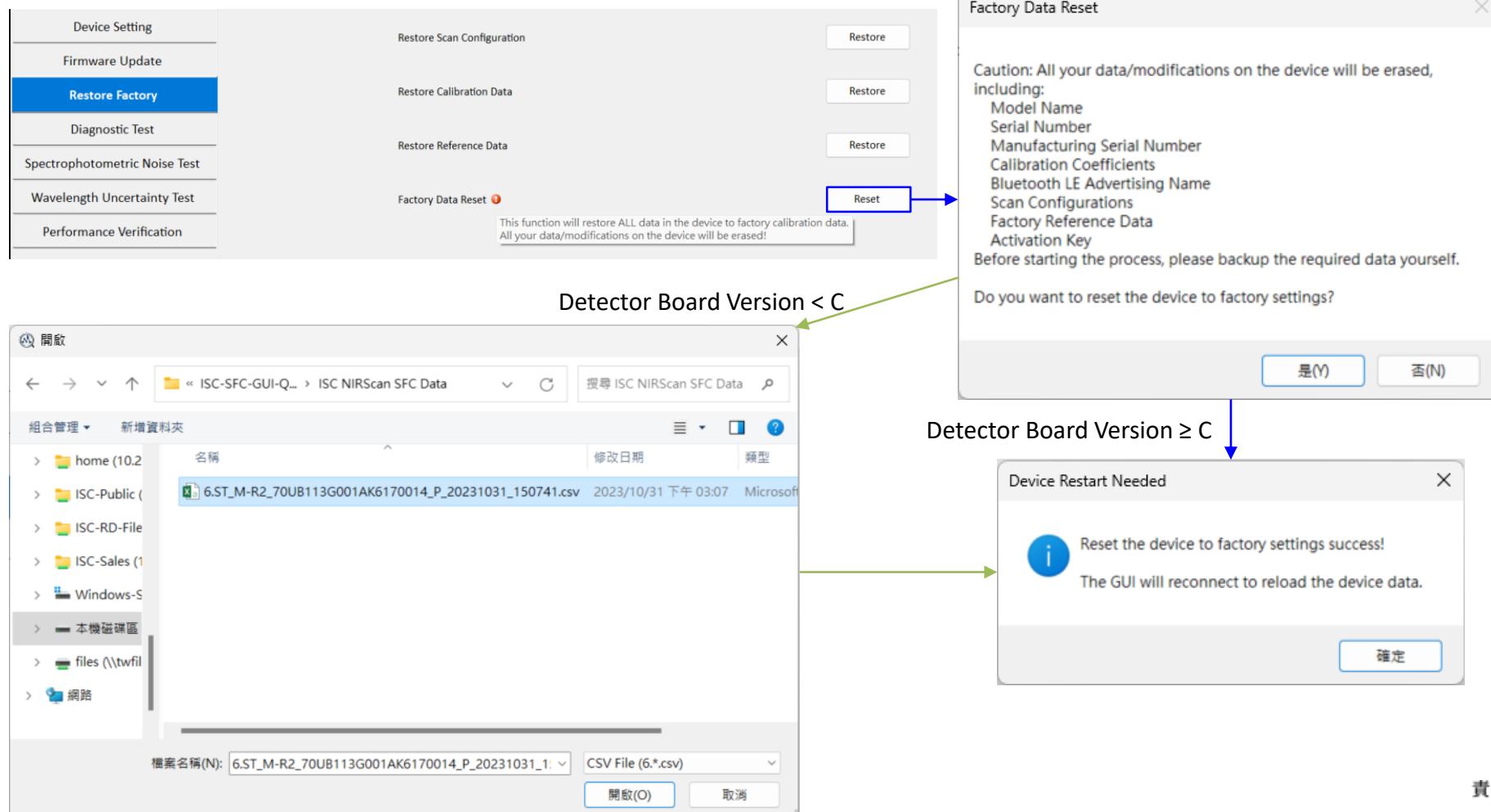
1. Click the “Browse” button to search for the DLPC150 firmware file (for example, \\DLPR150PROM_2.3.1.img).
2. Click the “Update” button. The firmware will be flashed to the board while the progress bar indicates the update process.
3. If the DLPC150 firmware update fails, it will display the corresponding error message.



Factory Data Reset



1. Before restoring device data, preparing a factory test report named 6.ST_{model}_{serial number}_P_{date}_{time}.csv. Newer devices may not need this report. For example, the detector board version is version C or newer.
2. Clicking the “Reset” button will display the content restored to the original factory settings for reconfirmation.
3. Select factory test report if needs. The GUI will be reconnected upon completion.

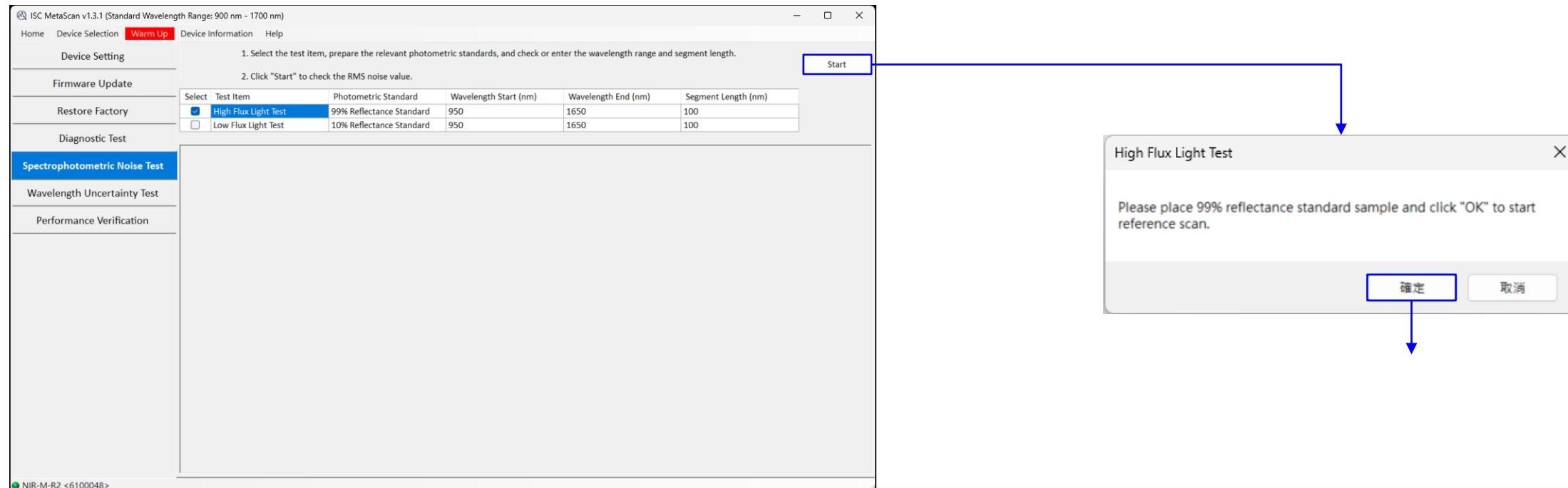


Spectrophotometric Noise Test

High Flux Light Test



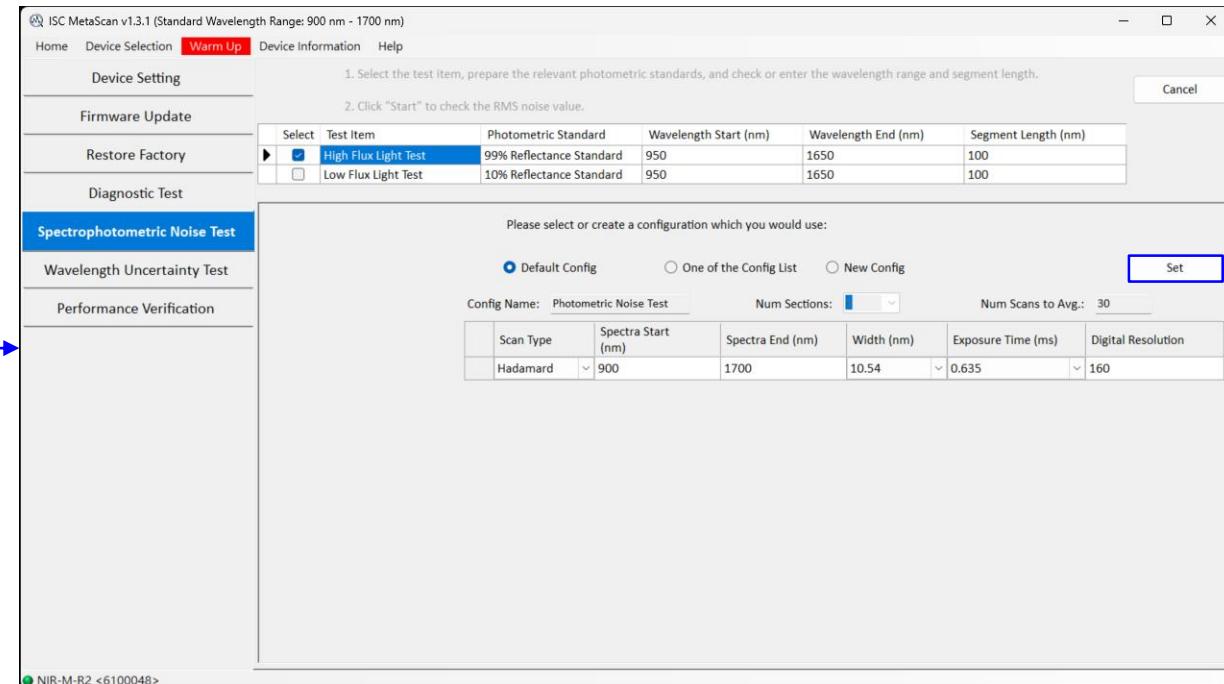
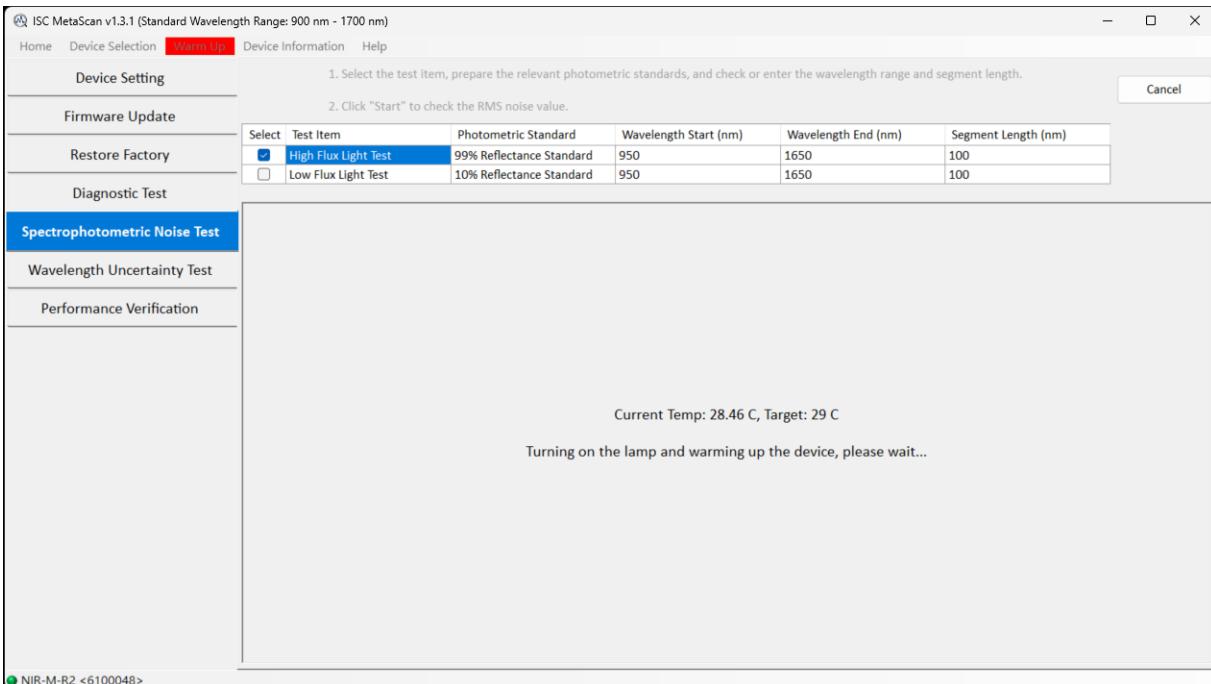
1. Before testing, please prepare reflectivity materials such as SRS99 and determine the wavelength range and segment length.
2. Before scanning, the system will confirm that the temperature is within the preset range. If it exceeds the range, the system will warm up or cool down.



High Flux Light Test (Cont.)

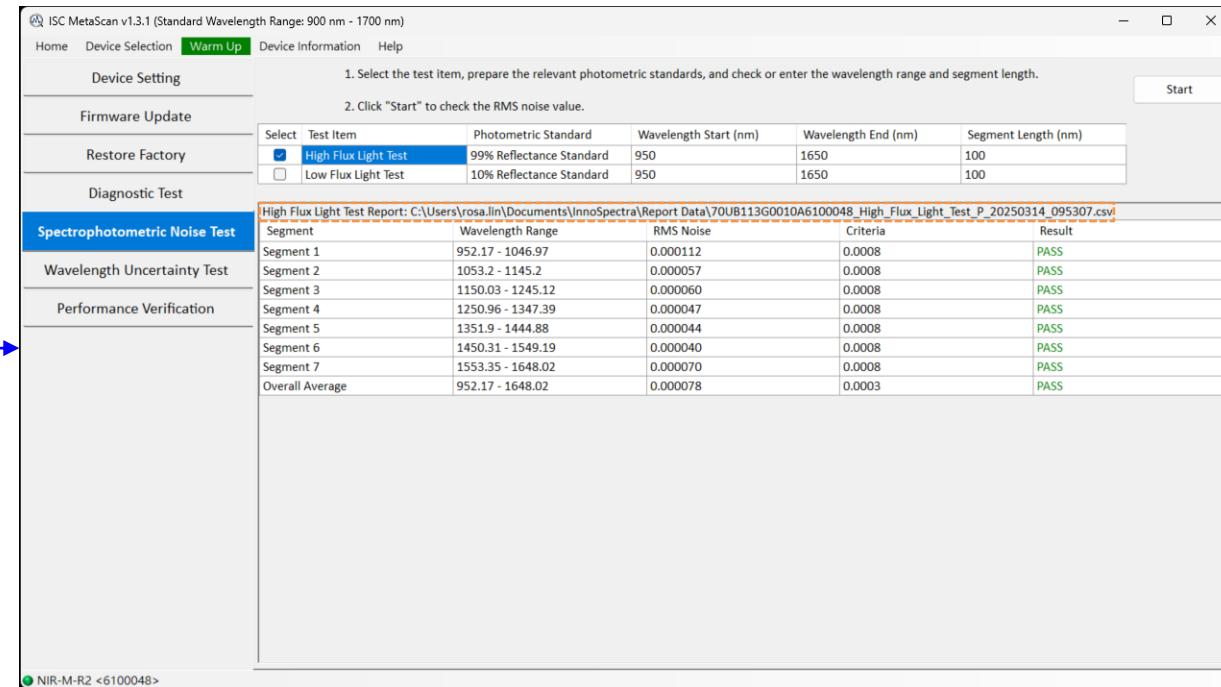
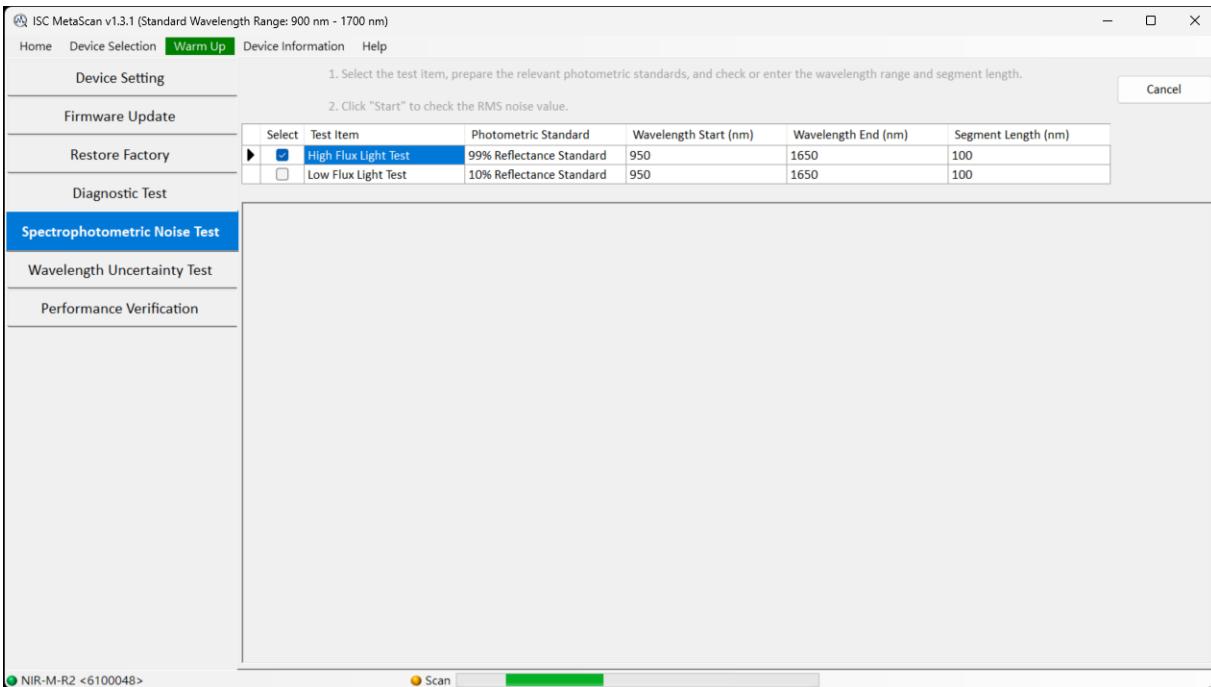


3. Select “Default Config” or others, then click “Set”, the system will start scanning. You can click "Cancel" at any time during the process.



High Flux Light Test (Cont.)

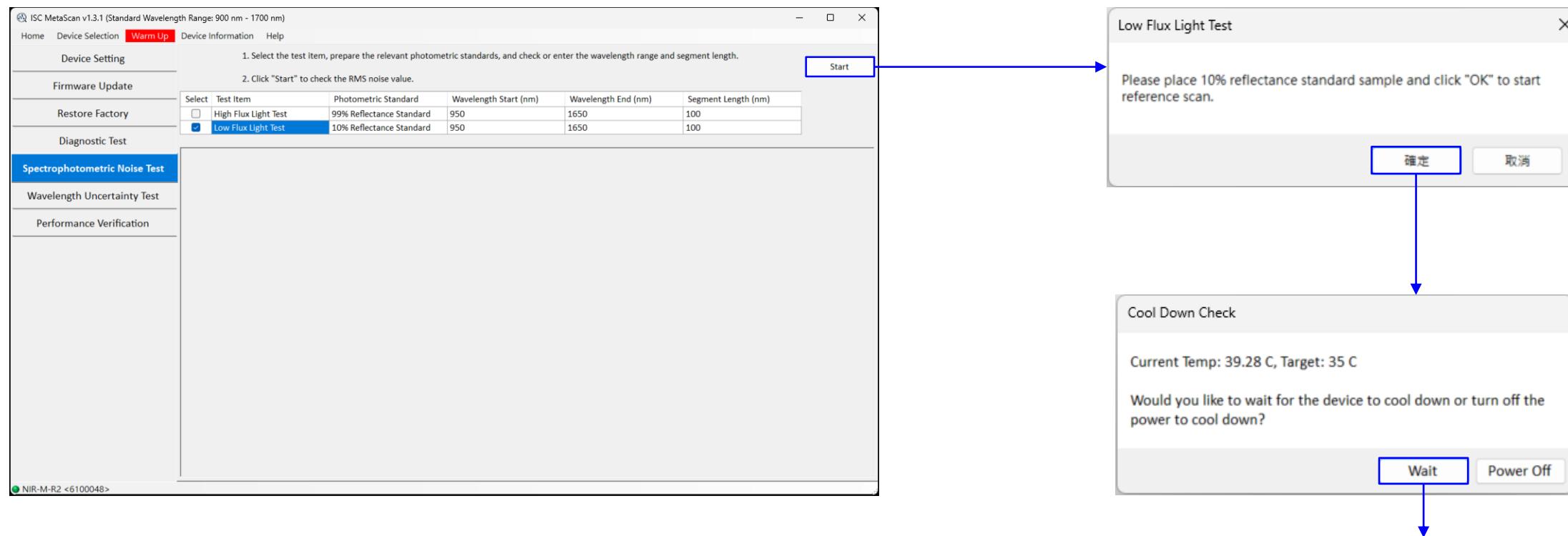
- After the test is completed, the results will be displayed and a test report will be stored.



Low Flux Light Test

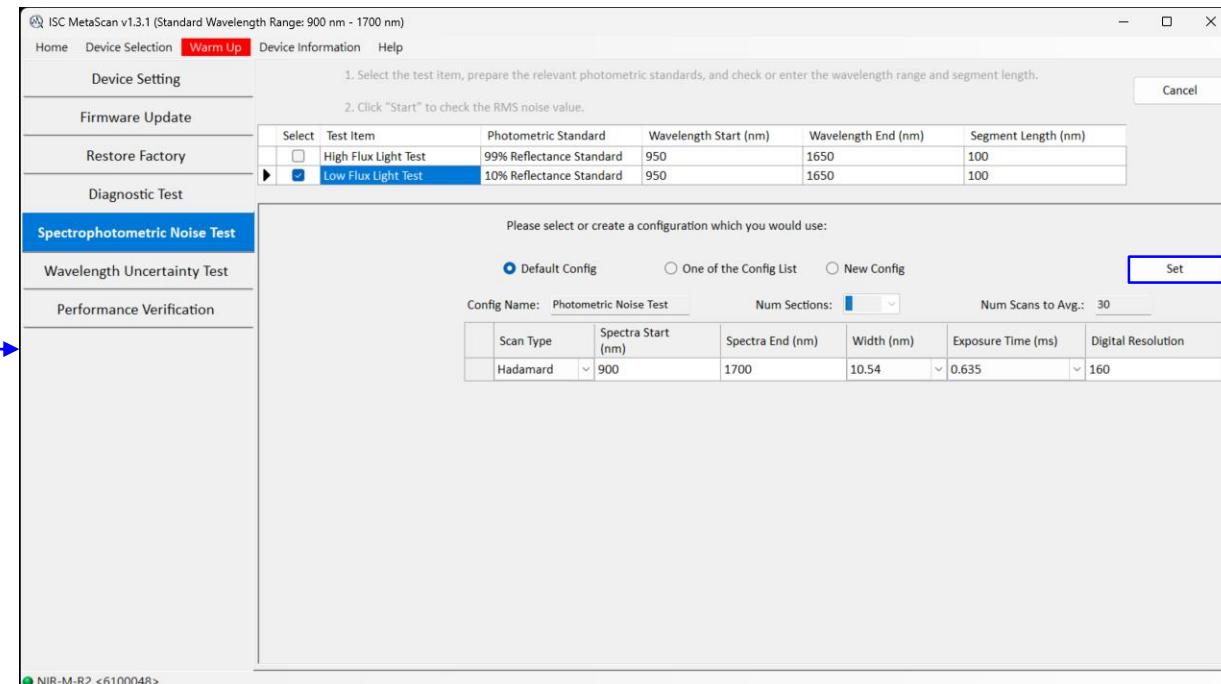
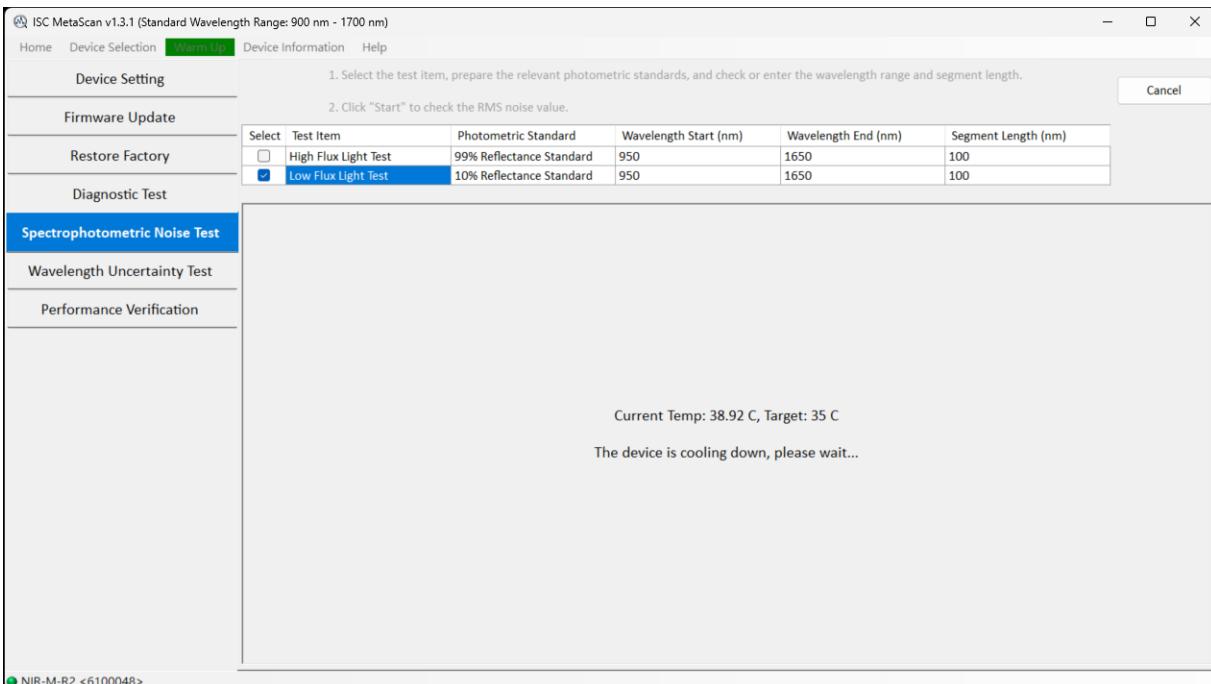


1. Before testing, please prepare reflectivity materials such as SRS10 and determine the wavelength range and segment length.
2. Before scanning, the system will confirm that the temperature is within the preset range. If it exceeds the range, the system will warm up or cool down.



Low Flux Light Test (Cont.)

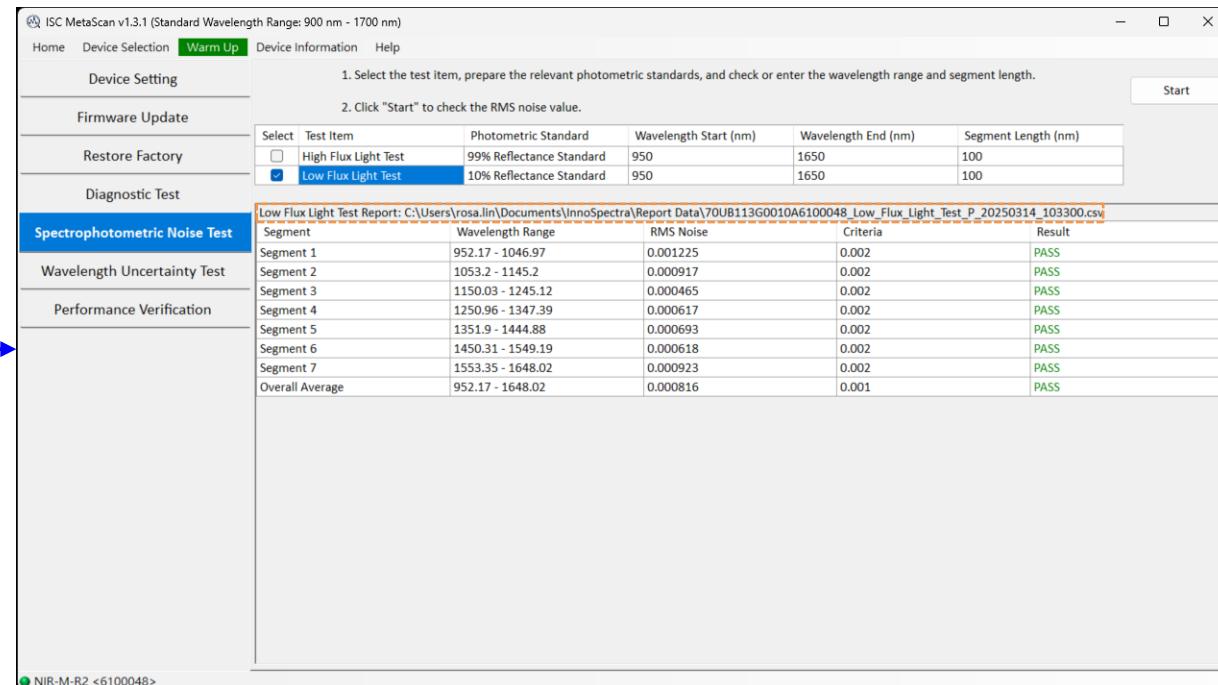
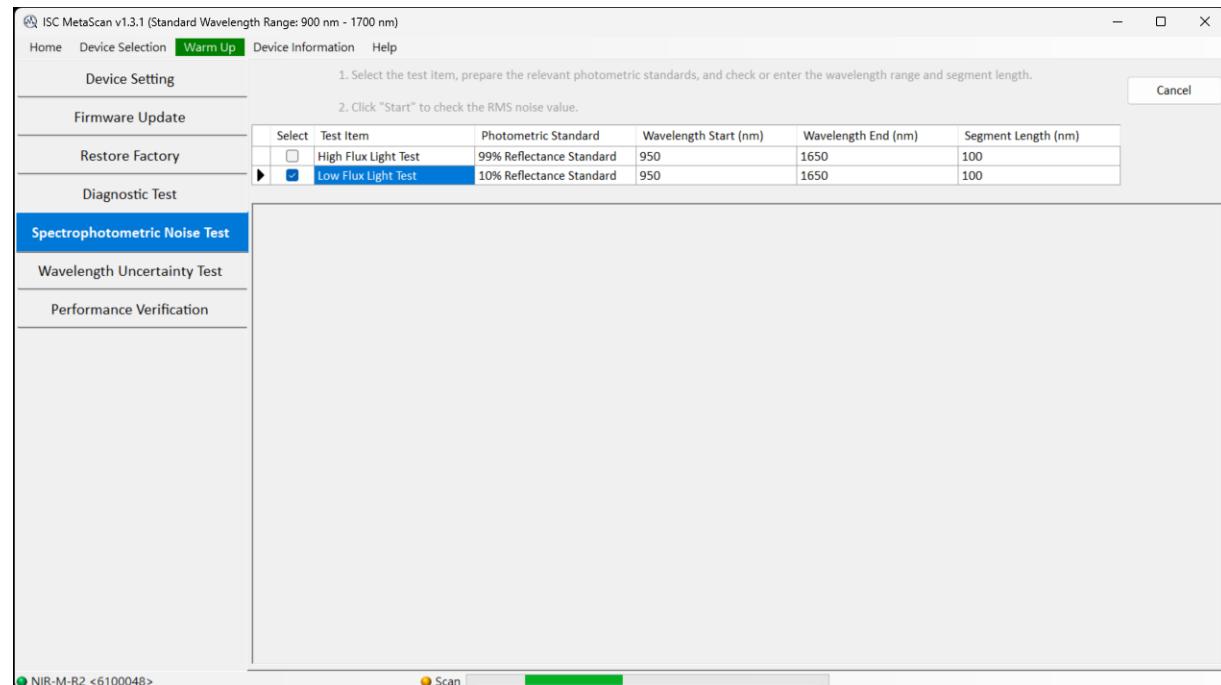
3. Select “Default Config” or others, then click “Set”, the system will start scanning. You can click "Cancel" at any time during the process.



Low Flux Light Test (Cont.)



4. After the test is completed, the results will be displayed and a test report will be stored.

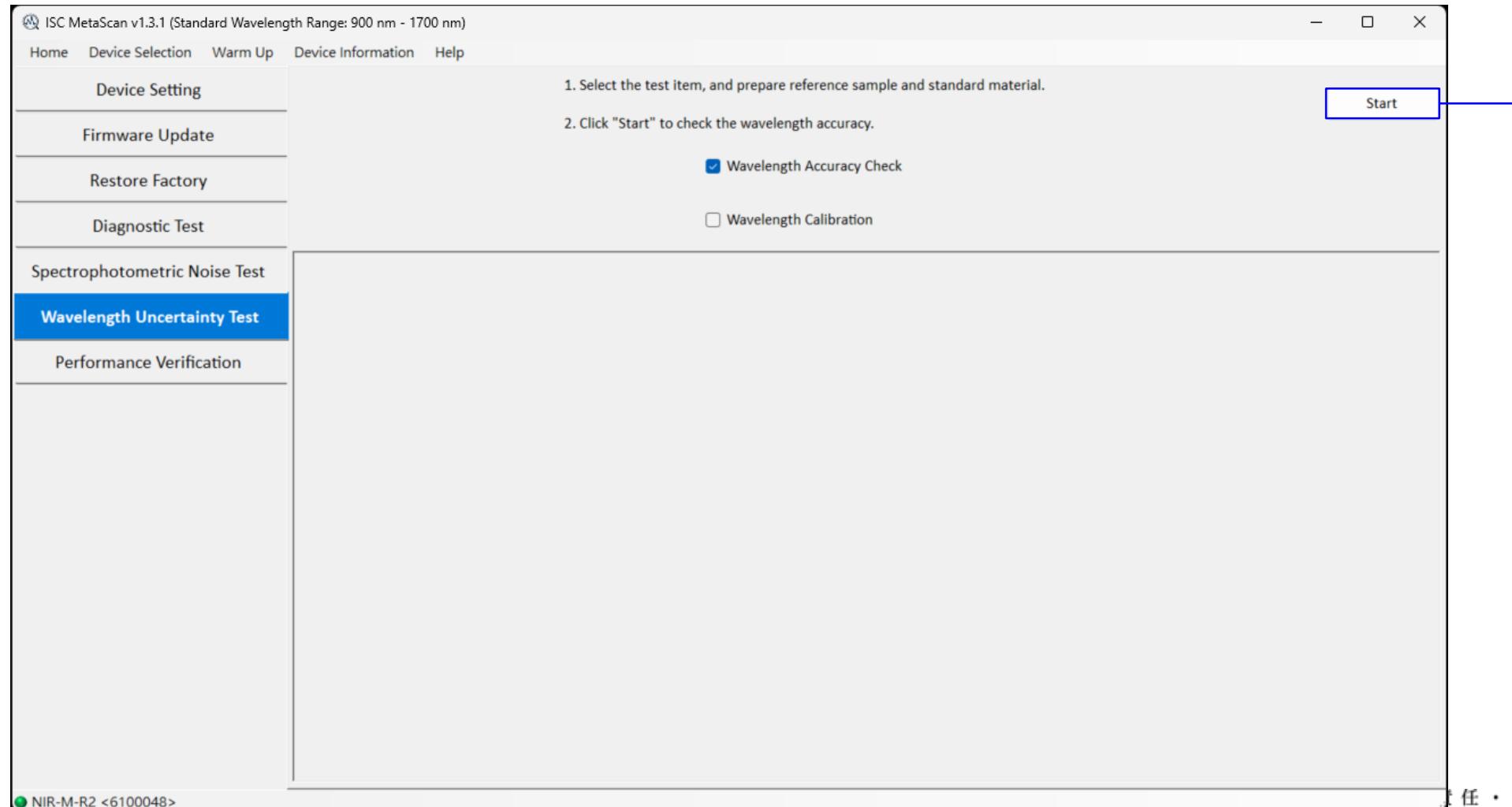


Wavelength Uncertainty Test

Wavelength Accuracy Check



1. Before testing, please prepare reference sample and stand material.
2. Before scanning, the system will confirm that the temperature is within the preset range. If it exceeds the range, the system will warm up or cool down.
3. Follow the instructions to start the test.



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Wavelength Accuracy Check (Cont.)



- You can click "Cancel" at any time during the process.
- You can click "Back" to re-execute the previous step during the process.

ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)

Home Device Selection **Warm Up** Device Information Help

Device Setting
Firmware Update
Restore Factory
Diagnostic Test
Spectrophotometric Noise Test
Wavelength Uncertainty Test
Performance Verification

1. Select the test item, and prepare reference sample and standard material.
2. Click "Start" to check the wavelength accuracy.

▶ Wavelength Accuracy Check
 Wavelength Calibration

Please determine the scan data which you would use:
 Absorbance Intensity

Please select the way to enter the expected wavelengths:
 Select the default standard material and expected peaks **SRM2036** Scan the standard material and select expected peaks in the plot
 Enter the number and value of the expected wavelengths

Wavelength
1 975.9
2 1075.8
3 1222.1
4 1367.3
5 1469.5

Next >

ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)

Home Device Selection **Warm Up** Device Information Help

Device Setting
Firmware Update
Restore Factory
Diagnostic Test
Spectrophotometric Noise Test
Wavelength Uncertainty Test
Performance Verification

1. Select the test item, and prepare reference sample and standard material.
2. Click "Start" to check the wavelength accuracy.

▶ Wavelength Accuracy Check
 Wavelength Calibration

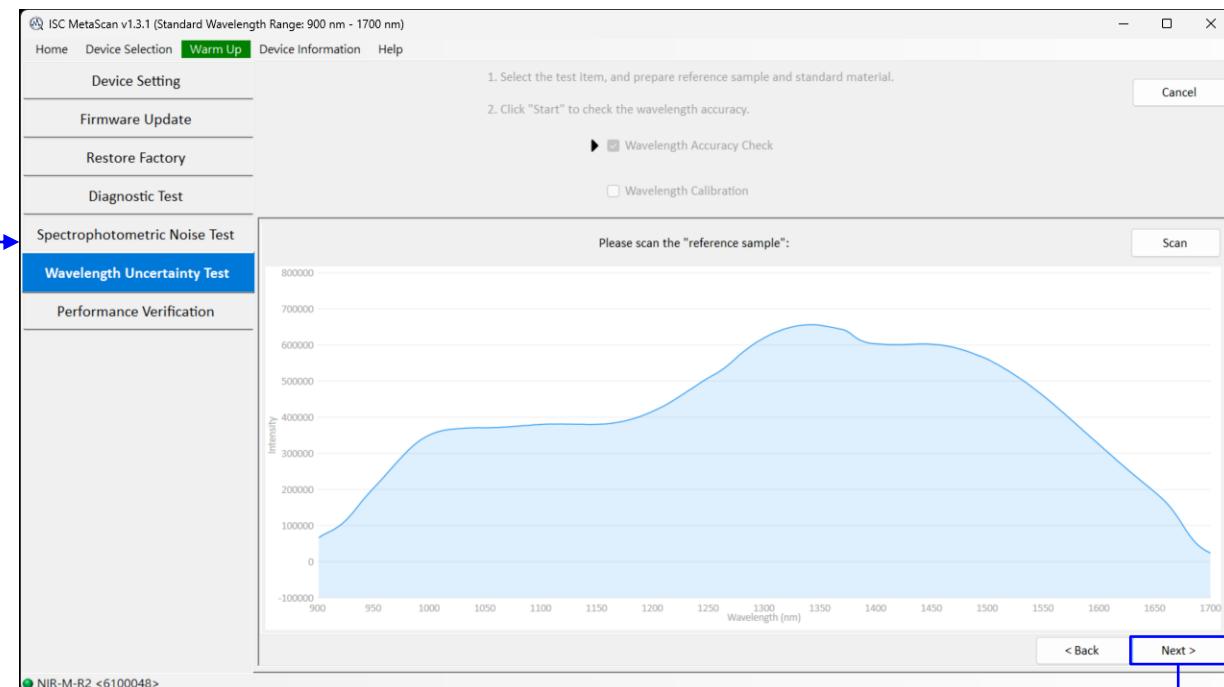
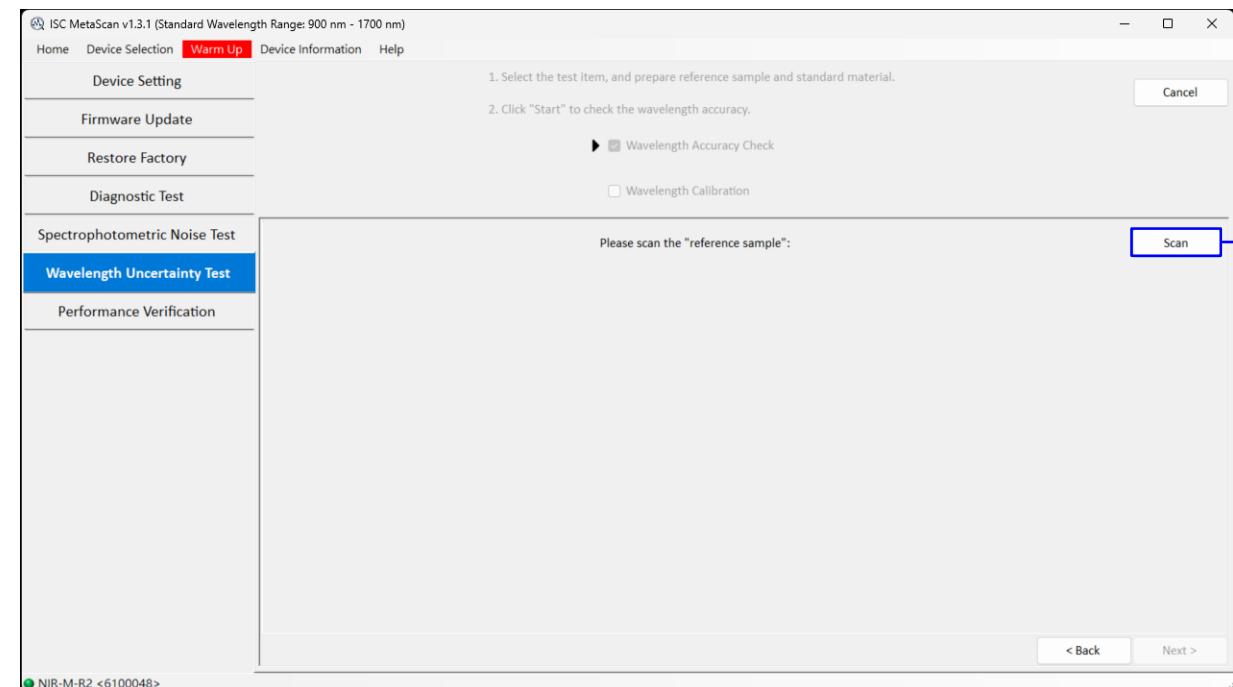
Please select or create a configuration which you would use:
 Default Config One of the Config List New Config

Config Name: UserReference Num Sections: 1 Num Scans to Avg.: 30

Scan Type	Spectra Start (nm)	Spectra End (nm)	Width (nm)	Exposure Time (ms)	Digital Resolution
Column	900	1700	7.03	0.635	228

< Back **Next >**

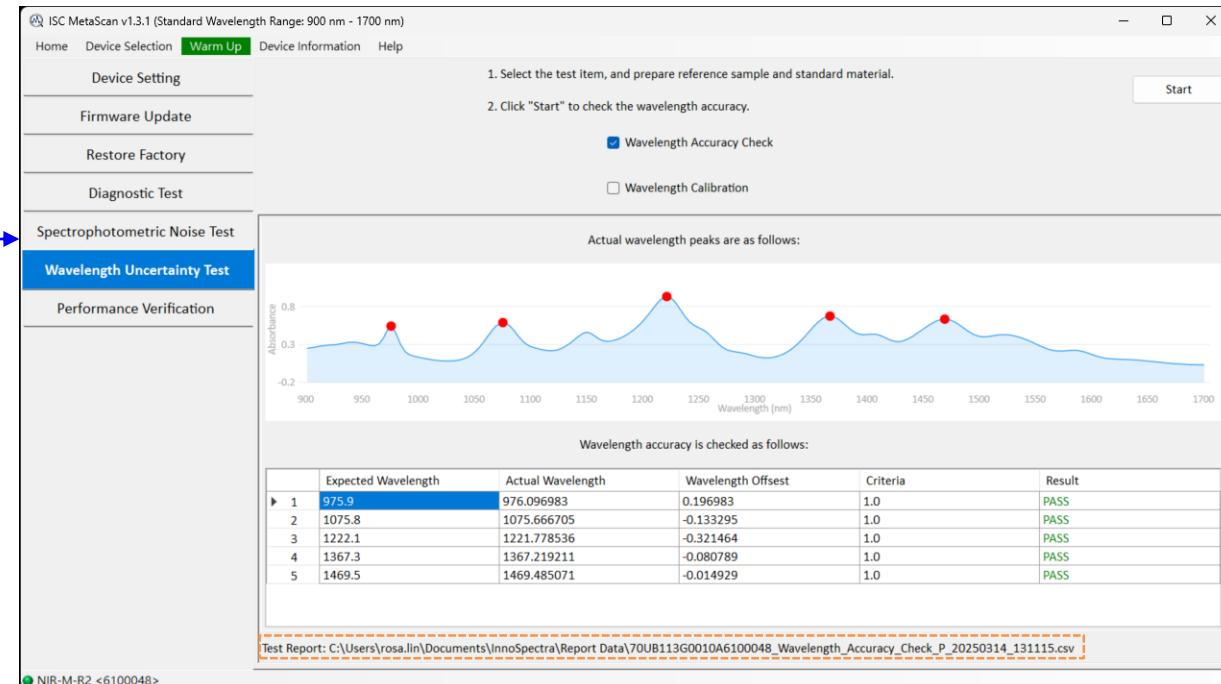
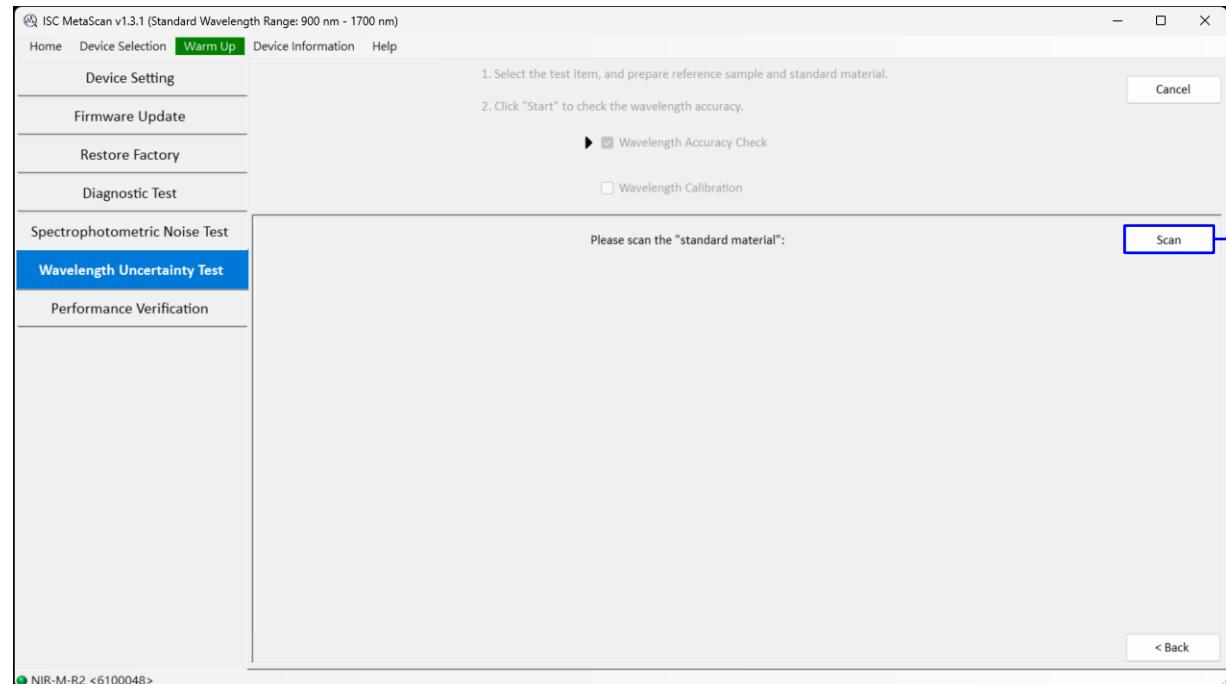
Wavelength Accuracy Check (Cont.)



Wavelength Accuracy Check (Cont.)



4. After the test is completed, the results will be displayed and a test report will be stored.



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Wavelength Calibration



1. The "Wavelength Accuracy Check" function must be completed before performing this test.
2. Before scanning, the system will confirm that the temperature is within the preset range. If it exceeds the range, the system will warm up or cool down.
3. Follow the instructions to start the test.

ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)

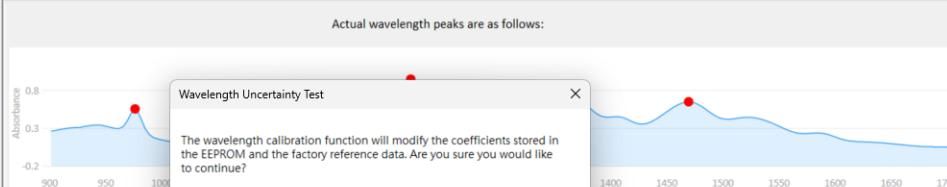
Home Device Selection **Warm Up** Device Information Help

Device Setting
Firmware Update
Restore Factory
Diagnostic Test
Spectrophotometric Noise Test
Wavelength Uncertainty Test
Performance Verification

1. Select the test item, and prepare reference sample and standard material.
2. Click "Start" to check the wavelength accuracy.

► Wavelength Accuracy Check
 Wavelength Calibration

Actual wavelength peaks are as follows:



The wavelength calibration function will modify the coefficients stored in the EEPROM and the factory reference data. Are you sure you would like to continue?

確定

	Expected Wavelength	Actual Wavelength	Wavelength Offset	Criteria	Result
1	975.9	976.050341	0.150341	1.0	PASS
2	1075.8	1075.692187	-0.107813	1.0	PASS
3	1222.1	1221.767326	-0.332674	1.0	PASS
4	1367.3	1367.209345	-0.090655	1.0	PASS
5	1469.5	1469.425328	-0.074672	1.0	PASS

Test Report: C:\Users\rosa.lin\Documents\InnoSpectra\Report Data\70UB113G0010A6100048_Wavelength_Accuracy_Check_P_20250314_131653.csv

NIR-M-R2 <6100048>

ISC MetaScan v1.3.1 (Standard Wavelength Range: 900 nm - 1700 nm)

Home Device Selection **Warm Up** Device Information Help

Device Setting
Firmware Update
Restore Factory
Diagnostic Test
Spectrophotometric Noise Test
Wavelength Uncertainty Test
Performance Verification

1. Select the test item, and prepare reference sample and standard material.
2. Click "Start" to check the wavelength accuracy.

Wavelength Accuracy Check
 Wavelength Calibration

Please determine the scan data which you would use:

Absorbance Intensity

Please select the way to enter the expected wavelengths:

Select the default standard material and expected peaks

Scan the standard material and select expected peaks in the plot

Enter the number and value of the expected wavelengths

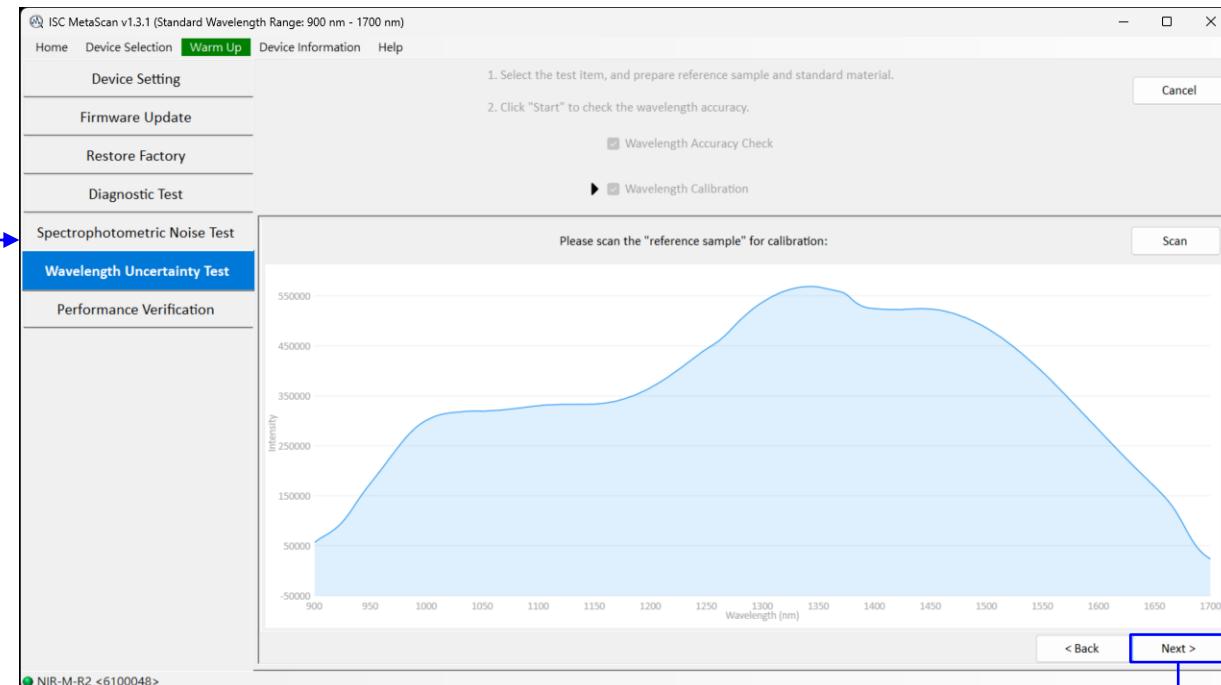
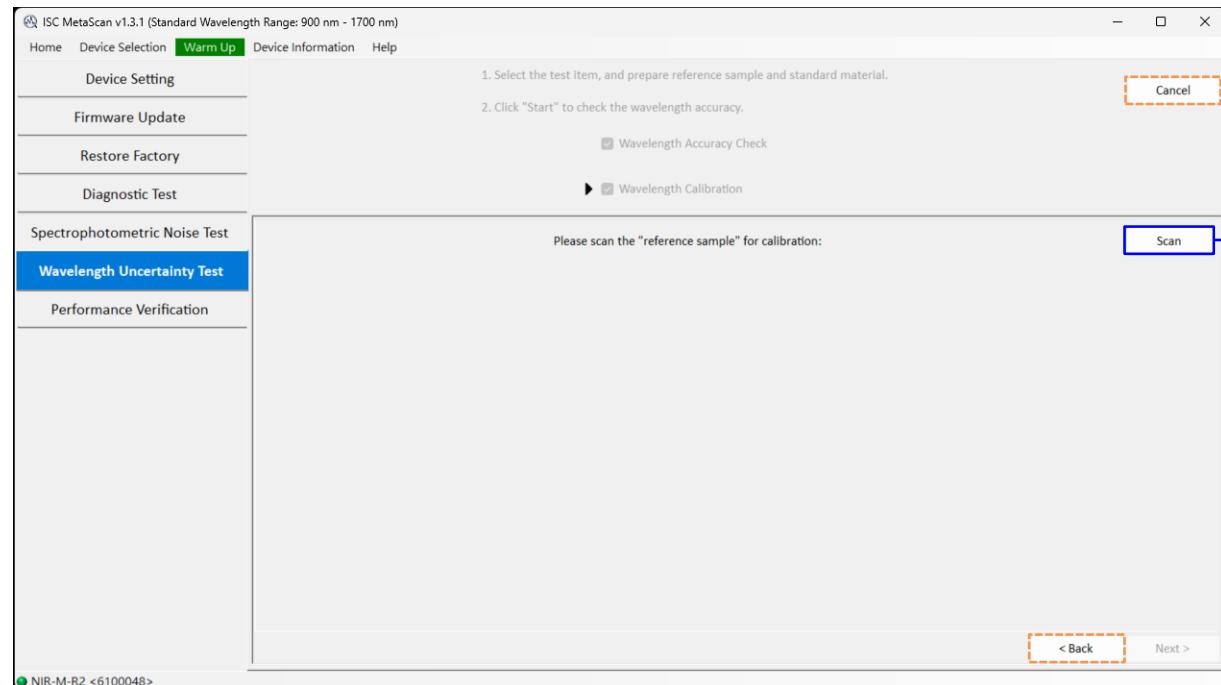
	Wavelength
1	975.9
2	1075.8
3	1222.1
4	1367.3
5	1469.5

NIR-M-R2 <6100048>

Next >

Wavelength Calibration (Cont.)

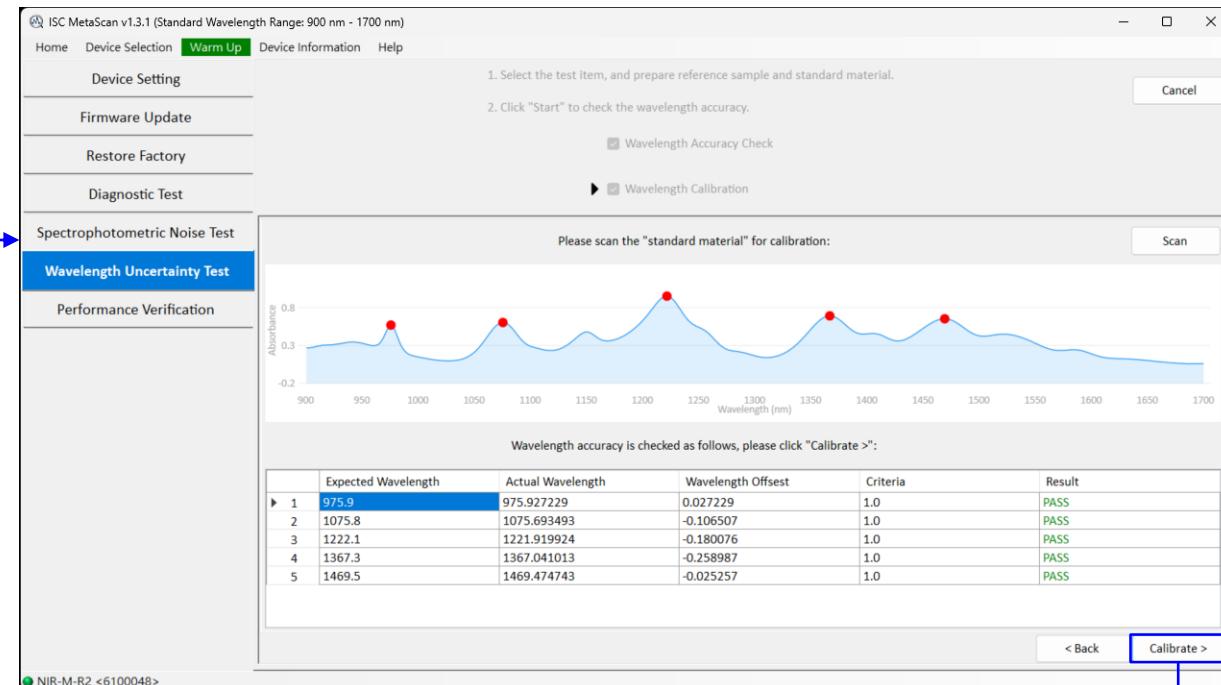
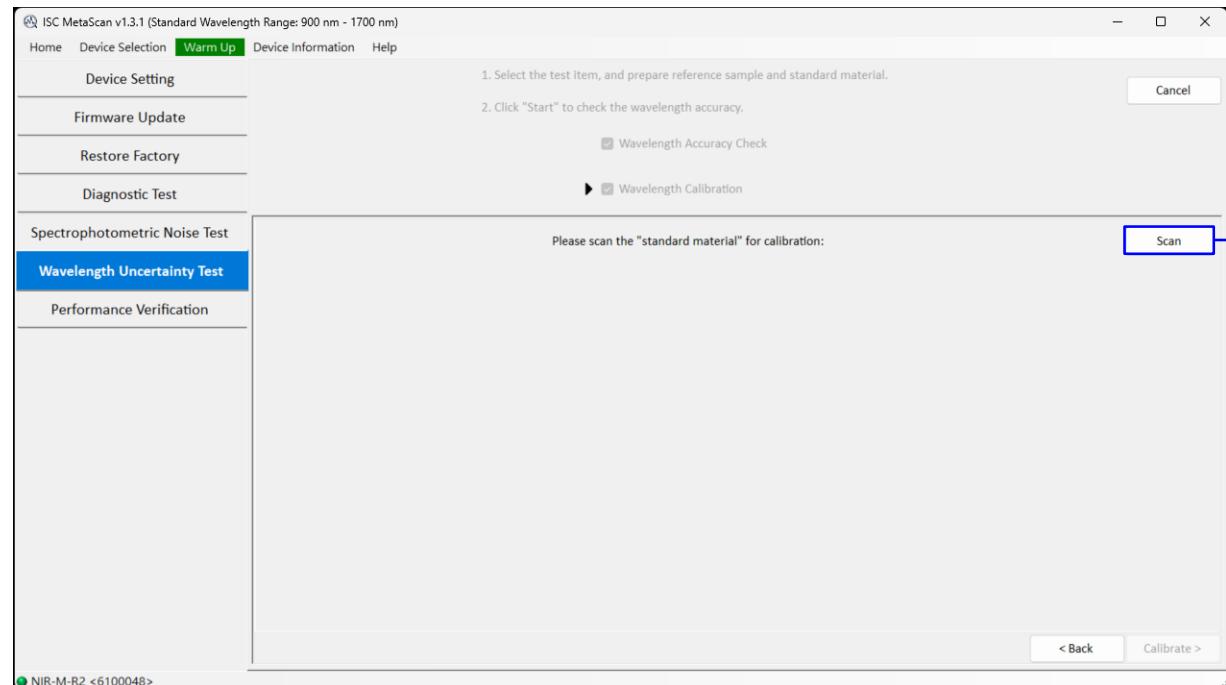
- You can click "Cancel" at any time during the process.
- You can click "Back" to re-execute the previous step during the process.



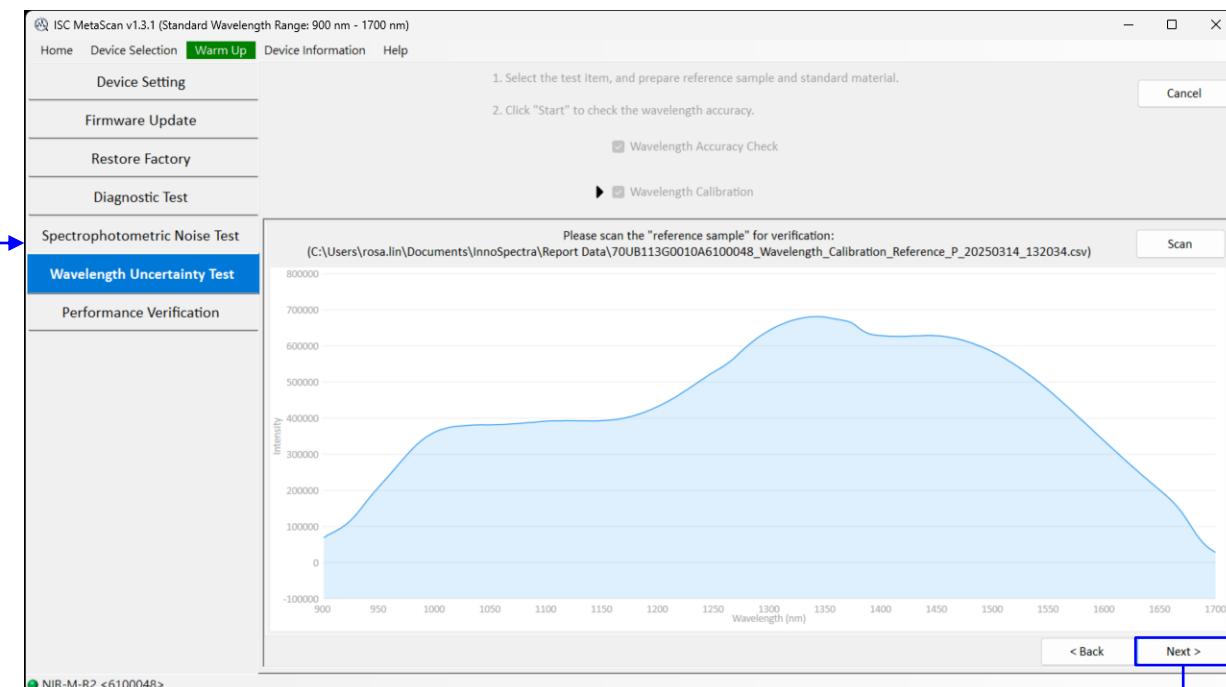
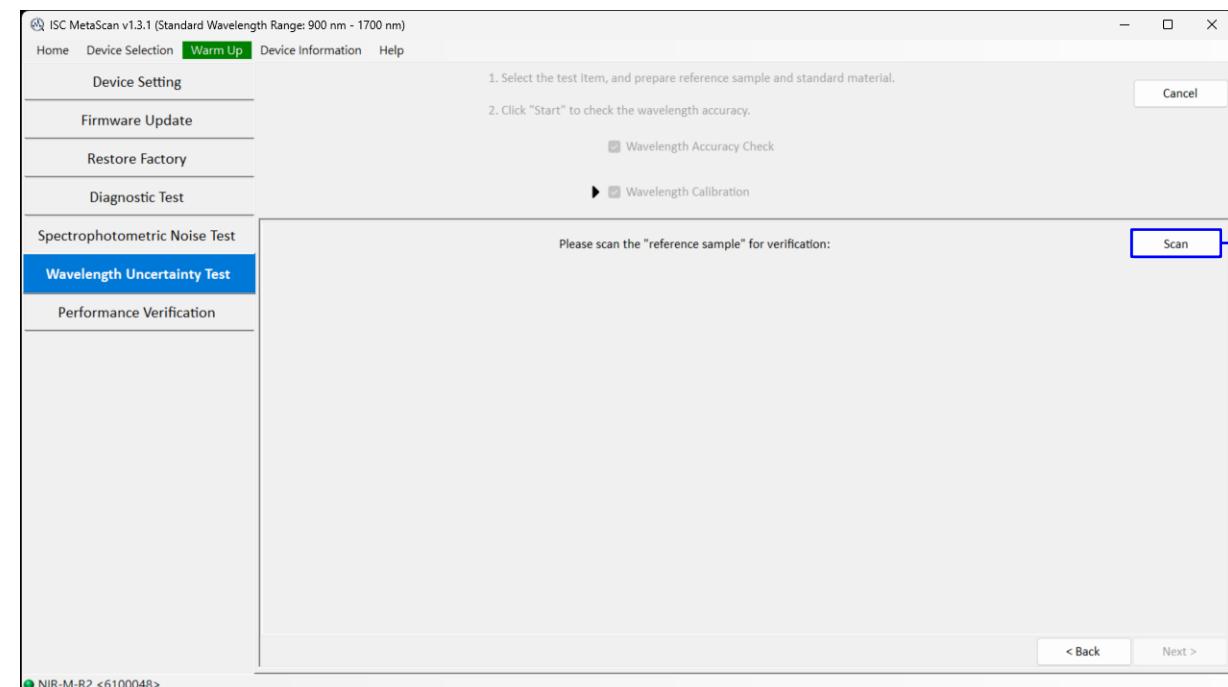
Wavelength Calibration (Cont.)



4. If you want to calibrate, please click "Calibrate".

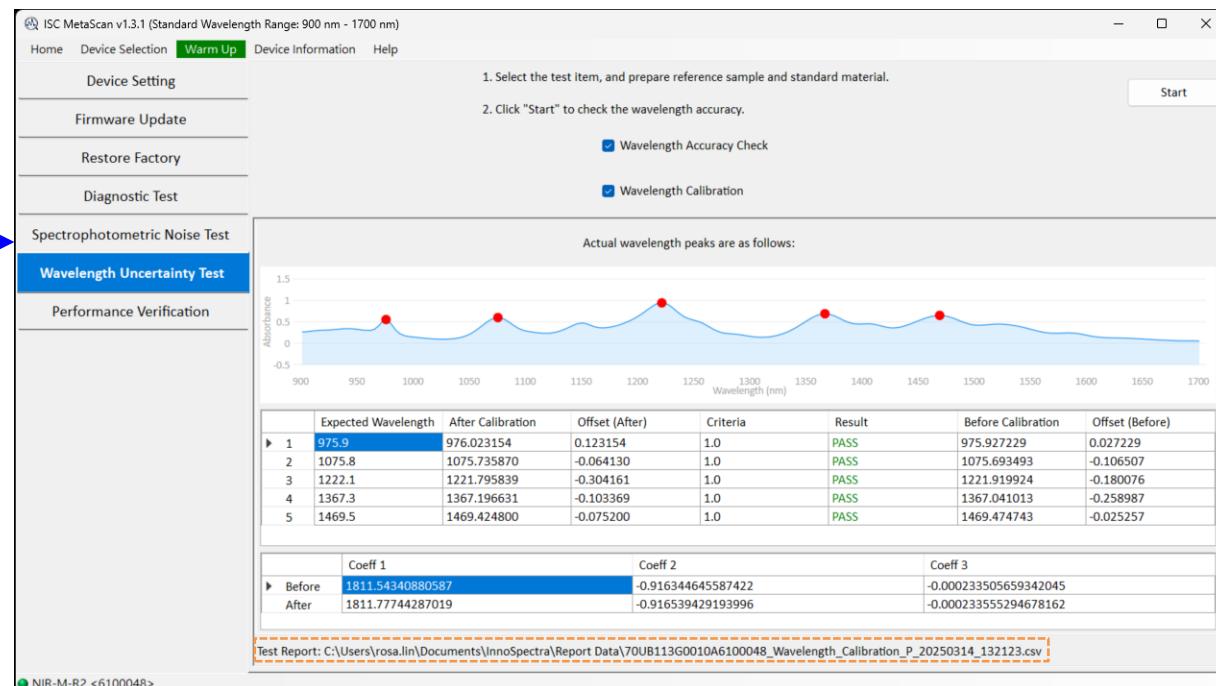
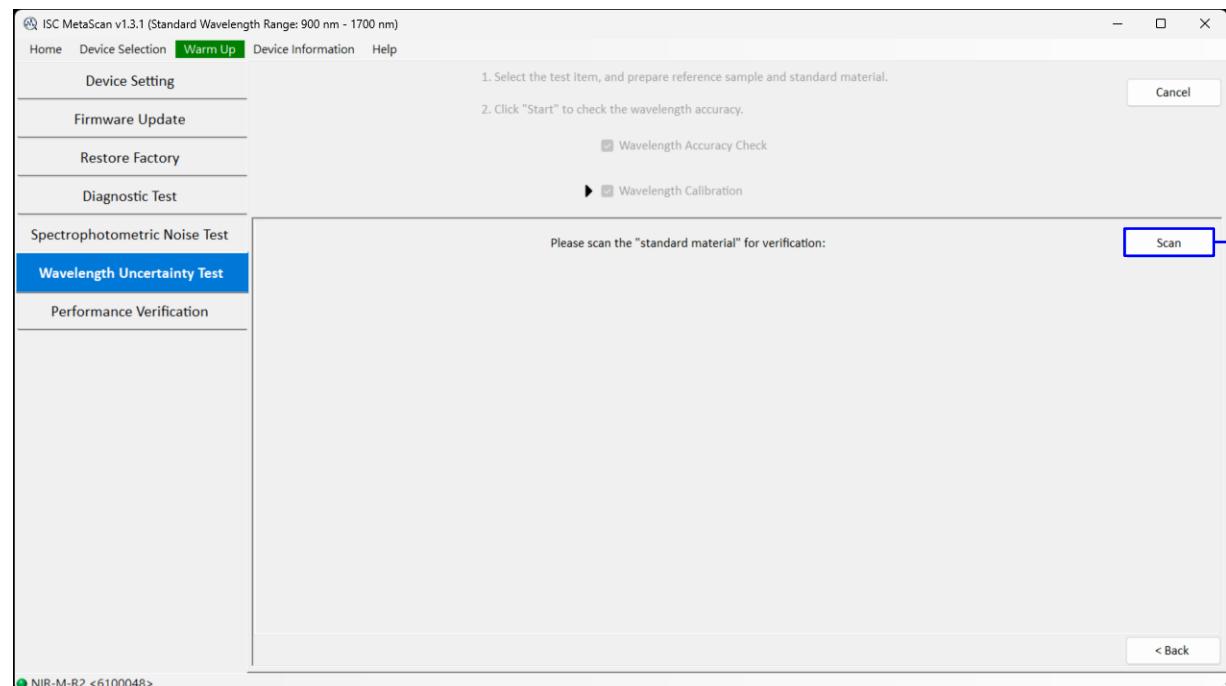


Wavelength Calibration (Cont.)



Wavelength Calibration (Cont.)

5. After the test is completed, the results will be displayed and a test report will be stored.

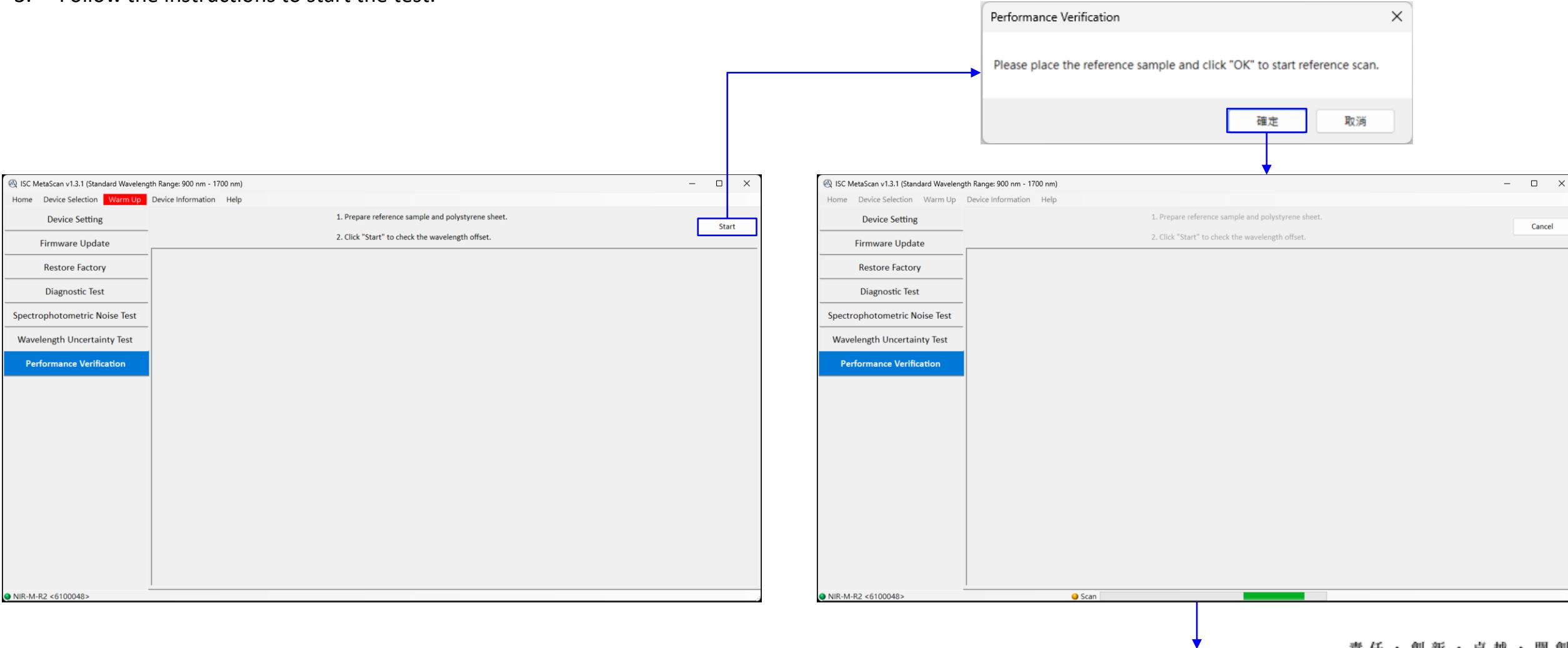


Performance Verification

Performance Verification



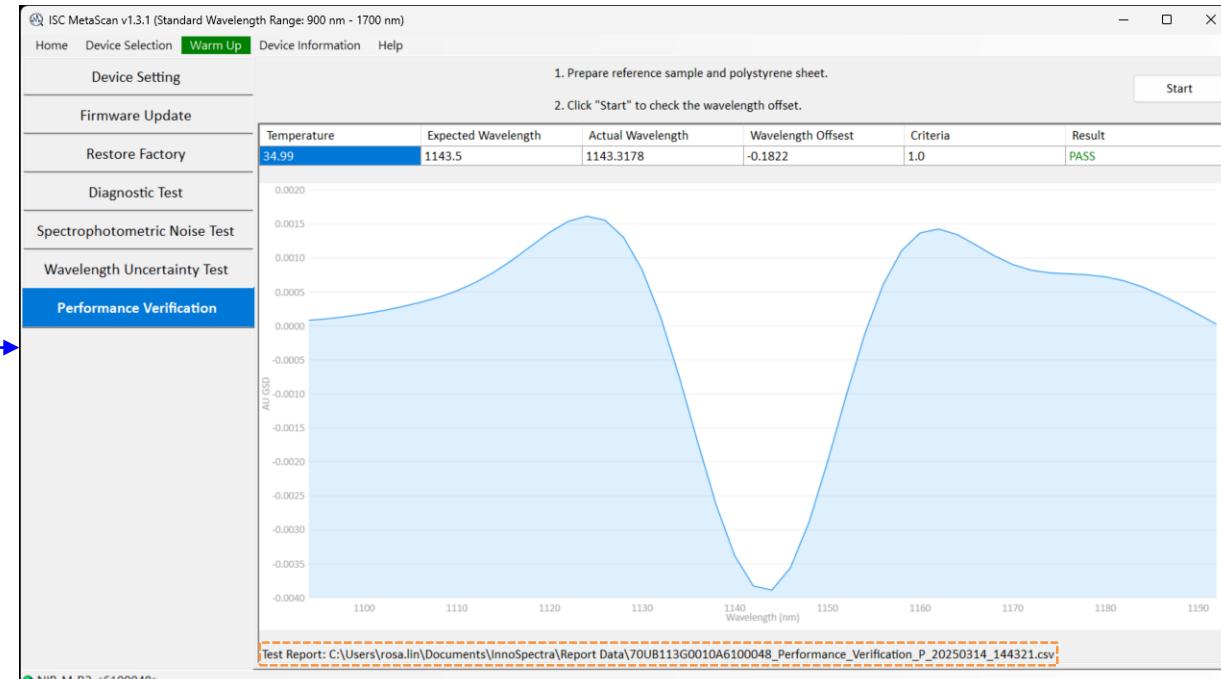
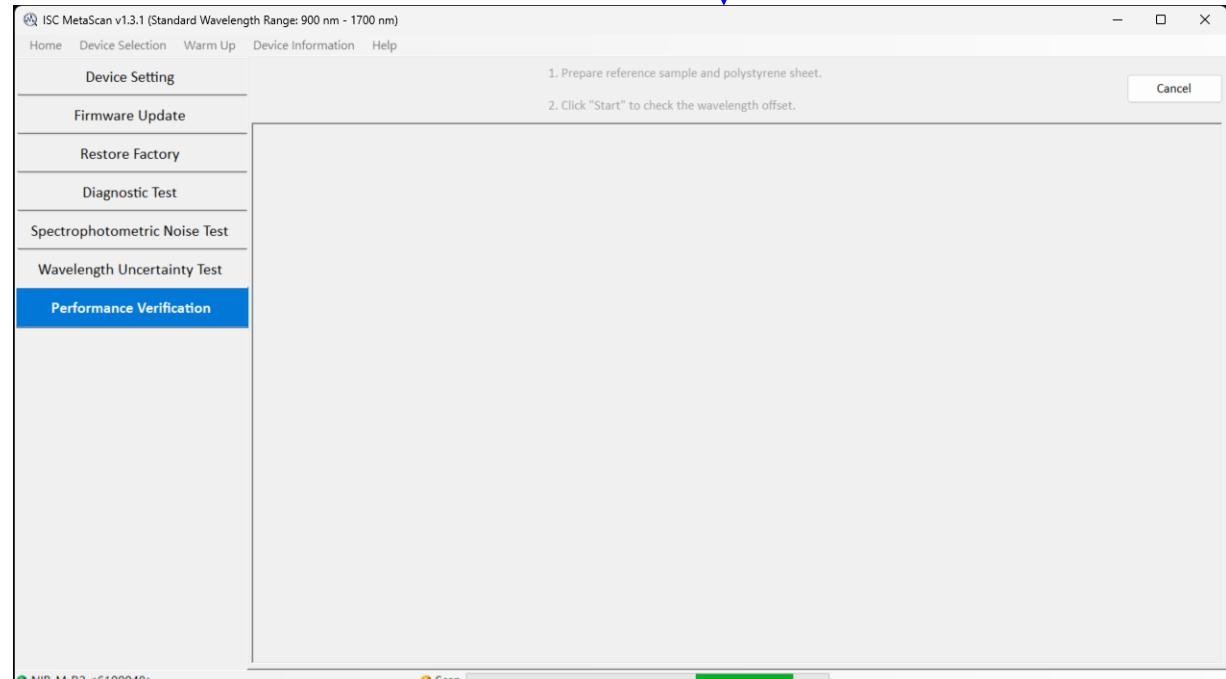
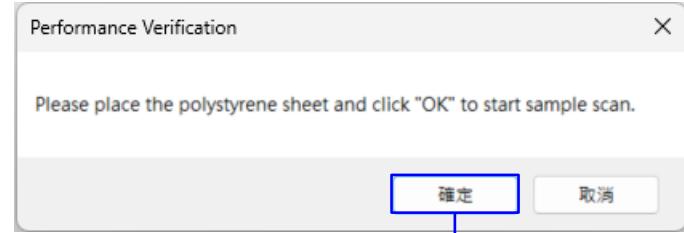
1. Before testing, please prepare reference sample and polystyrene sheet.
2. Before scanning, the system will confirm that the temperature is within the preset range. If it exceeds the range, the system will warm up or cool down.
3. Follow the instructions to start the test.



Performance Verification (Cont.)



- After the test is completed, the results will be displayed and a test report will be stored.



Thank You

