



Quick Start Guide for NIR-M-R11

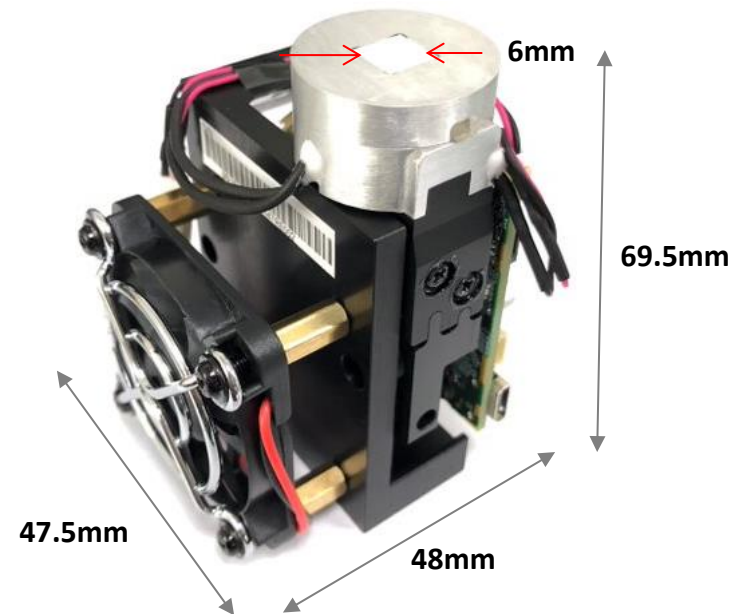
2022.3.15



Responsibility Innovation Superiority Entrepreneurship

Specification

- Wavelength range: 1350~2150nm
- Wavelength resolution : $\Delta\lambda / \lambda < 0.01$, typ. 12nm @ 1530nm LD
- Wavelength accuracy: $\leq \pm 1$ nm
- SNR $\geq 5000:1$ in 1s scan
- Detector: $\phi 1$ mm extended InGaAs
- Slit width: 25 μ m
- 3 tungsten filament lamp (0.7W*3)
- Scan mode: Linear / Hadamard (default) / Slew
- Scan window: $\phi 6$ mm with square cover glass
- Fan : 40x40x6.5mm; 5V /6000RPM / 0.15m³/min.
- Power requirement: 5V DC. Max. 1.2A DC. (high-power USB hub is preferred)
- USB cable: ISC's accessory is preferred.
- Weight : 120g
- Dimension : 47.5*69.5*48mm



Perform a scan job

- Please set up scan configuration, for example, **Hadamard 2 (default)**.

Scan Setting | Scan Config | Saved Scans

Device Default Configuration:
Hadamard 2

Local configurations

Copy >>

Copy <<

Move >>

Move <<

Device configurations

Hadamard 2

Set Device Default Config

Details

Name: Num Scans to Avg.:

Num Sections: 1 2 3 4 5

Scan Type:

Spectral Range Start:

Spectral Range End:

Width (nm):

Exposure Time (ms):

Dig. Resolution:

Max Resolution:

Pattern Used:

Total Pattern Used:

New

Edit

Delete

Save

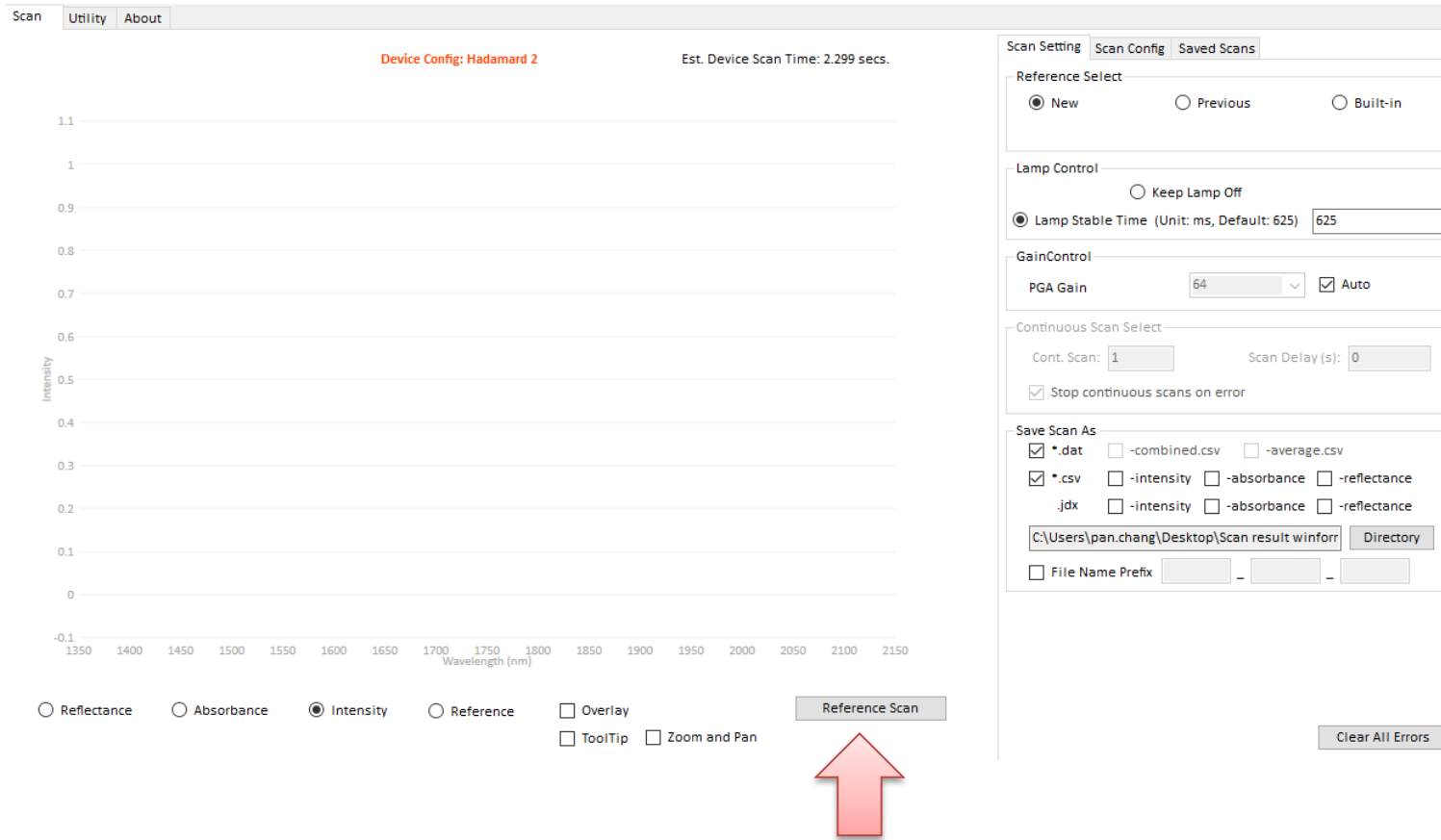
Cancel

Perform a scan job

- Please scan an **SRS99** to capture a reference signal.

Scan Utility About

Device Config: Hadamard 2 Est. Device Scan Time: 2.299 secs.



Intensity

Wavelength (nm)

Reflectance Absorbance Intensity Reference

Overlay ToolTip Zoom and Pan

Reference Scan

Clear All Errors

Scan Setting Scan Config Saved Scans

Reference Select

New Previous Built-in

Lamp Control

Keep Lamp Off

Lamp Stable Time (Unit: ms, Default: 625) 625

GainControl

PGA Gain 64 Auto

Continuous Scan Select

Cont. Scan: 1 Scan Delay (s): 0

Stop continuous scans on error

Save Scan As

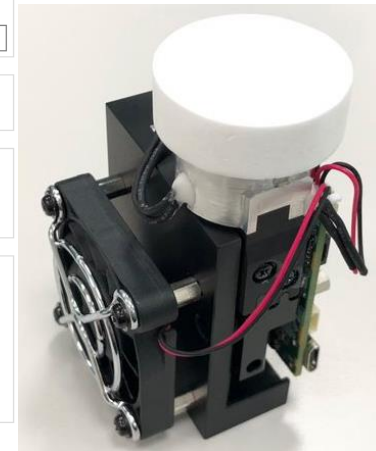
*.dat -combined.csv -average.csv

*.csv -intensity -absorbance -reflectance

.jdx -intensity -absorbance -reflectance

C:\Users\pan.chang\Desktop\Scan result winfor Directory

File Name Prefix - -

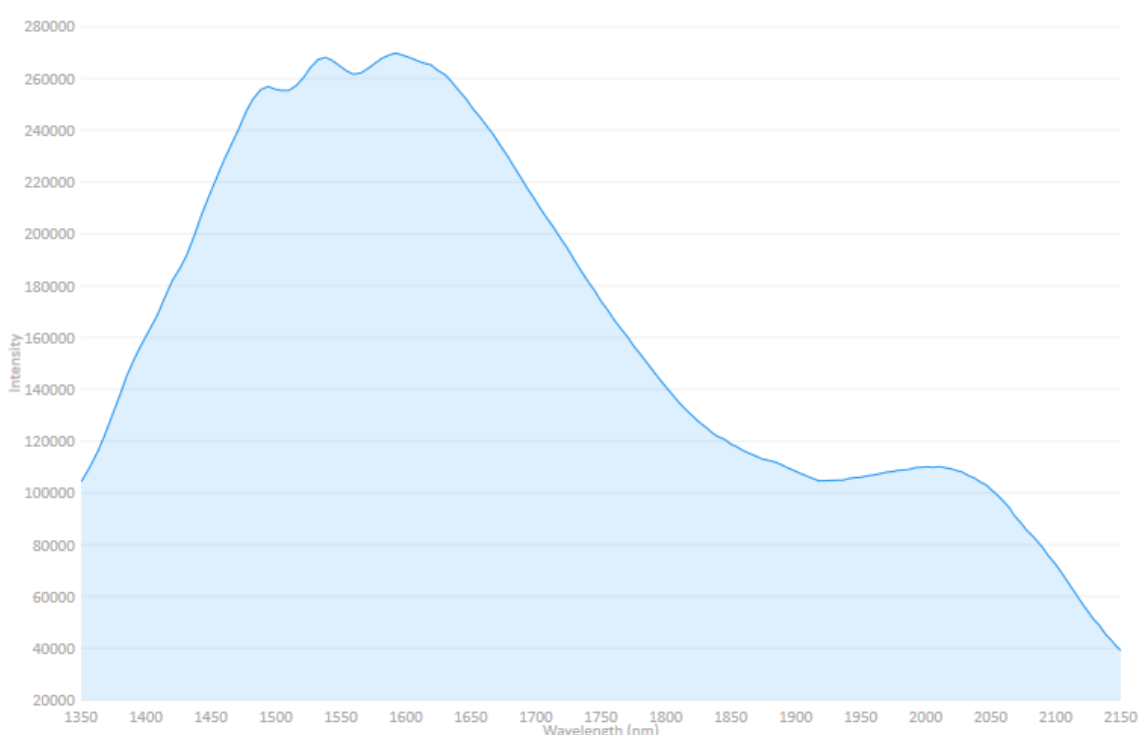


Perform a scan job

- A reference signal is captured and displayed as below. In this case, we select **Auto PGA**, the software determines PGA=4 for this SRS99 in “Hadamard 2” configuration.

Scan Utility About

Total Scan Time: 4.344 secs. Device Config: Hadamard 2 Est. Device Scan Time: 2.299 secs.



Intensity

Wavelength (nm)

Reflectance
 Absorbance
 Intensity
 Reference
 Overlay
 ToolTip
 Zoom and Pan

Scan

Scan Setting Scan Config Saved Scans

Reference Select

New
 Previous
 Built-in

Previous reference last set on : 2021/7/29 @ 16:30:25

Lamp Control

Keep Lamp Off
 Lamp Stable Time (Unit: ms, Default: 625)

GainControl

PGA Gain Auto

Continuous Scan Select

Cont. Scan: (1/1) Scan Delay (s):

Stop continuous scans on error

Save Scan As

*.dat
 -combined.csv
 -average.csv
 *.csv
 -intensity
 -absorbance
 -reflectance
 .jdx
 -intensity
 -absorbance
 -reflectance

File Name Prefix - -

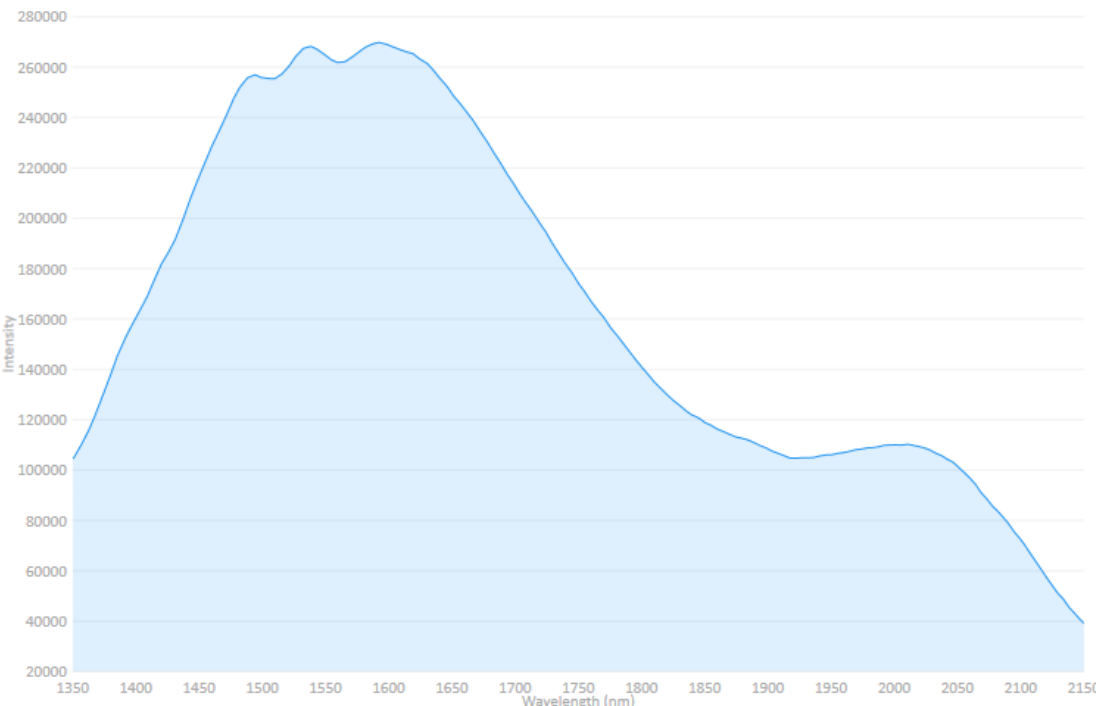
Clear All Errors

Perform a scan job

- To perform a sample signal scan, you can disable “Auto PGA” and **fix the PGA to 4**. This will ensure both sample and reference signals with **same PGA gain**.

Scan Utility About

Total Scan Time: 4.157 secs. Device Config: Hadamard 2 Est. Device Scan Time: 2.299 secs.



Intensity

Wavelength (nm)

Reflectance
 Absorbance
 Intensity
 Reference
 Overlay
 ToolTip
 Zoom and Pan

Scan

Scan Setting Scan Config Saved Scans

Reference Select

New
 Previous
 Built-in

Previous reference last set on : 2021/7/29 @ 16:30:25

Lamp Control

Keep Lamp Off
 Lamp Stable Time (Unit: ms, Default: 625)

GainControl

PGA Gain Auto

Continuous Scan Select

Cont. Scan: (1/1) Scan Delay (s):

Stop continuous scans on error

Save Scan As

*.dat
 -combined.csv
 -average.csv
 *.csv
 -intensity
 -absorbance
 -reflectance
 .jdx
 -intensity
 -absorbance
 -reflectance

C:\Users\pan.chang\Desktop\Scan result winform Directory

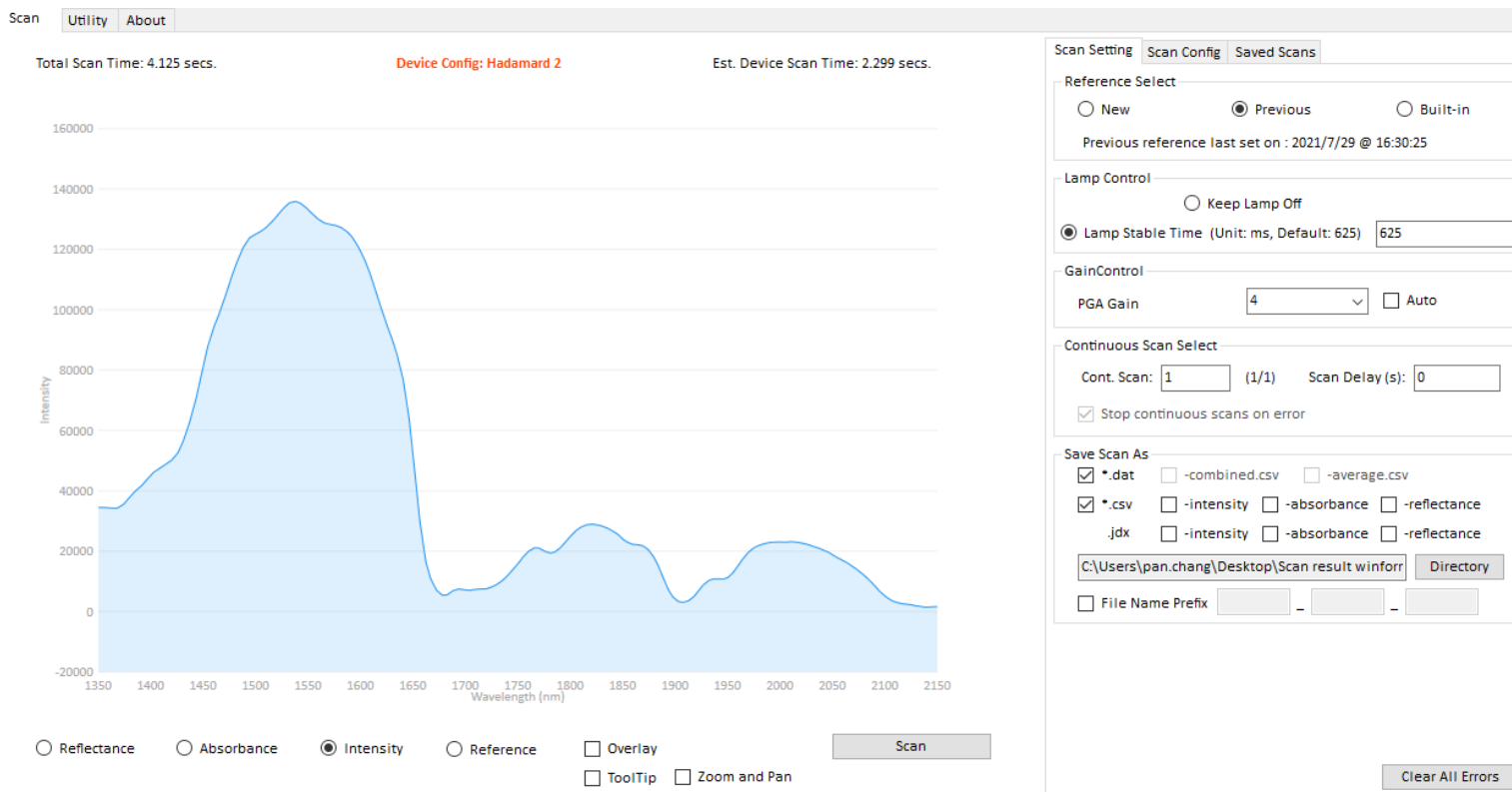
File Name Prefix - -

Clear All Errors

Responsibility Innovation Superiority Entrepreneurship

Perform a scan job

- The sample signal is captured and displayed as follows.



Scan Setting Scan Config Saved Scans

Reference Select

New
 Previous
 Built-in
 Previous reference last set on : 2021/7/29 @ 16:30:25

Lamp Control

Keep Lamp Off
 Lamp Stable Time (Unit: ms, Default: 625)

GainControl

PGA Gain Auto

Continuous Scan Select

Cont. Scan: (1/1) Scan Delay (s):

Stop continuous scans on error

Save Scan As

*.dat
 -combined.csv
 -average.csv
 *.csv
 -intensity
 -absorbance
 -reflectance
 .jdx
 -intensity
 -absorbance
 -reflectance

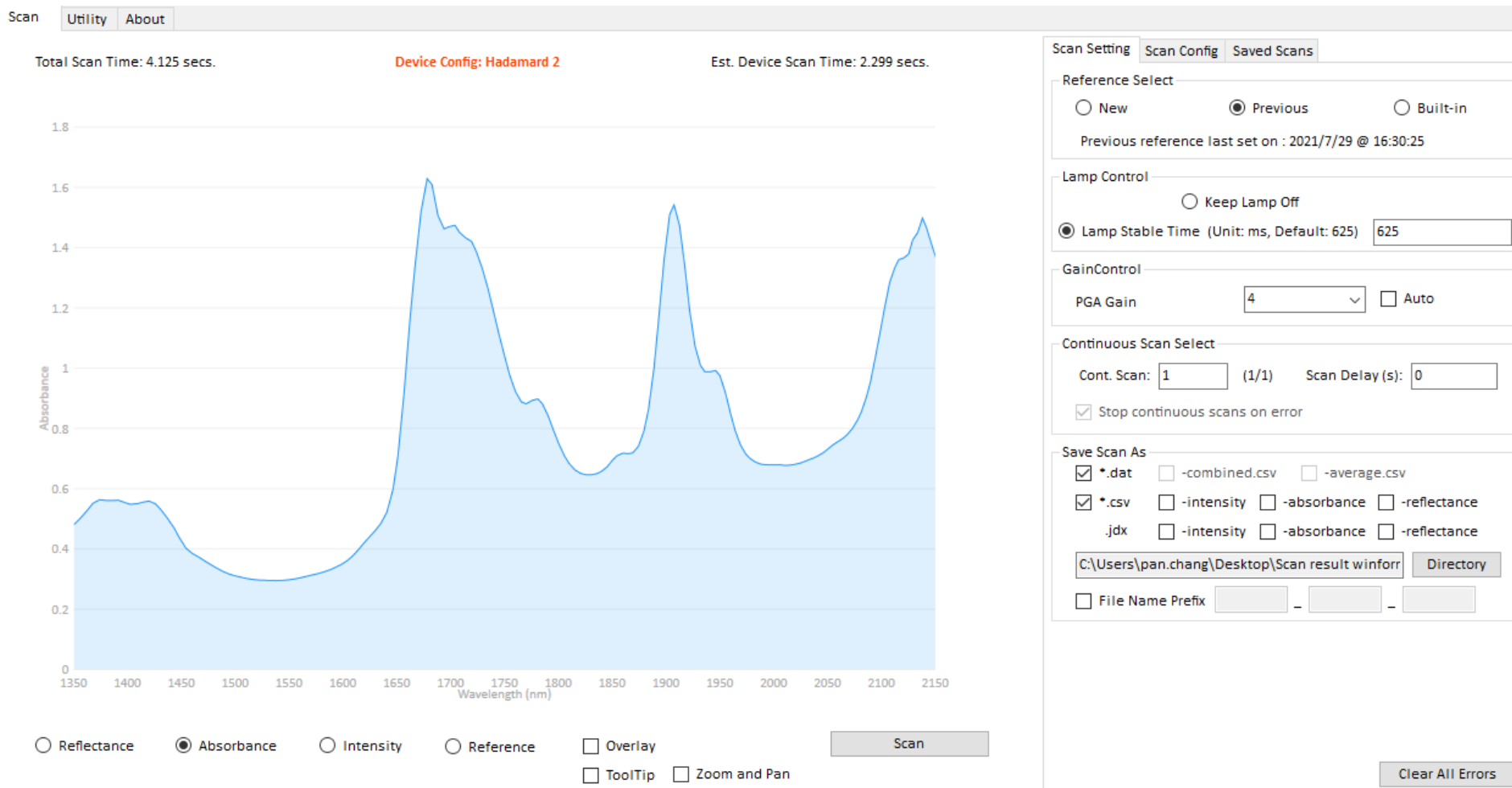
C:\Users\pan.chang\Desktop\Scan result winforr

File Name Prefix - -



Perform a scan job

- The absorbance of this sample can be observed as below.



Continuous Scan

- If you plan to perform continuous scans without moving or changing the sample, remember to set the "scan delay" (for example, 4s or longer). By increasing the delay time, the sample can be prevented from heating for a long time. This can help you to get correct spectrum and better SNR.

Scan Setting | Scan Config | Saved Scans

Reference Select

New Previous Built-in

Previous reference last set on : 2021/7/29 @ 16:30:25

Lamp Control

Keep Lamp Off

Lamp Stable Time (Unit: ms, Default: 625)

GainControl

PGA Gain Auto

Continuous Scan Select

Cont. Scan: (1/1) Scan Delay (s):

Stop continuous scans on error

Save Scan As

*.dat -combined.csv -average.csv

*.csv -intensity -absorbance -reflectance

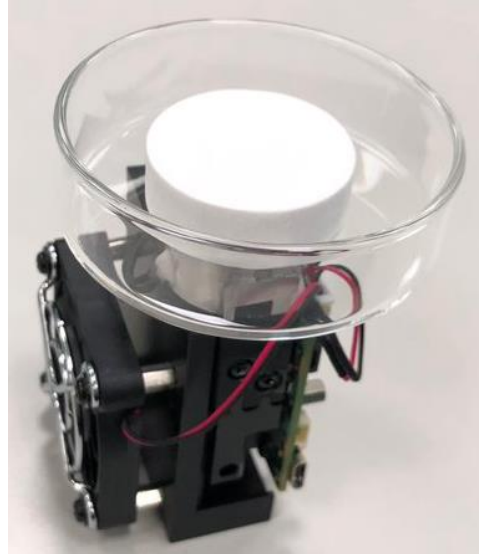
.jdx -intensity -absorbance -reflectance

File Name Prefix - -

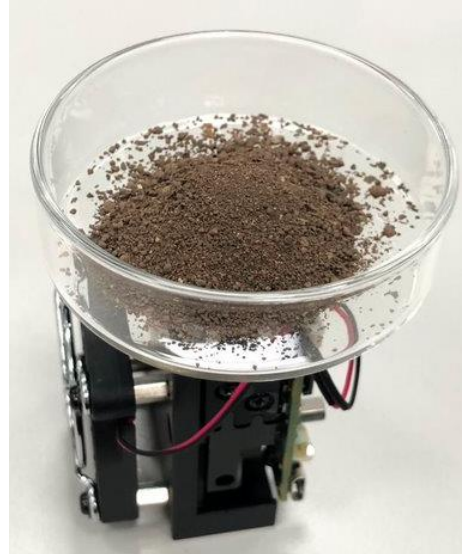


Example: Soil scan test

- To perform a soil scan, you can create a **New** configuration (ex. Soil scan) and double click the name of new configuration to activate it.
- You can put the soil into the Petri dish to perform a scan.



Reference scan



Sample scan

Scan Setting | Scan Config | Saved Scans

Device Default Configuration : Hadamard 2

Soil scan Copy >> Copy << Move >> Move <<

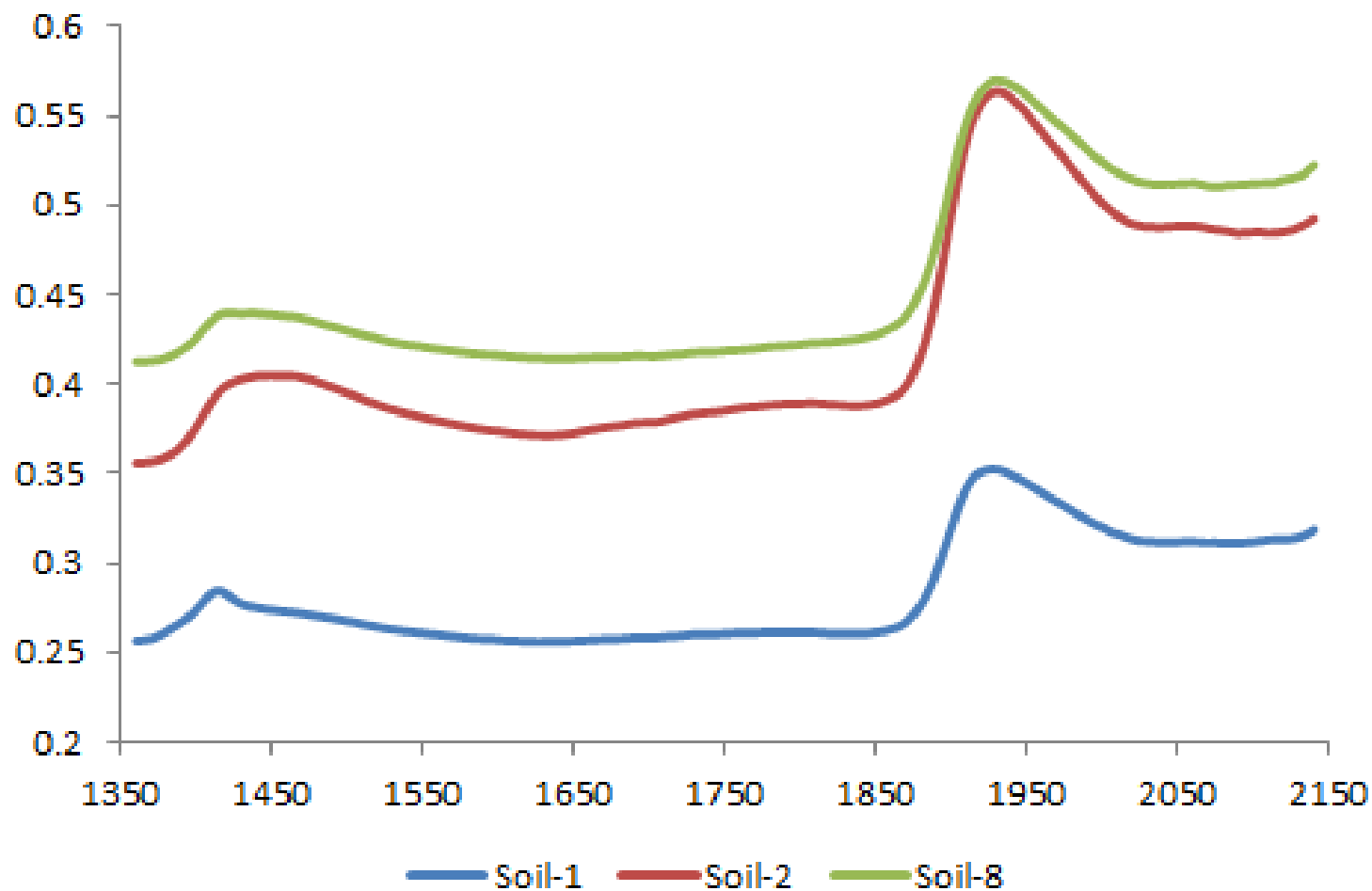
Set Device Default Config

Details

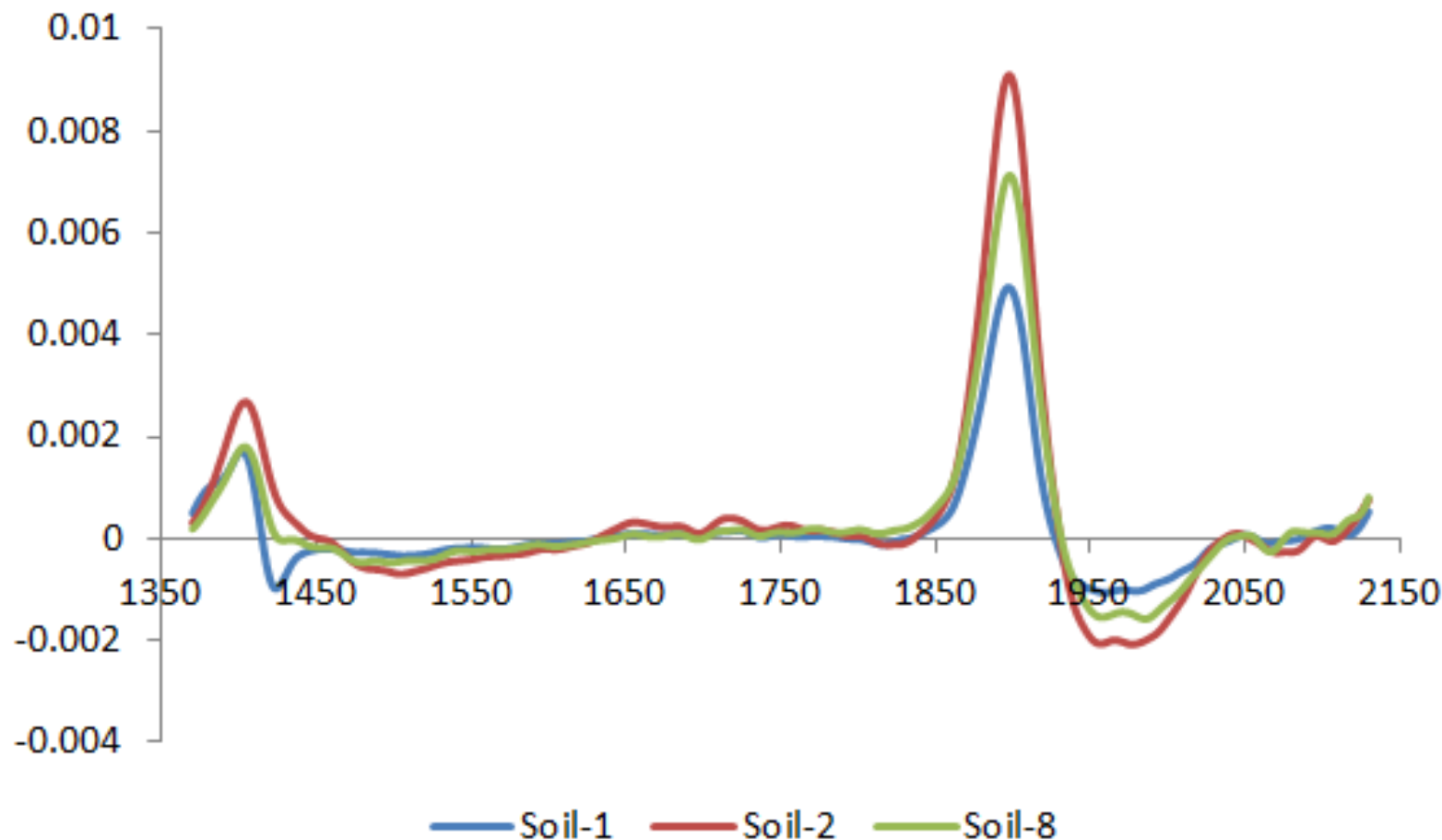
Name	Soil scan	Num Scans to Avg.	20			
Num Sections	1	1	2	3	4	5
Scan Type	Had					
Spectral Range Start	1350					
Spectral Range End	2150					
Width (nm)	10.54					
Exposure Time (ms)	0.635					
Dig. Resolution	240					
Max Resolution	594					
Pattern Used	268					
Total Pattern Used	268					

New Edit Delete Save Cancel

- Scan different soil samples.
- Perform smoothing on the data.



- Perform the first derivative on the data.
- Differences between samples can be observed.



Example: Cheese & Flour scan test



- To perform a scan, you can create a **New** configuration (ex. cheese scan) and double click the name of new configuration to activate it.
- You can put the cheese or flour into the dish to perform a scan.

Local configurations

cheese scan

Copy >>

Copy <<

Move >>

Move <<

Device configurations

Hadamard 2

Set Device Default Config

Details

Name: Num Scans to Avg.:

Num Sections: 1 2 3 4 5

Scan Type:

Spectral Range Start:

Spectral Range End:

Width (nm):

Exposure Time (ms):

Dig. Resolution:

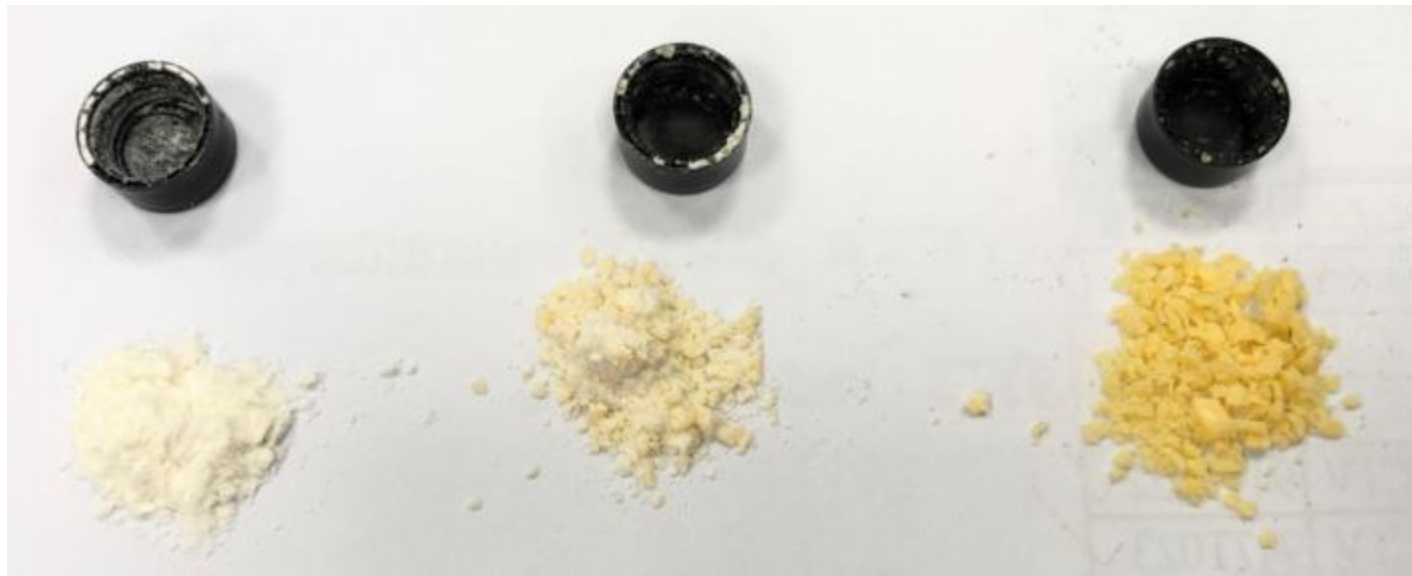
Max Resolution:

Pattern Used:

Total Pattern Used:

Respons

Samples description



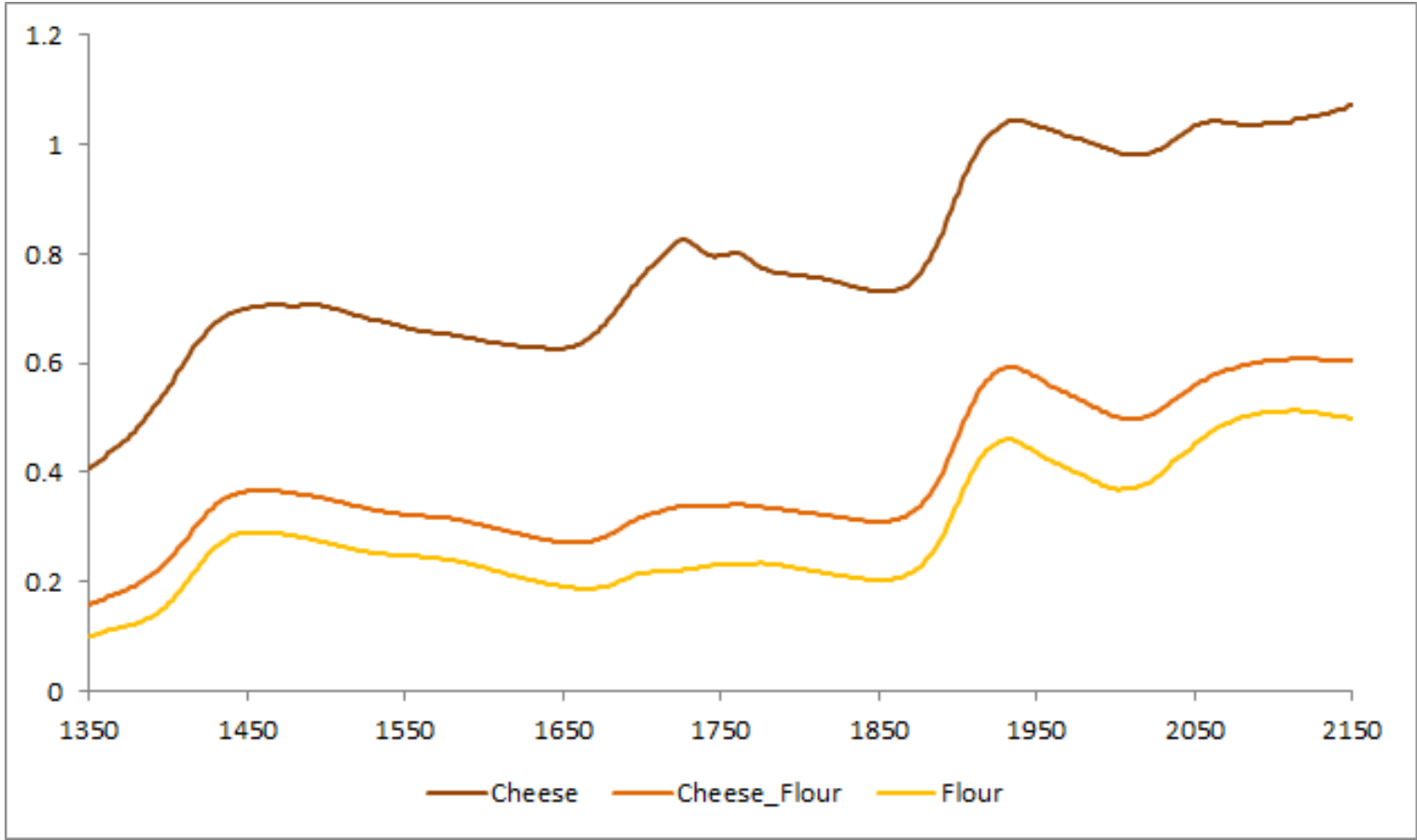
Flour

Cheese / Flour

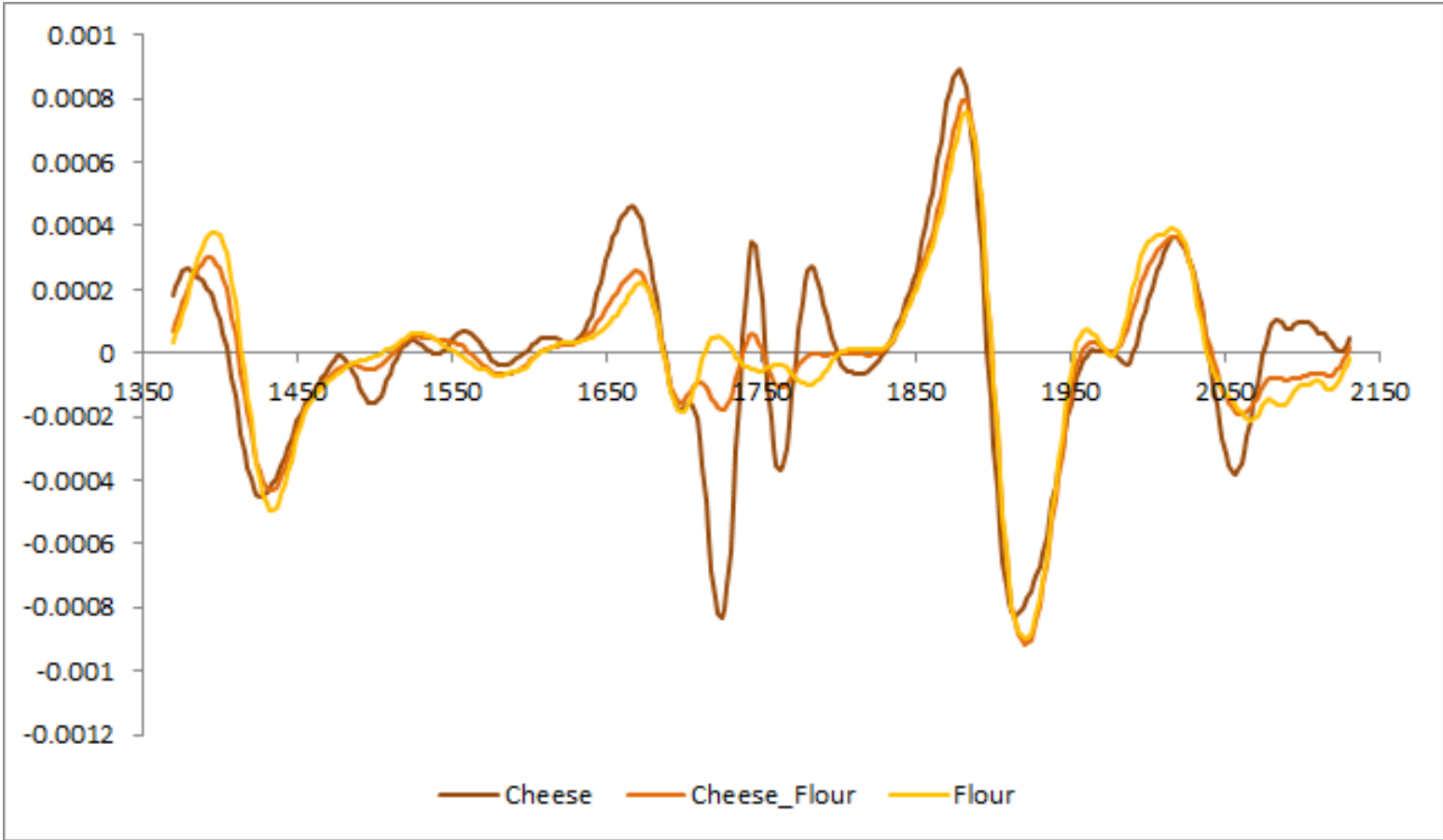
Cheese

Protein%: Flour < Cheese / Flour < Cheese

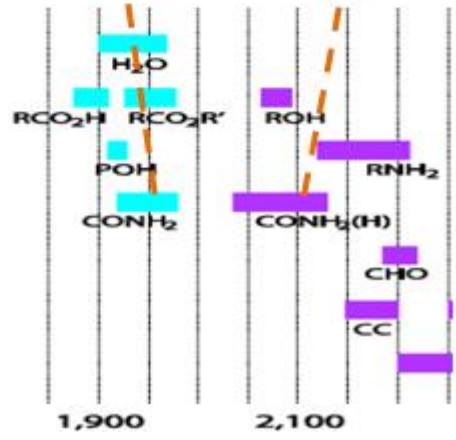
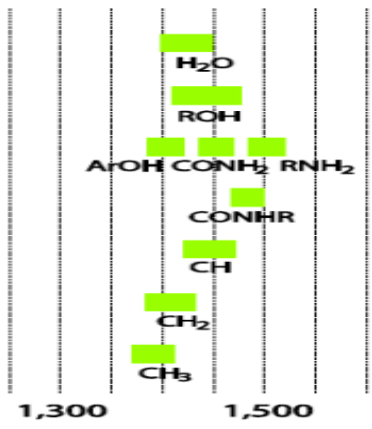
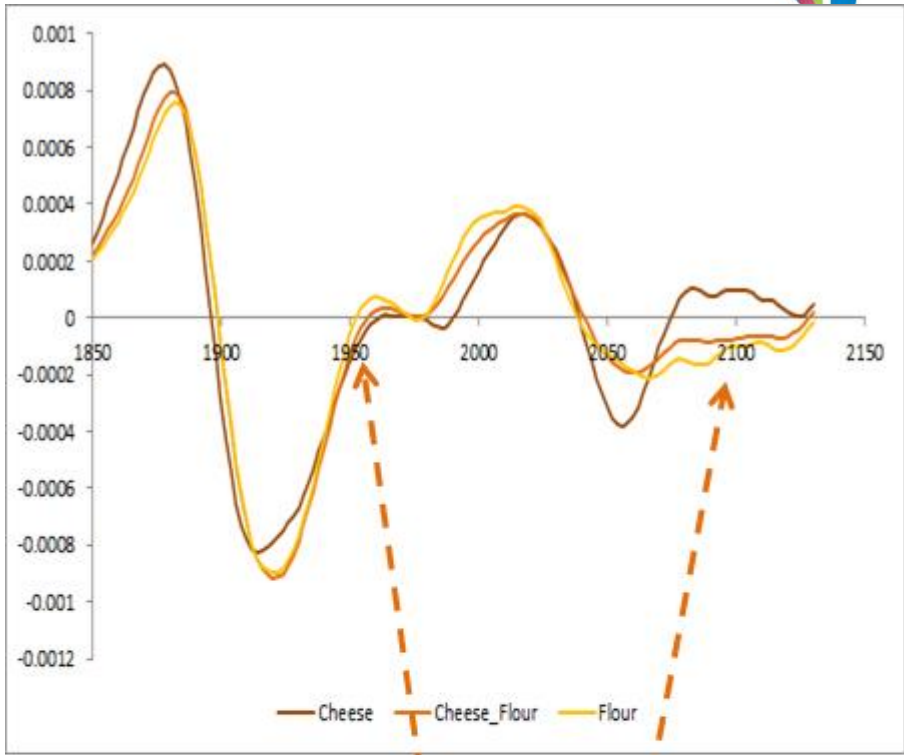
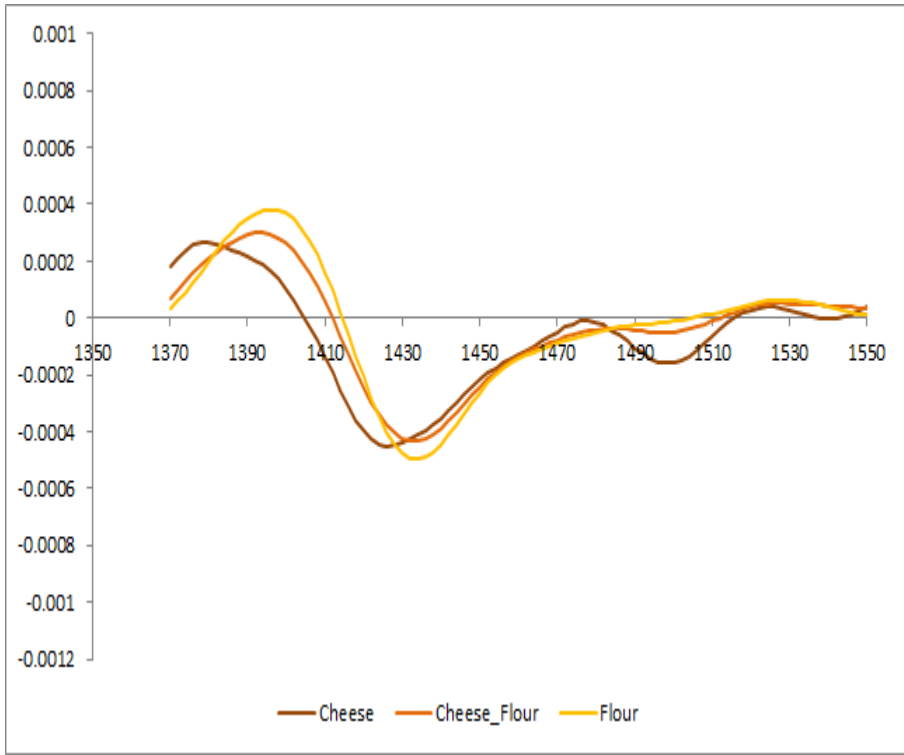
Cubic spline resampling (2nm)



S-G Derivative (2-2-21)

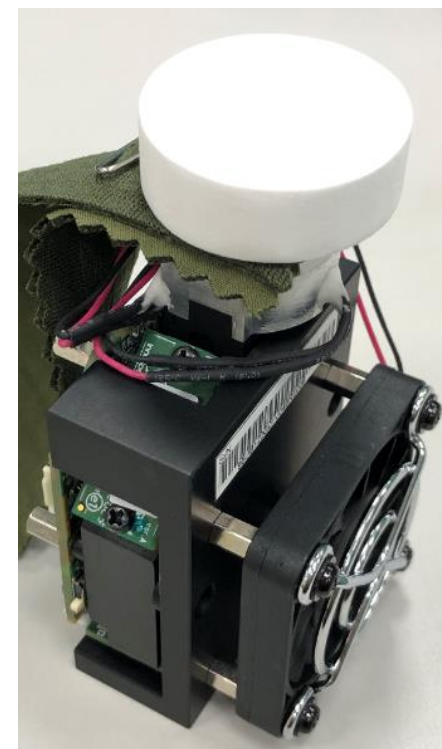


CONH2 & RNH2 Absorption



Example: Blended Fabric scan test

- To perform a scan with default configuration (Hadamard 2).
- You can put a reference white on the top of fabric while sample scan for preventing light leakage.
- Scan and get 6 data for each fabric.

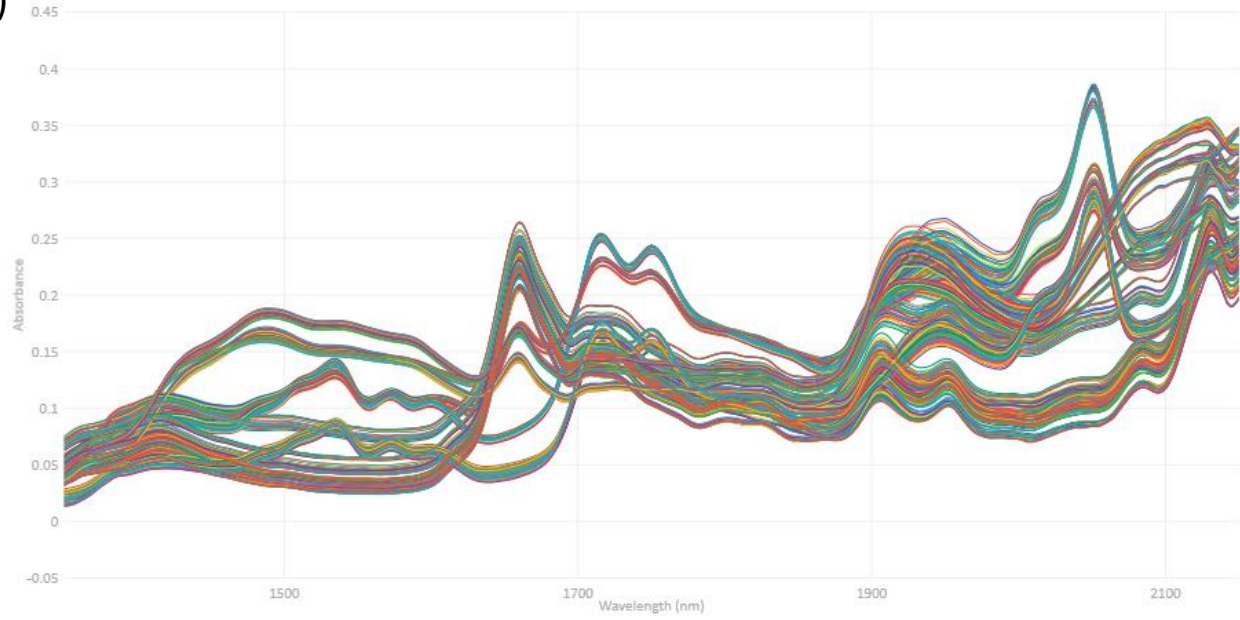


卓越·開創

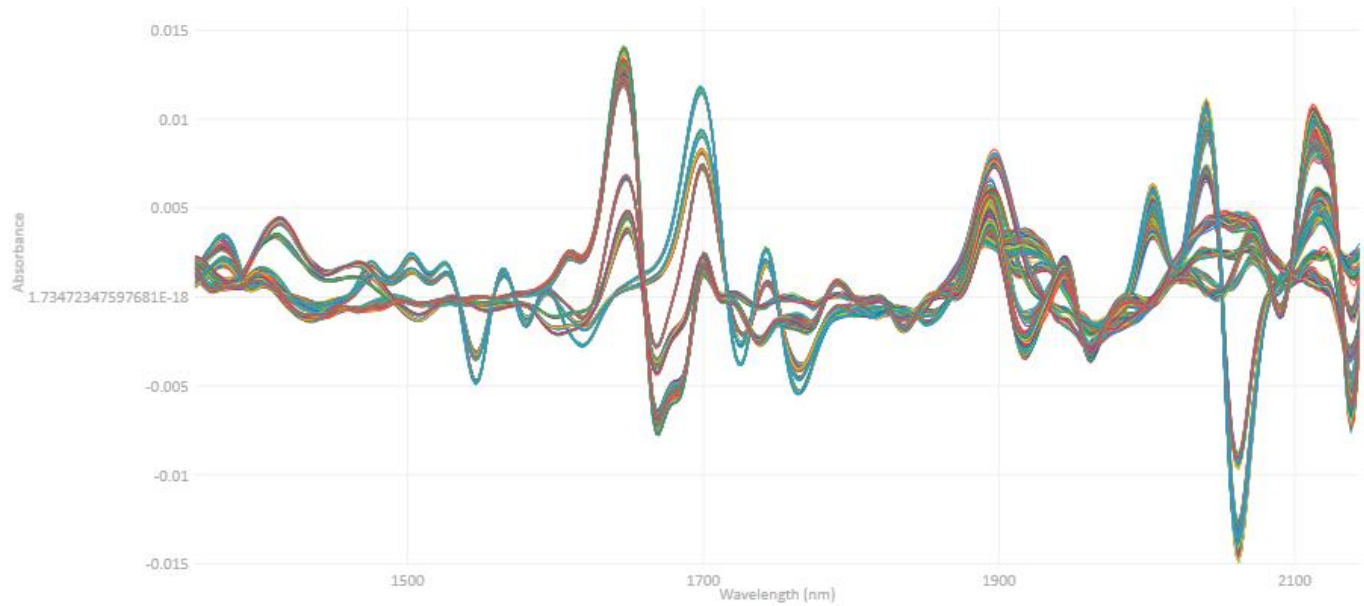
Example: Blended Fabric scan test



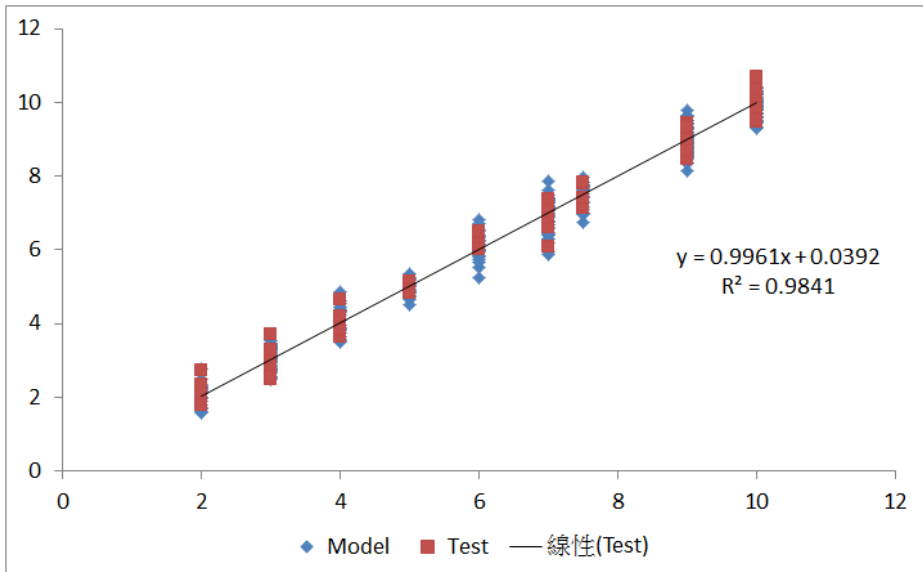
Cubic spline resampling (2nm)



S-G Derivative (1-2-7)



Prediction of Spandex Content in Blended Fabric



Condition:

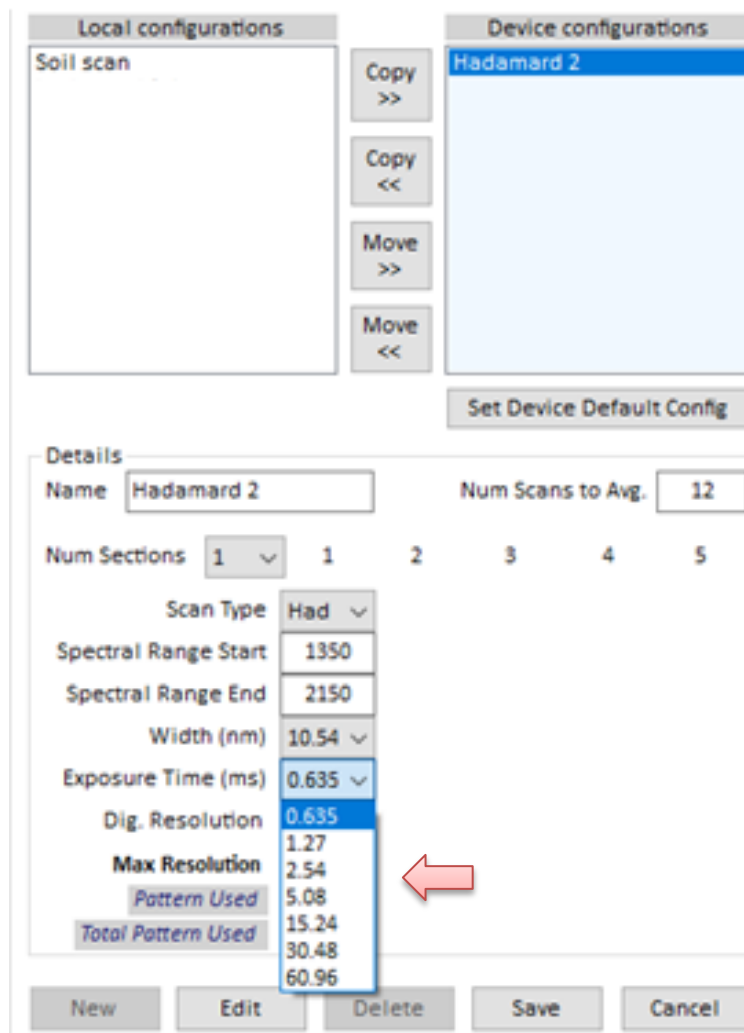
- 5 units NIR-M-R11
- 14 kinds of blended fabrics
- Spandex content : 2-10%

Result :

- $R^2 > 0.98$ with PLSR
- Average of RMSEC & RMSEP $< 0.4\%$

SNR Enhancement

- In Hadamard mode, you can also increase the exposure time to improve SNR.



The screenshot displays the software's configuration interface, divided into 'Local configurations' and 'Device configurations'. The 'Local configurations' panel shows a 'Soil scan' entry. The 'Device configurations' panel has 'Hadamard 2' selected. Between these panels are buttons for 'Copy >>', 'Copy <<', 'Move >>', and 'Move <<'. Below these is a 'Set Device Default Config' button. The 'Details' section for 'Hadamard 2' includes fields for 'Name', 'Num Scans to Avg.' (set to 12), and a 'Num Sections' dropdown (set to 1). The 'Scan Type' is set to 'Had'. The 'Exposure Time (ms)' dropdown is open, showing options: 0.635 (selected), 1.27, 2.54, 5.08, 15.24, 30.48, and 60.96. A red arrow points to the 0.635 option. At the bottom are buttons for 'New', 'Edit', 'Delete', 'Save', and 'Cancel'.

Thank You

