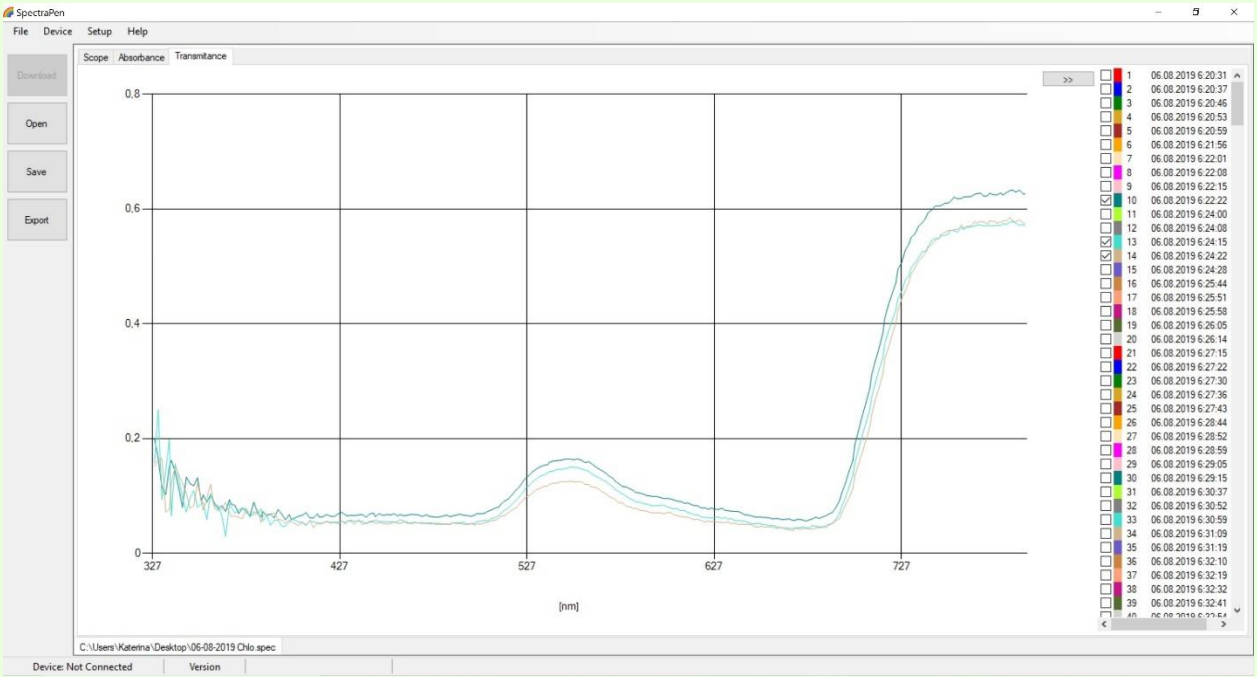
SpectraPen software

User Guide



PHOTON SYSTEMS INSTRUMENTS

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The contents of this manual have been verified to correspond to the specifications of the device. However, deviations cannot be ruled out. Therefore, a complete correspondence between the manual and the real device cannot be guaranteed. The information in this manual is regularly checked, and corrections may be made in subsequent versions.

The visualizations shown in this manual are only illustrative.

This manual is an integral part of the purchase and delivery of equipment and its accessories and both Parties must abide by it.

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TABLE OF CONTENTS

1 Software Installation 4

2 Data transfer 5

3 Software Menu 6

4 Data Visualization 7

5 Troubleshooting and Customer Support 13

6 Appendix 14

6.1 Programming Custom Index in SpectraPen 14

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1 SOFTWARE INSTALLATION

1. Download the SpectraPen software from PSI website https://handheld.psi.cz/products/spectrapen-mini/#download to your computer and launches the SpectraPen program.
2. To activate all software features register the software as follows (Fig. 1).
   - Select: **Help > Register**
   - Enter serial registration number, which is available in download section on PSI website
   - Select: OK

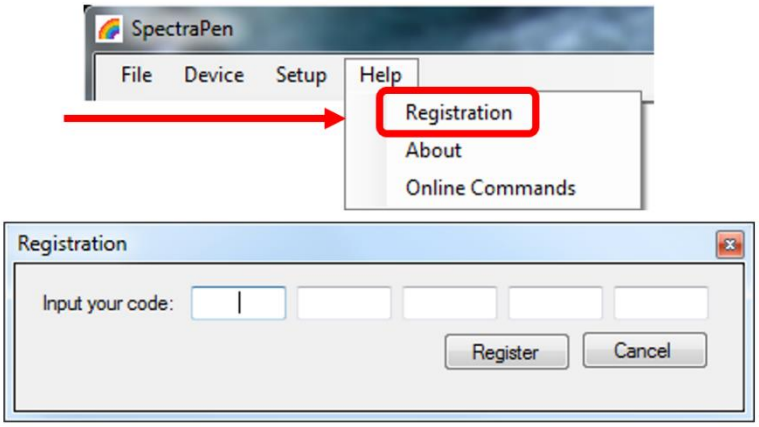

Fig. 1 Software registration.

	It is not possible to download data from the SpectraPen device without software registration.

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2 DATA TRANSFER

For data transfer from mobile application to your computer select **Share** and choose your preferred option (Fig. 2).

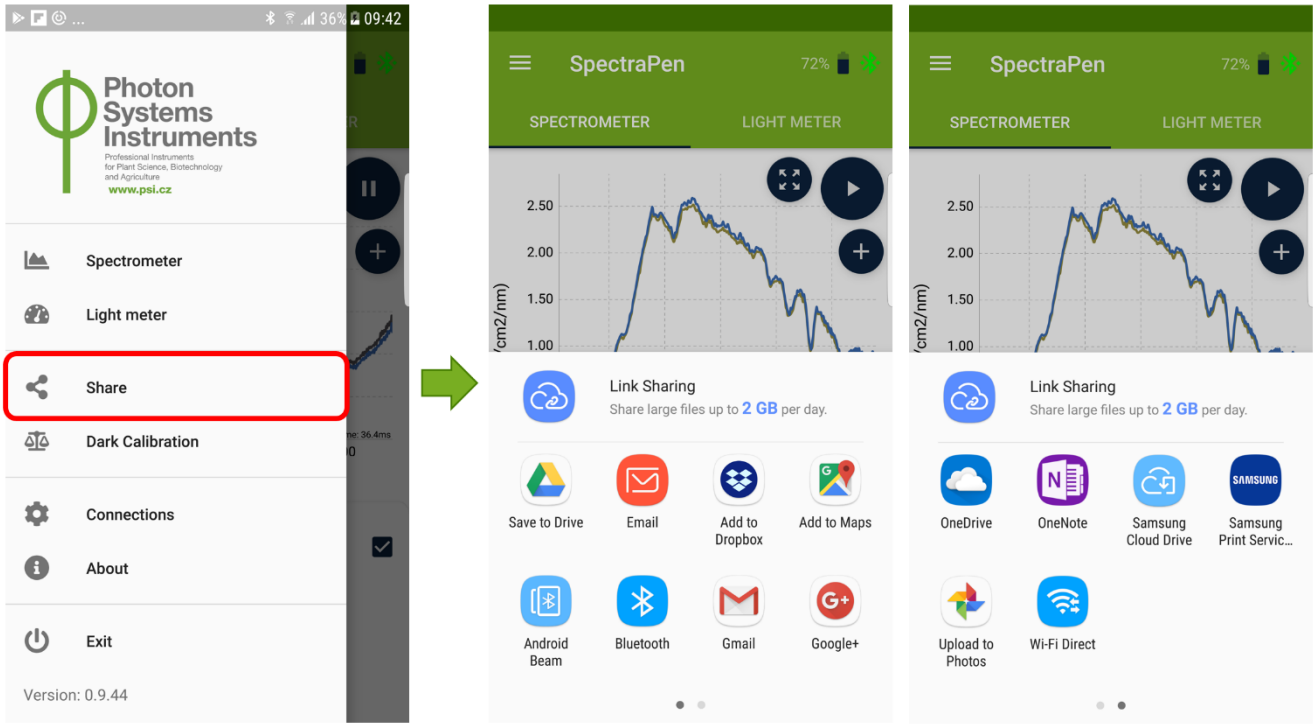

Fig. 2 Data export and sharing via available communication channels.

	Please note that share function is only way to data transfer from the application to your computer. The USB port serves only for device charging.

Open your data in .spec format using the SpectraPen software.

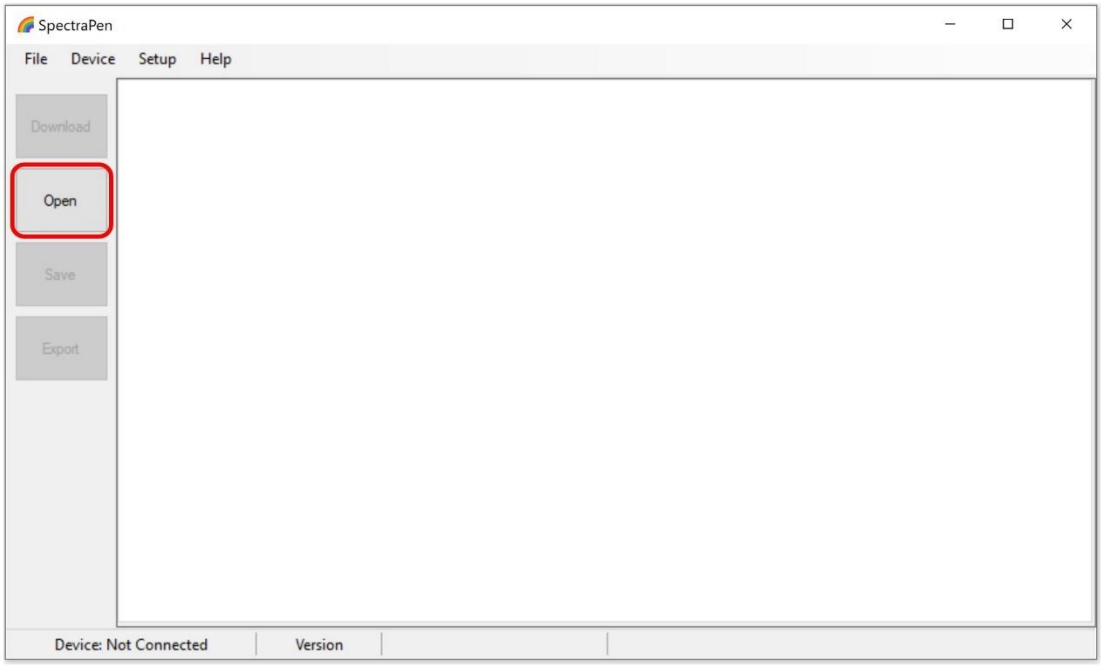

Fig. 3 Opening data in SpectraPen software.

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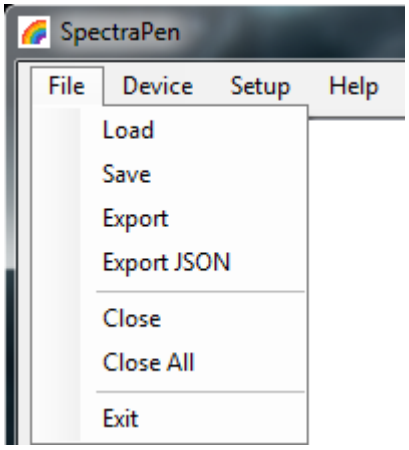
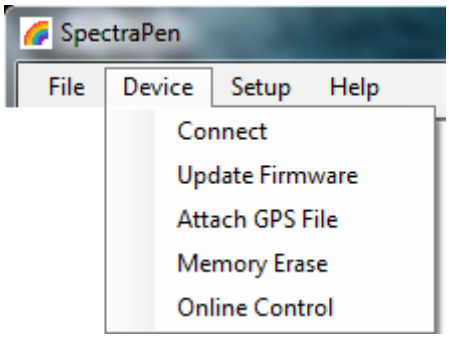
3 SOFTWARE MENU

MENU: File



Load	Loads previously saved data files.
Save	Saves data to hard disc.
Export	Exports data in .txt format.
Export to JSON	Exports data in JavaScript Object Notation.
Close	Closes the current experiment.
Close All	Closes all open experiments.
Exit	Exits the program.

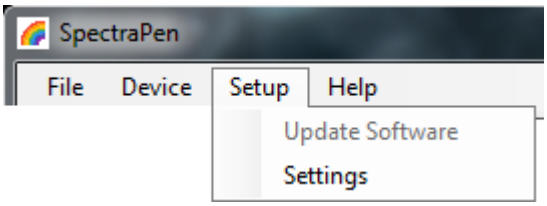
MENU: Device **not related to SpectraPen mini**



Connect	Detects and connects the device.
Update Firmware	Used for firmware updates.*
Attach GPS File	Used to download data from the GPS module of the old version of the SpectraPen - LM 500.
Memory Erase	Erases data from the SpectraPen memory.
Online Control	Online control of SP device.

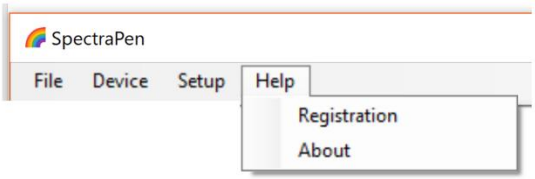
* *For more information on firmware updating, see Chapter* ***Error! Reference source not found.*** *of this Operation Manual.*

MENU: Setup



Update Software	Used for software updates.
Settings	On/off – Auto memory erase after download. Selection of separator for the csv file after its export and following opening in Excel (TAB, SEMICOLON, COMMA, SPACE).

MENU: Help



Registration	Used for the SpectraPen software registration.
About	Offers basic information about the program.

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4 DATA VISUALIZATION

1. Visualization modes: **Scope** mode window is always displayed as the default. To view irradiance data go to **Irradiance** tab (Fig. 4).

⚠	**Scope** mode represents non-calibrated spectrum.

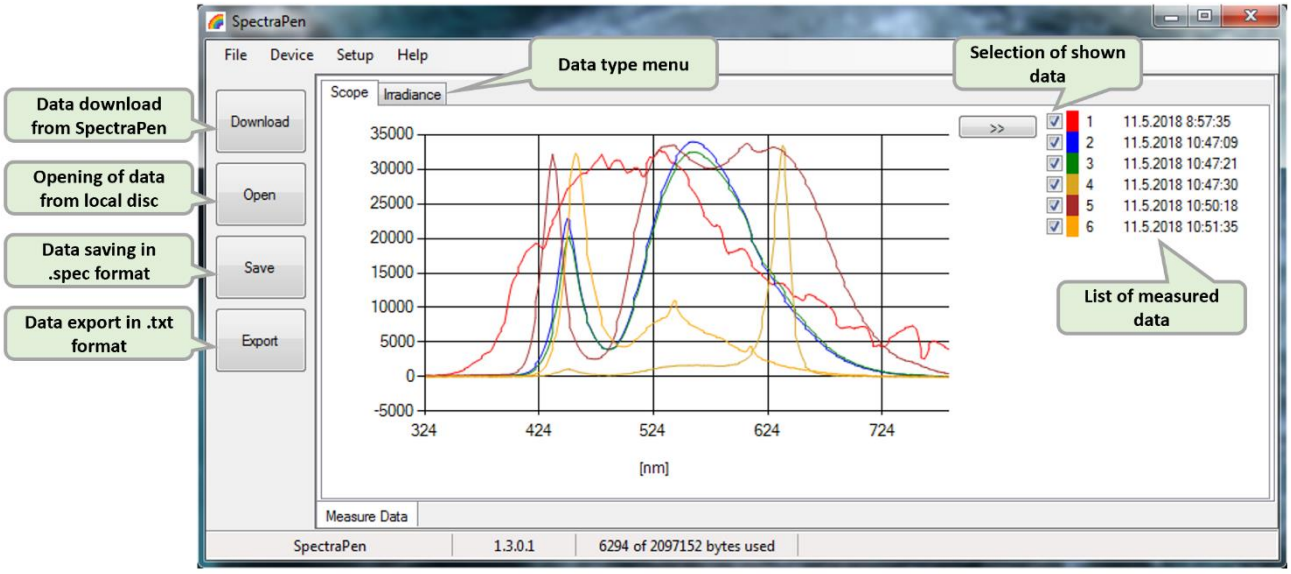

Fig. 5 Scope graph.

2. All data that are downloaded are displayed in the Scope window. The user can select the set of measurements to be displayed by marking and unmarking the data from the **selection** list (Fig. 4).

3. Right click on list of measured data enables **edit data name, delete** selected measurement or **show and hide** all measured data in the graph– Select all measure and Clear all measure (Fig. 6).

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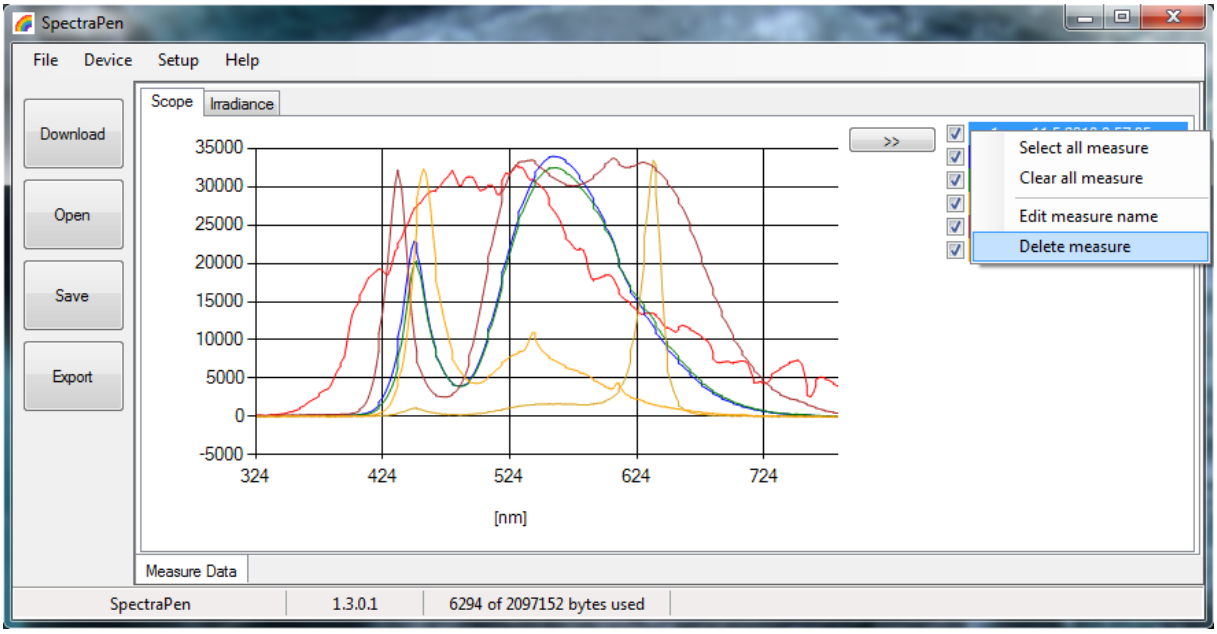

Fig. 6 Options for list of data.

4. In the graph **marker** feature is available, which enables display of the numeric values for wavelength and light irradiance for the selected wavelength of the scan (Fig. 7). Use the mouse to select the given point. In top right corner of the graph (red rectangle) is displayed exact value for the selected point on the x-axis and y-axis.

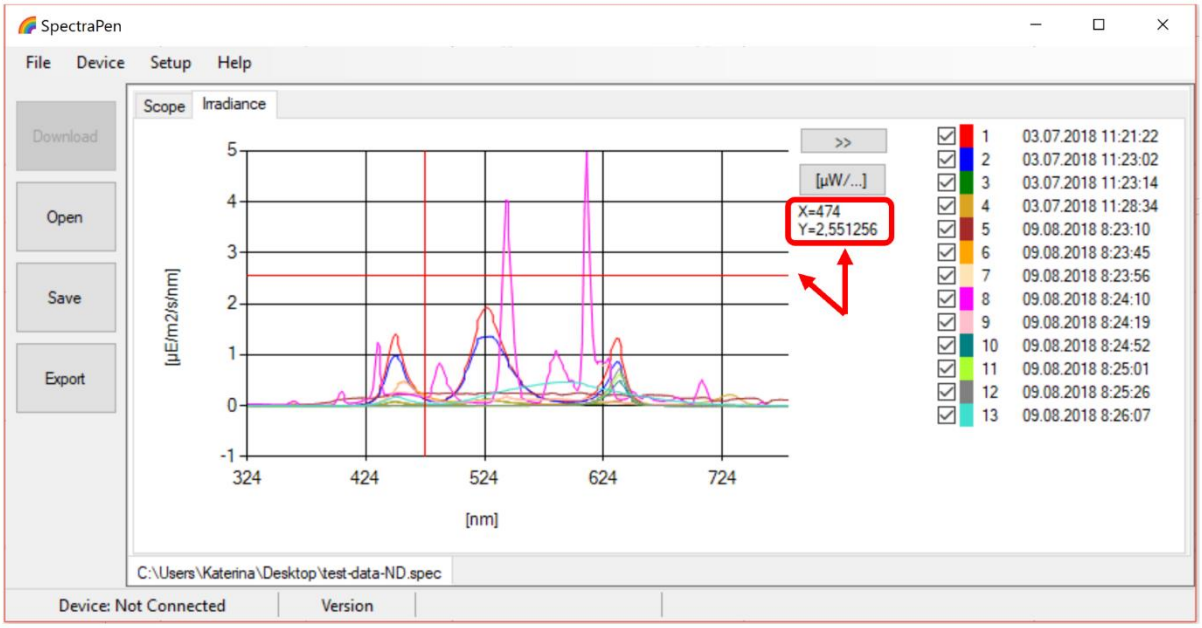

Fig. 7 Marker feature.

5. To **zoom in on the data displayed in the graph** select an area of the displayed graph (Fig. 8). To reverse these steps and return to original display use minus icon in the corners of the zoom area marked with red rectangles in Fig. 8.

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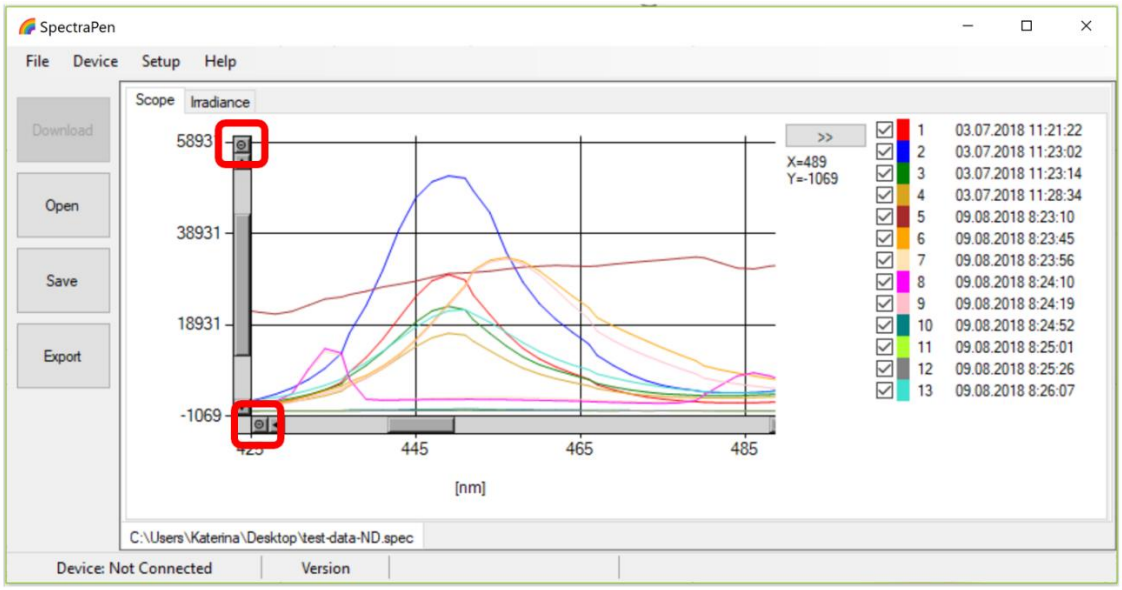

Fig. 8 Zoom function.

6. Select **Irradiance tab** to view the irradiance data stored either as umol/m2/s/nm or per uWatts/cm2/nm. To change the units in which the spectra is displayed click on the unit icon as shown in (Fig. 9).

7. To view the light meter data for the spectral scans acquired click on the unit icon as depicted by red arrow in Fig. 9. Irradiance and illuminance **light meter numerical values** for each scan are displayed as LUX, PAR or IRRADIANCE values (Fig. 9).

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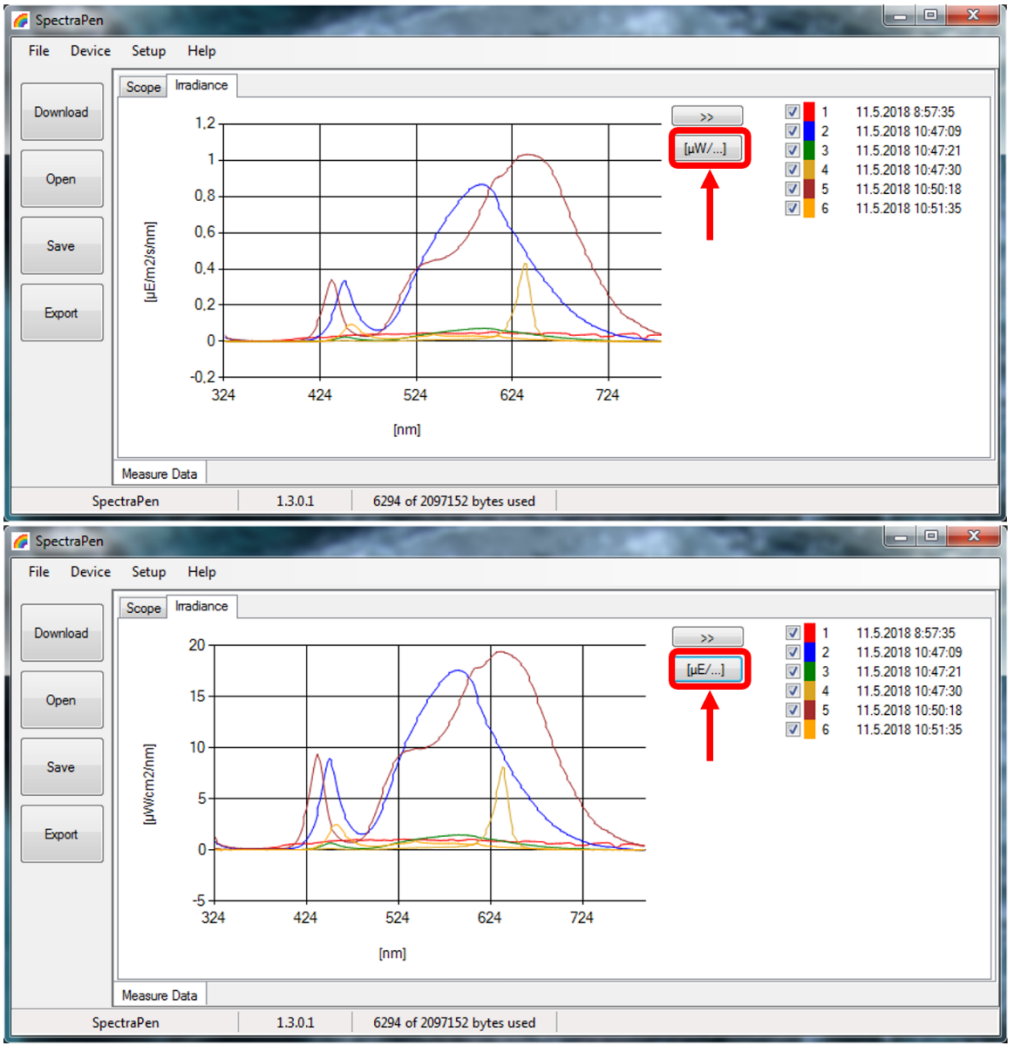

Fig. 9 Irradiance shown in different units.

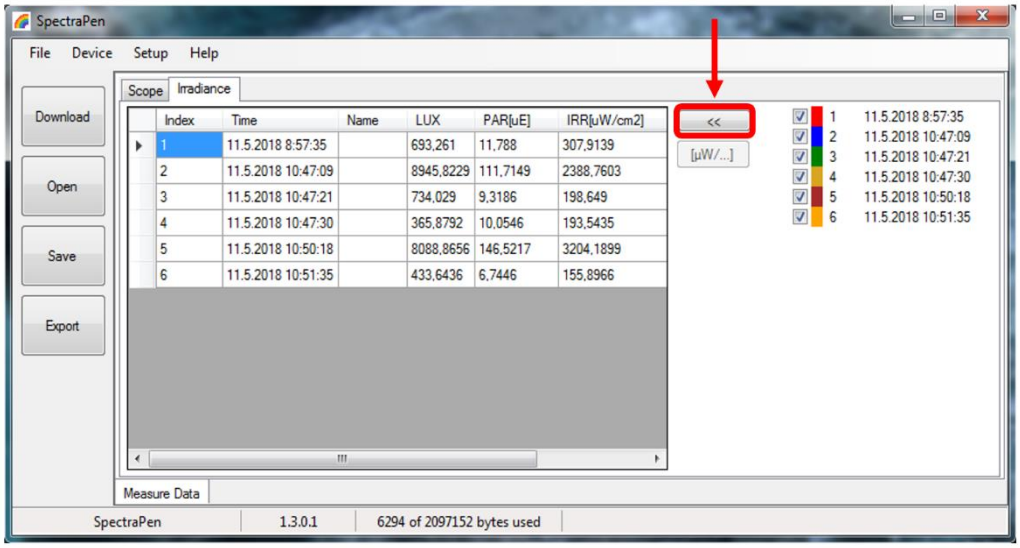

Fig. 10 Numerical values of measured light intensities.

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8. Select **File>Export** to export the data in .txt format. Export function allows the user to specify the type of data. The options are:

Spectrum – all raw scope data for entire range of measured wavelengths are exported including data for the dark scan.
Spectrum scope – scope data normalised to dark spectrum scan are exported for all acquired scans or set of selected measurements.

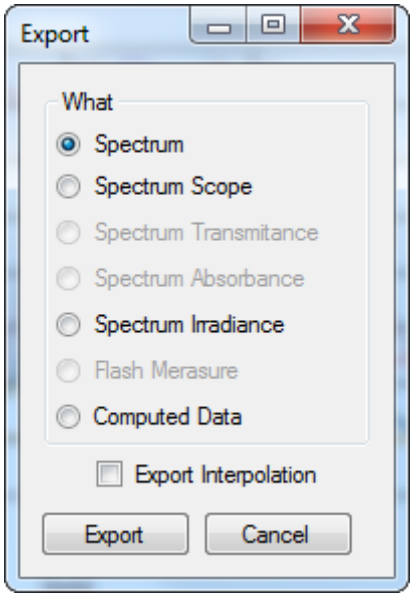

Fig. 11 Export options.

Spectrum Irradiance – irradiance data for all measurements are exported. The user can choose to export the numeric values either in µE/m^2/s/nm, µW/cm^2/nm or both (Fig. 12).

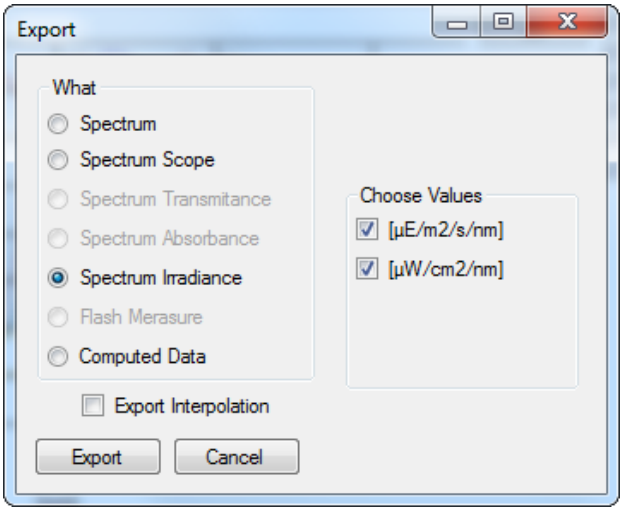

Fig. 12 Export of Irradiance spectrum.

Computed Data – computed numeric values for Scope and Irradiance are exported for all measurements. The user can choose if only Scope numeric values or Irradiance numeric values are exported. For irradiance values, numeric data for Photon flux density and PAR in µmol/m^2/s units, irradiance in µW/cm^2 units and illuminance in LUX units are exported (Fig. 13).

Export interpolation – if this option is marked the spectrum is exported with step of 1 nm.

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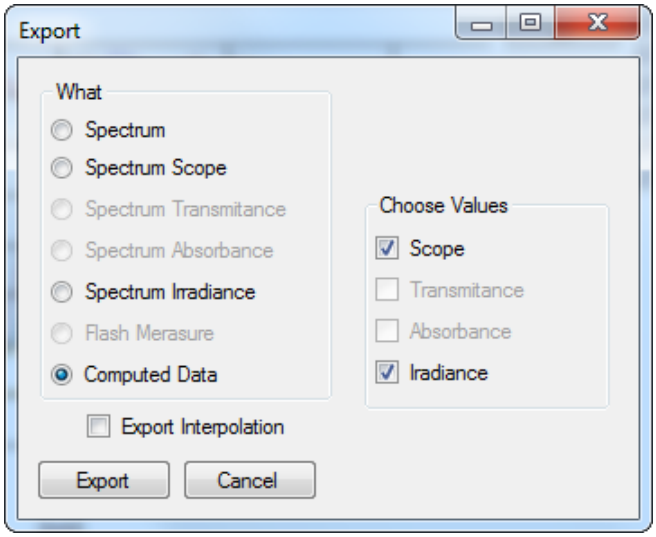

Fig. 13 Export of computed values.

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5 TROUBLESHOOTING AND CUSTOMER SUPPORT

In case of troubles and for customer support, please, visit **FAQ** on our websites, write to **support@psi.cz** or contact your local distributor.

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6 APPENDIX

6.1 PROGRAMMING CUSTOM INDEX IN SPECTRAPEN

The SpectraPen software enables programming custom indexes, which can be used for wide range of calculation based on the measured spectrum.

1. Go to the main **SpectraPen folder** in your PC (Usually in Program Files).
2. Open the file **Config > Formulas.txt.**
3. Write your index into this .txt file and save it (Fig. 18).
   Index example:
   Scope:PSIindex:PSI test index:Scope[600nm]/ Scope[500nm]

   Scope – the index is placed in the bookmark Scope in data in the software
   PSIindex – name of the index in the SpectraPen software and in exported data
   PSI test index – full name of the index (not showed)
   Scope[600nm]/ Scope[500nm] – equation for calculation; calculated from 500 and 600 nm of Scope spectra

Fig. 14 New index in the Formulas file.

4. Restart the SpectraPen Software.
5. The new index appears in the selected bookmark in the data (Fig. 15).
6. For export of this index choose the option “Computed values” and selected spectrum in the export table.

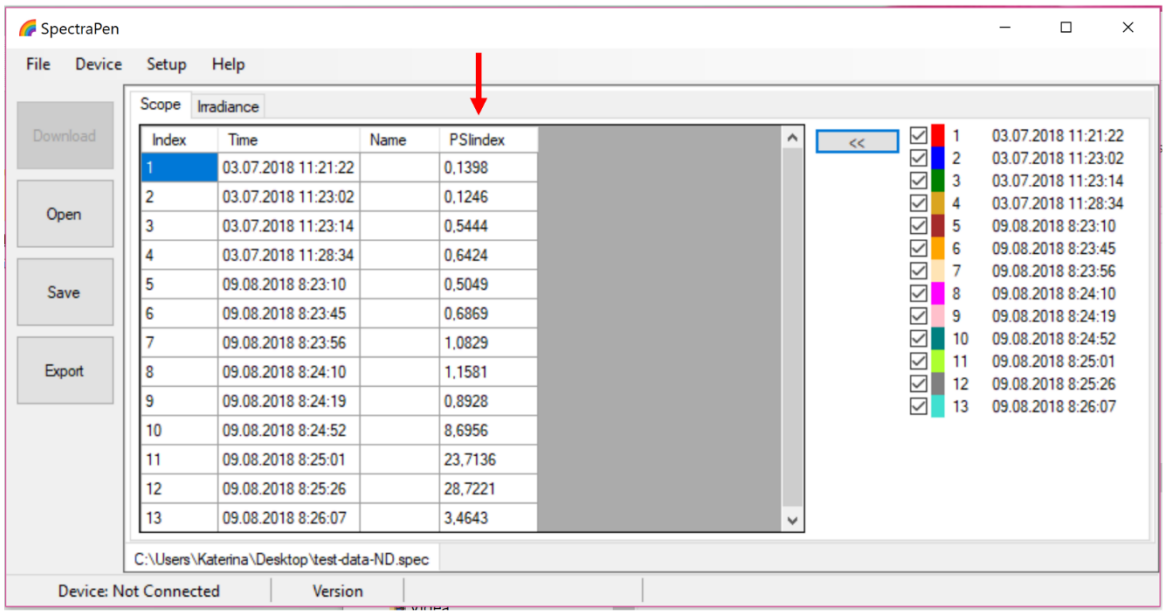

Fig. 15 New index.

Function description

Different mathematical functions can be used in SpectraPen software syntax to create new custom formulas.

min, max -

min(value1, value2)

value1 - number, variable, function

value2 – number, variable, function

- only one value can be function!

min(array)

array – array of numbers

example1: max(Scope)

example2: min(Irradiance)

example3: min(Scope[760nm], max(Scope[450], Scope[680]))

example5: max(Irradiance[550nm], (5+4)*4)

---

ln – the natural (base e) logarithm of specified number

ln(value)

value – number, variable, function

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example1: ln(5)

example2: ln(Irradiance[760nm])

example2: ln(max(Irradiance [550nm], Irradiance[480nm]))

example5: ln((5+4)*4)

---

log – the logarithm of specified number in a specified base.

logB(value)

B – base - number

value – number, variable, function

example1: log2(5)

example2: log5(Scope[760nm])

example3: log10(max(Scope[550nm], Scope[480nm]))

example4: log10((5+4)*4)

---

sqrt – the square root of a specified number

sqrt(value)

value – number, variable, function

example1: sqrt(5)

example2: sqrt(Scope[760nm])

example3: sqrt(max(Scope[550nm], Scope[480nm]))

example4: sqrt(((5+4)*4) + 6)

---

^ - spedified number raised to the specified power

value^power

value – number, variable, function

power – number, variable, function

example1: Irradiance[760nm]^ Irradiance[550nm]

example2: min(Irradiance[760nm], Irradiance[550nm])^max(Irradiance[435nm], Irradiance[430nm])

example3: Transmitance[760nm]^0.5

---

integral - express the area under the curve of a graph of the function in the interval

integral(function_values, from, to)

function_values – input values for integral compute

from,to – limit values

example1: integral(IrradianceL, 360nm, 700nm)

example2: integral(IrradianceE, 360nm, 700nm) * IrradianceE[450]