全光譜分析儀Multiskan GO 的技術原理及應用

Grace Li 20261030

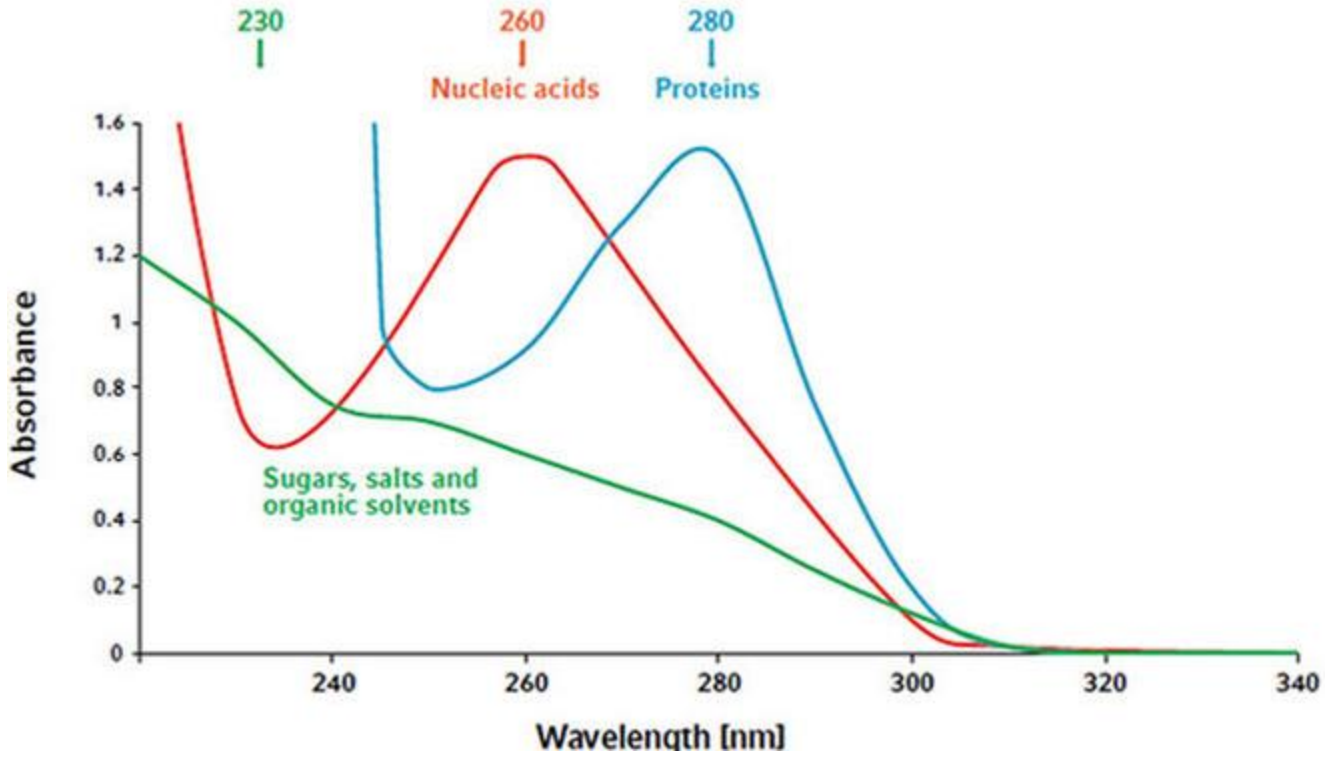
Overview

- Absorbance
- Application
- Introduction of Multiskan GO
- Operation

Absorbance

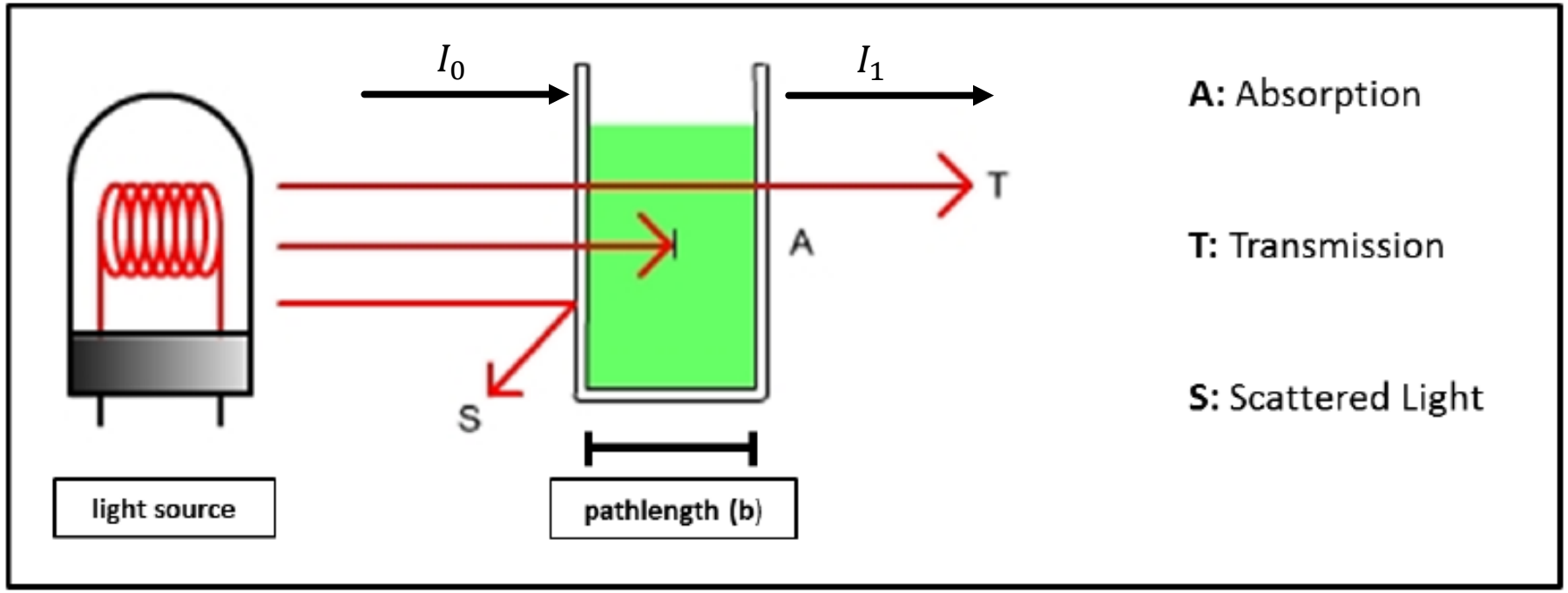
Why measure absorbance ?

In biology and chemistry, the principle of absorbance is used to **quantify absorbing molecules in solution**.



https://handling-solutions.eppendorf.com/sample-handling/photometry/applications/detailview-applications/news/uv-vis-spectrophotometry-easy-and-quick-quantification-of-nucleic-acids/

Absorbance



$$Transmittance[T] = \frac{I_1}{I_o} \qquad Absorbance[A] = \log_{10}\left[\frac{I_0}{I_1}\right] = \log_{10}[\frac{1}{T}]$$

I_1 = intensity of the radiation (light)

I_0 = amount of light of the incident light beam

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The Microplate Reader Company

Absorbance

Absorbance[A][O.D.]	Transmittance[T%]
0	100%
1	10%
2	1%
3	0.1%
4	0.01%
5	0.001%

That means a sample with:

- 1 O.D. allows 10% of light to be transmitted through the sample
- 2 O.D. allows 1% of light to be transmitted through the sample
- 3 O.D. allows 0.1% of light to be transmitted through the sample
- 4 O.D. allows 0.01% of light to be transmitted through the sample

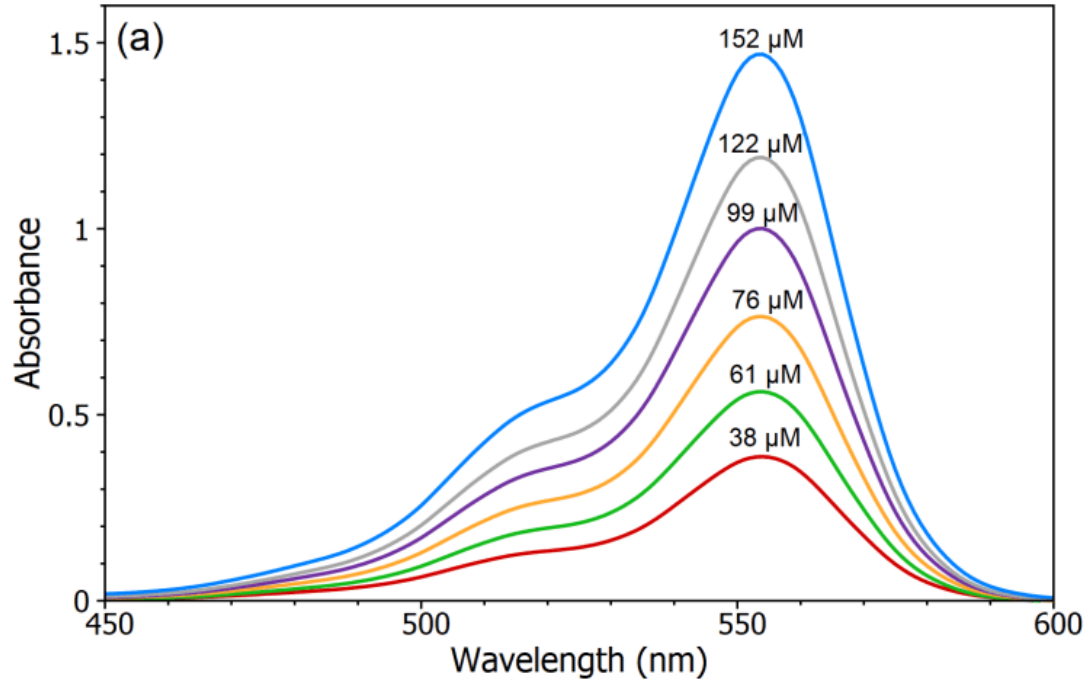
$$Transmittance[T] = \frac{I_1}{I_o} \qquad Absorbance[A] = \log_{10}\left[\frac{I_0}{I_1}\right] = \log_{10}[\frac{1}{T}]$$

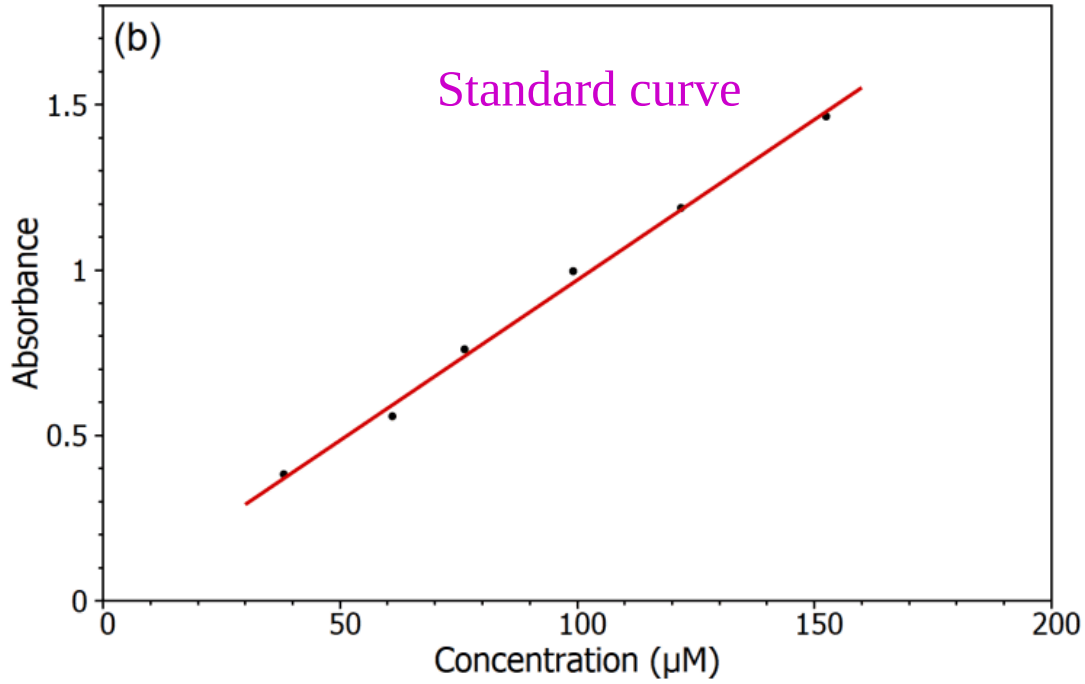
Absorbance

The Beer's law

$$A = \varepsilon c l$$

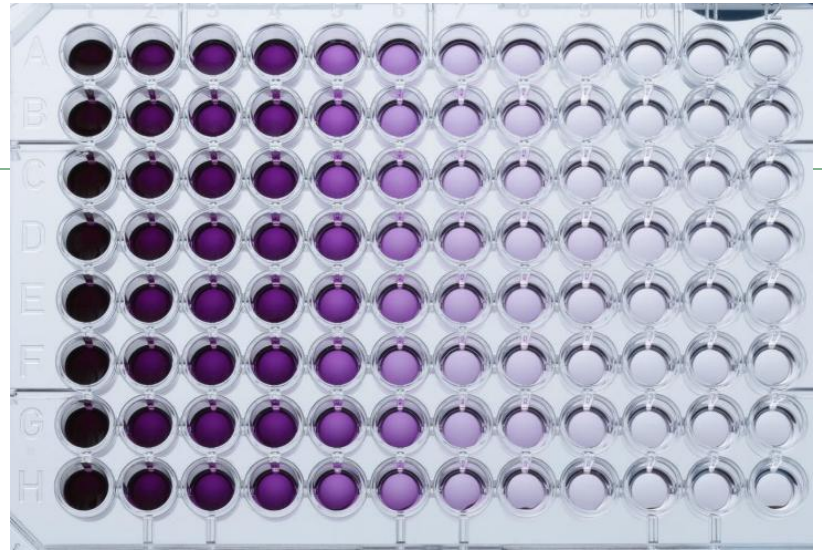
A	Absorbance	
ε	Molar absorption coefficient	$M^{-1}cm^{-1}$
c	Molar concentration	M
l	optical path length	cm





https://www.edinst.com/blog/the-beer-lambert-law/

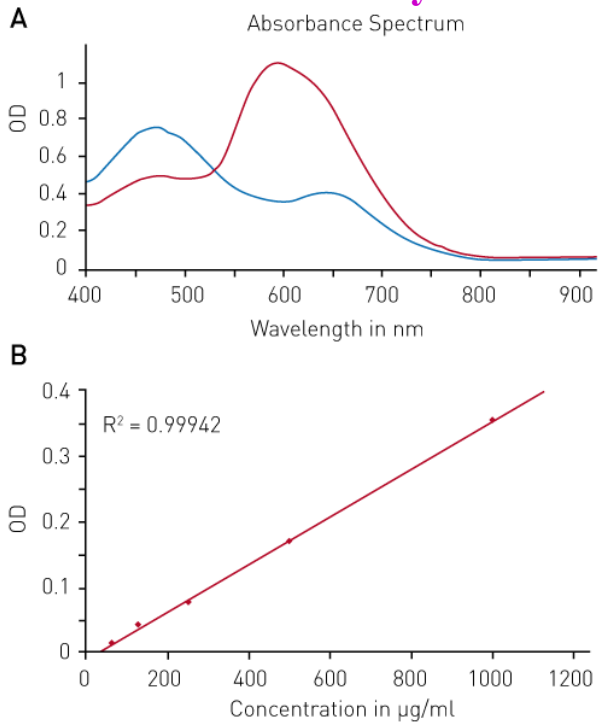
Experiment



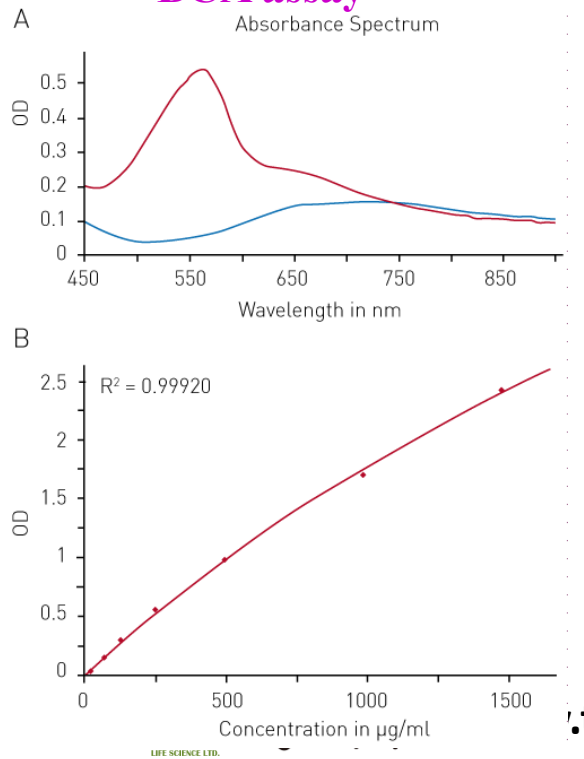
Cell viability(MTT Assay)

- ELISA
- Cell viability(MTT)
- Bradford/BCA
- DNA/Protein (260 nm / 280 nm)
- Microbial growth (OD 600 nm)

Bradford assay



BCA assay

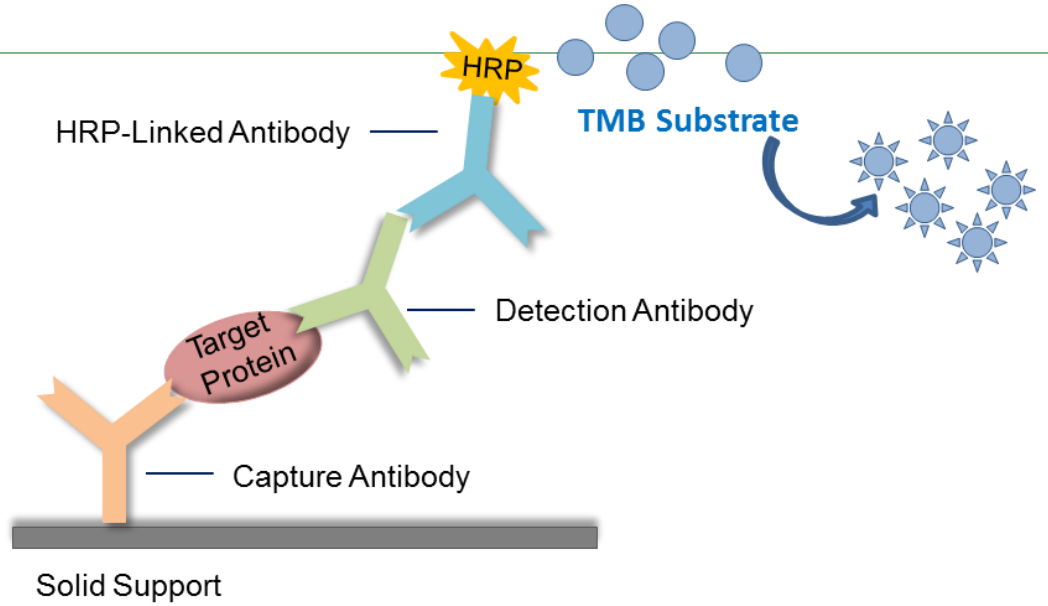


Application

ELISA

To detect specific protein by antibody

Usually measure 450 or 405 nm



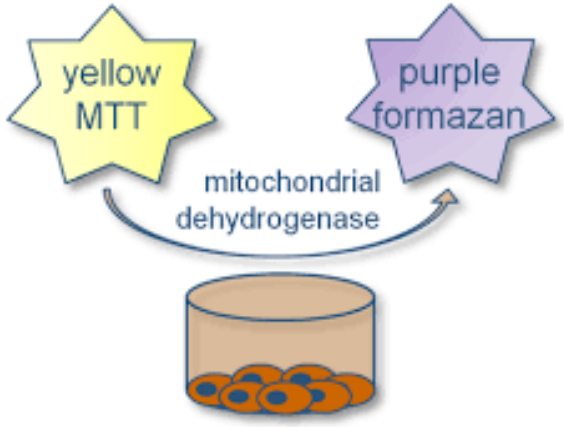
Cell viability CCK-8 and MTT

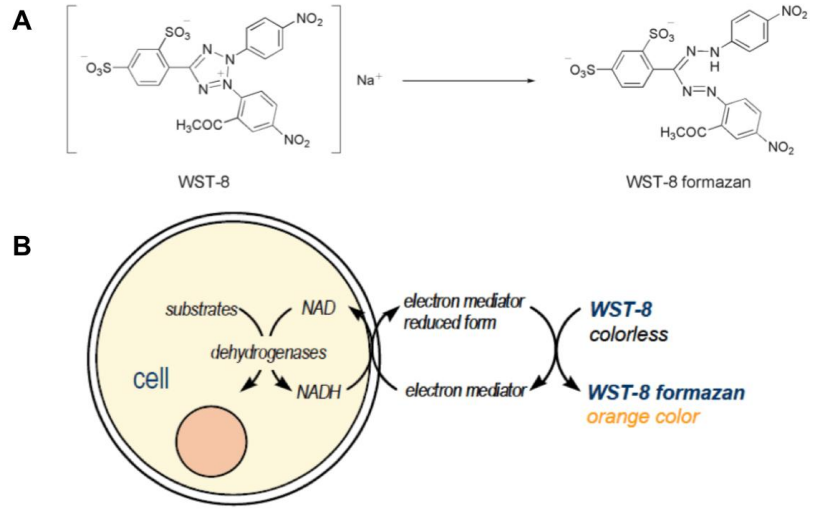
To check the vial cell number by specific reagent

Usually measure 450 and 570 nm

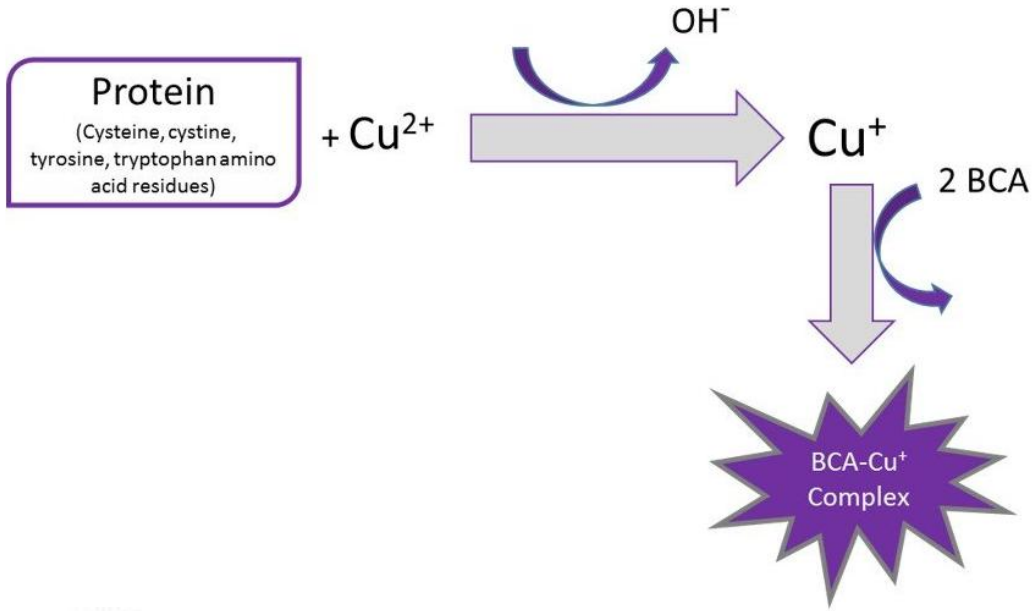
MTT = 570nm

CCK-8 = 450nm





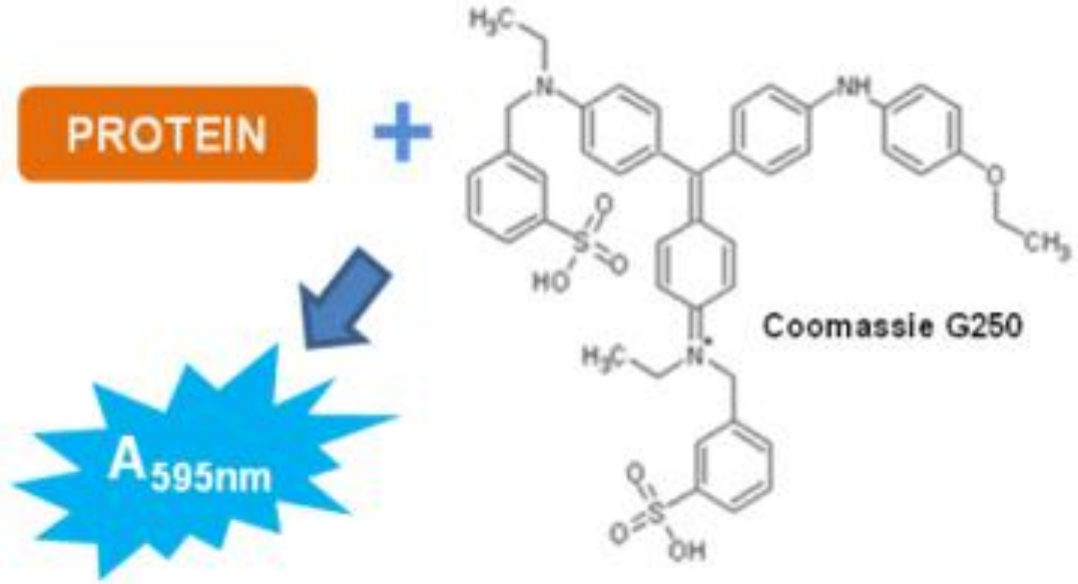
Application



BCA

To quantify protein in unknown sample

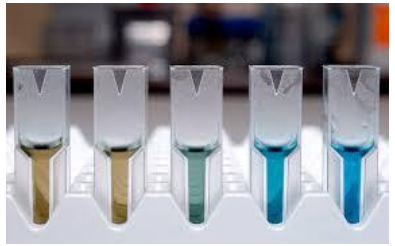
Usually measure 562 nm



Bradford

To quantify protein in unknown sample

Usually measure 595 nm



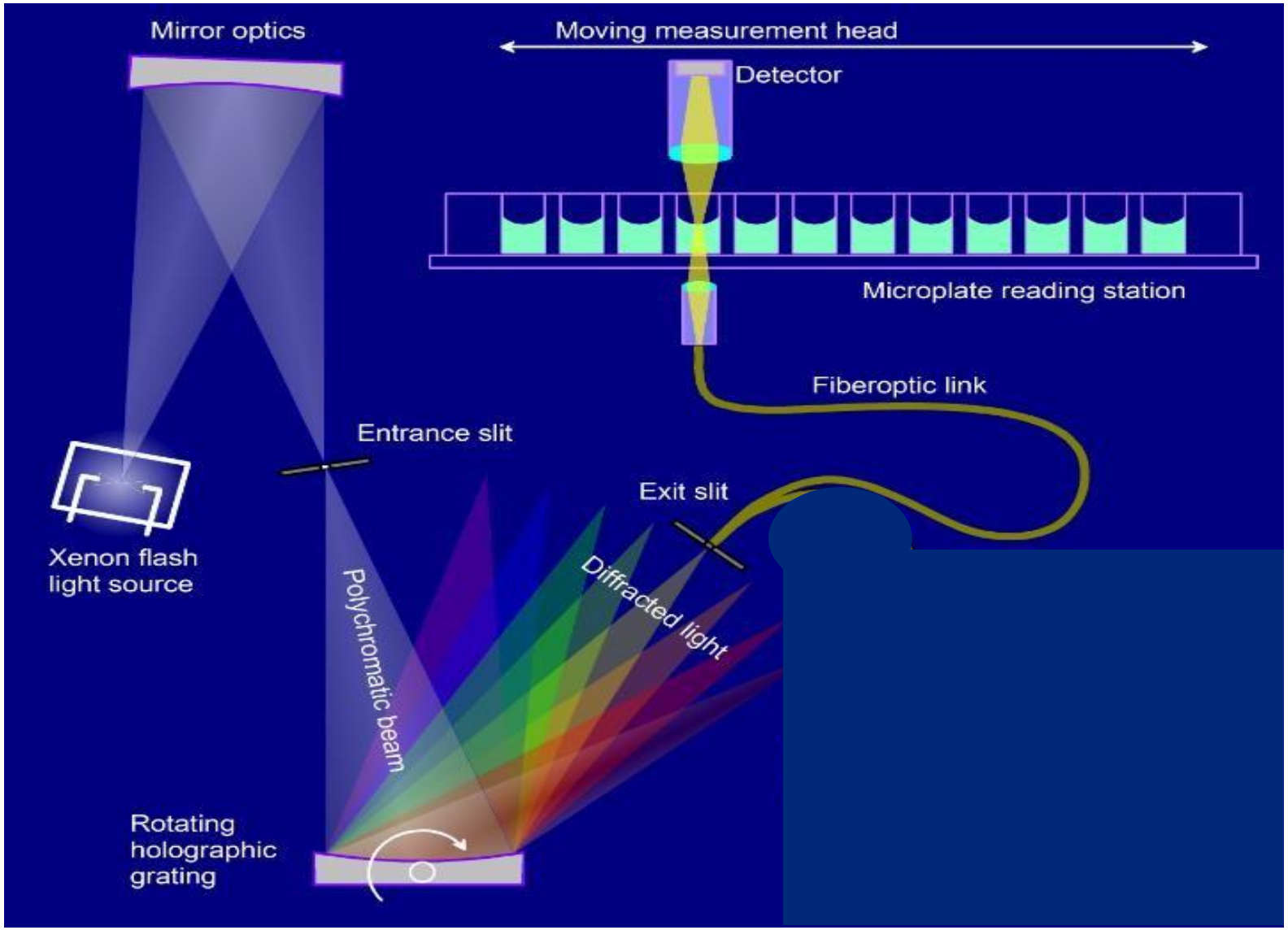
Introduction of Multiskan GO

	Multiskan GO
Wavelength	200 -1000 nm
Reads	96- and 384-well plates
Shaker	V
Incubation	up to +45°C
Reading speed	96-well plate in ~ 6 seconds
Spectrum	~10 seconds



Introduction of Multiskan GO

Monochromator based system with adjustable wavelength



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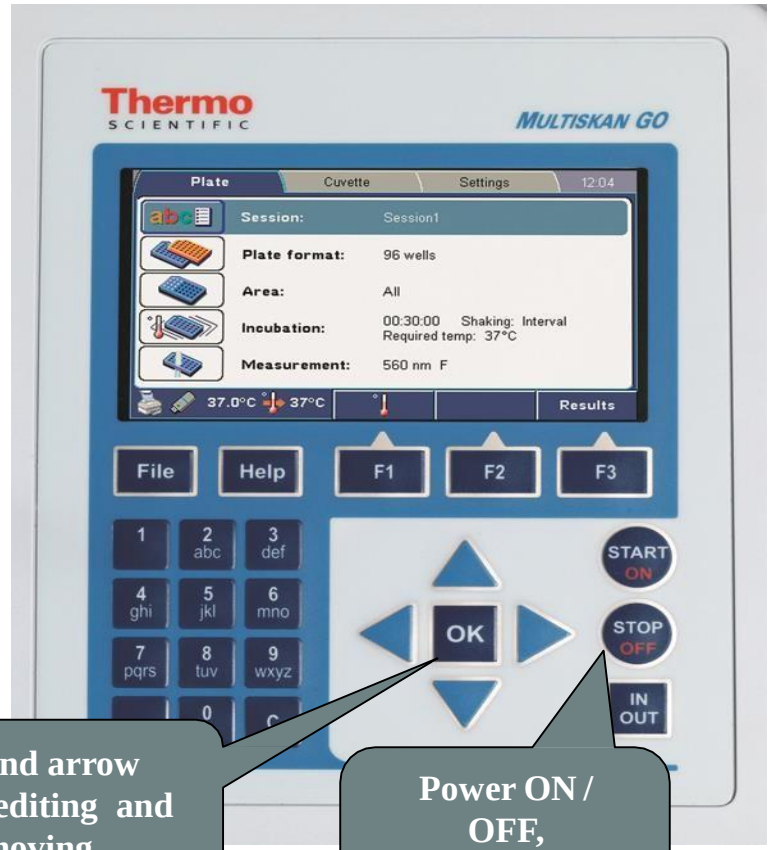
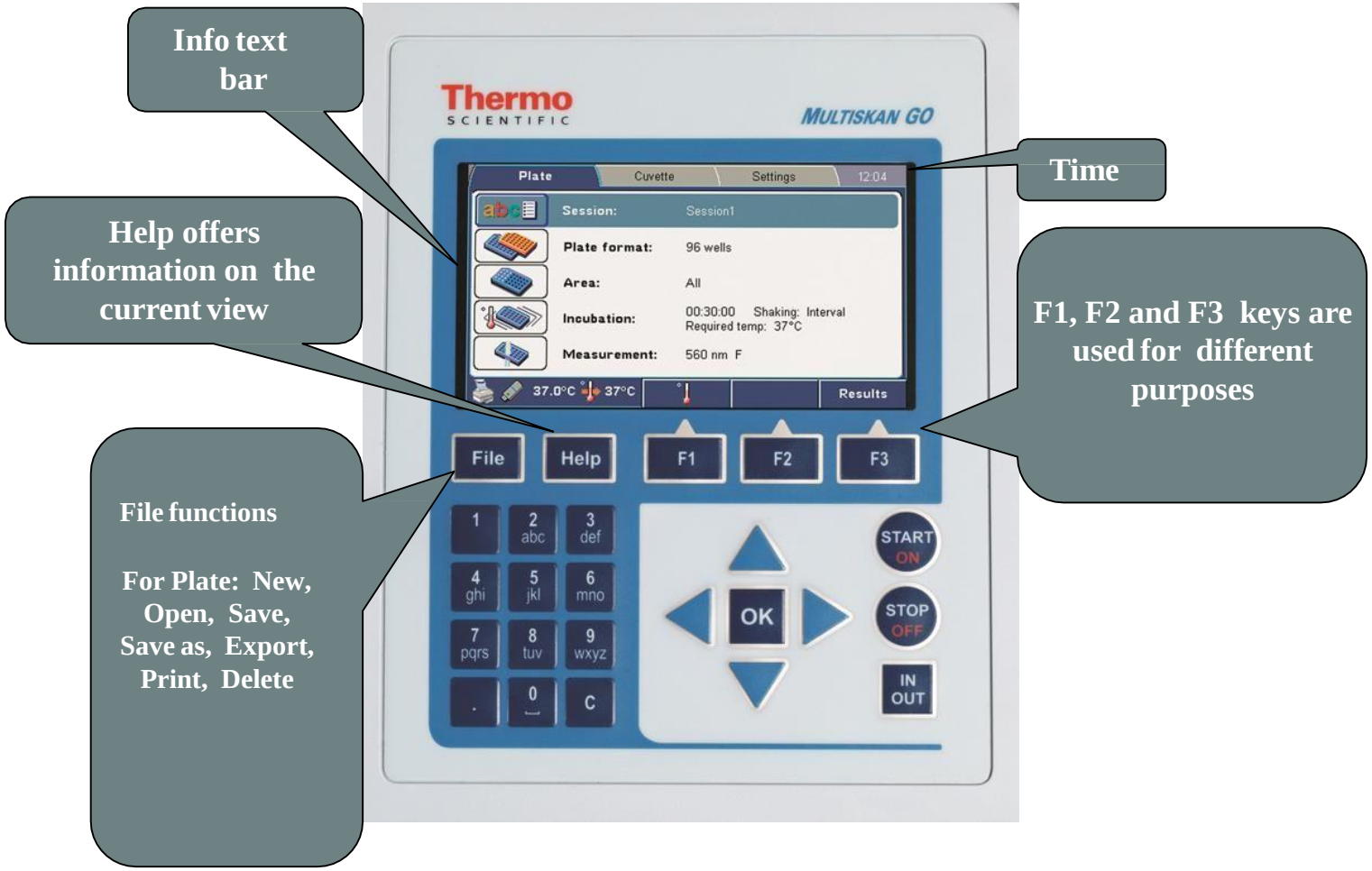
Operation

- User Interface tabs
  - **Plate**:
    defines protocol for the plate measurement
  - **Settings**:
    configuration settings
    - Configuration, Date & Time, Status report



Operation



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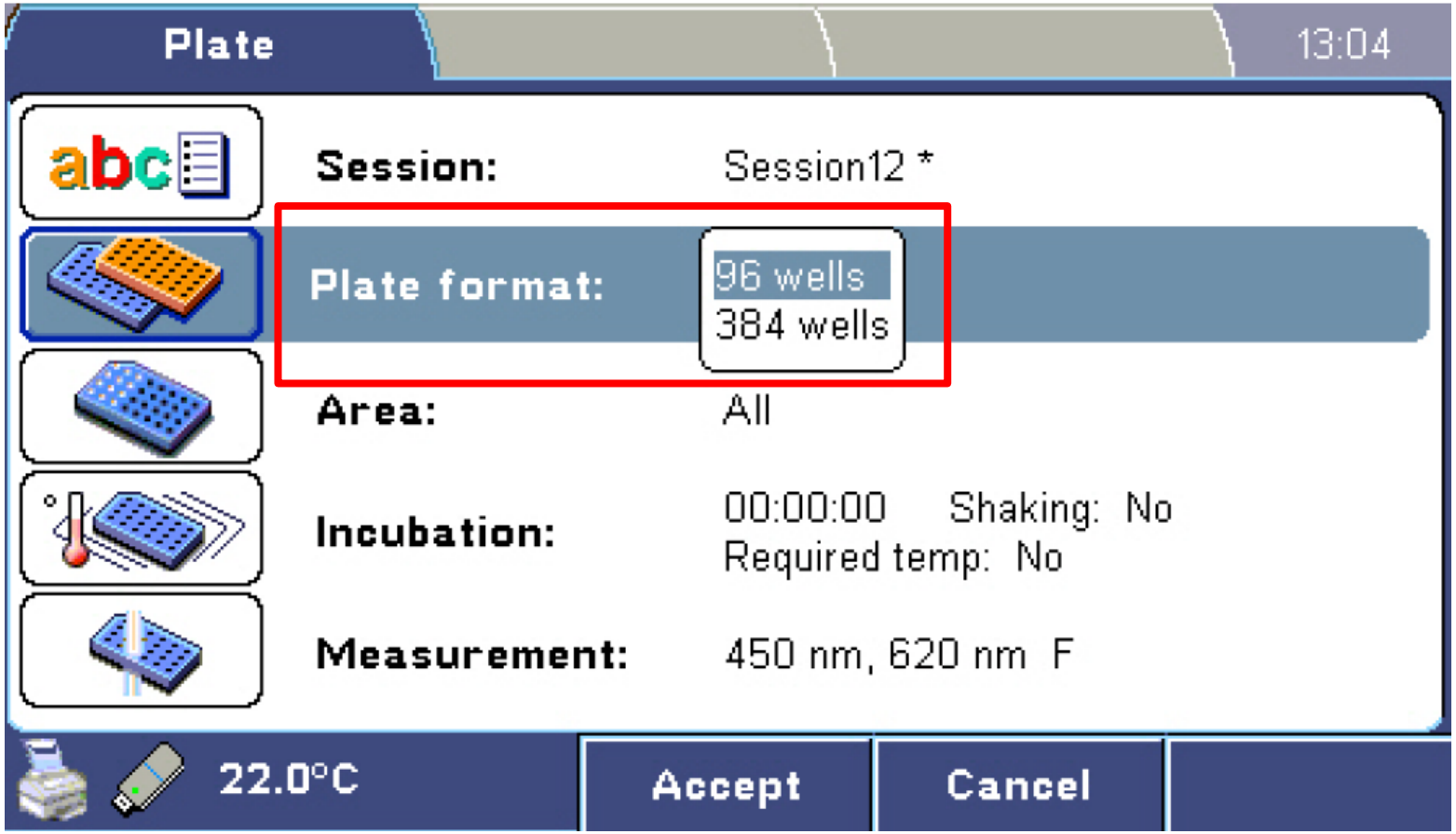
Operation-Plate measurement

- Selecting “Plate format”



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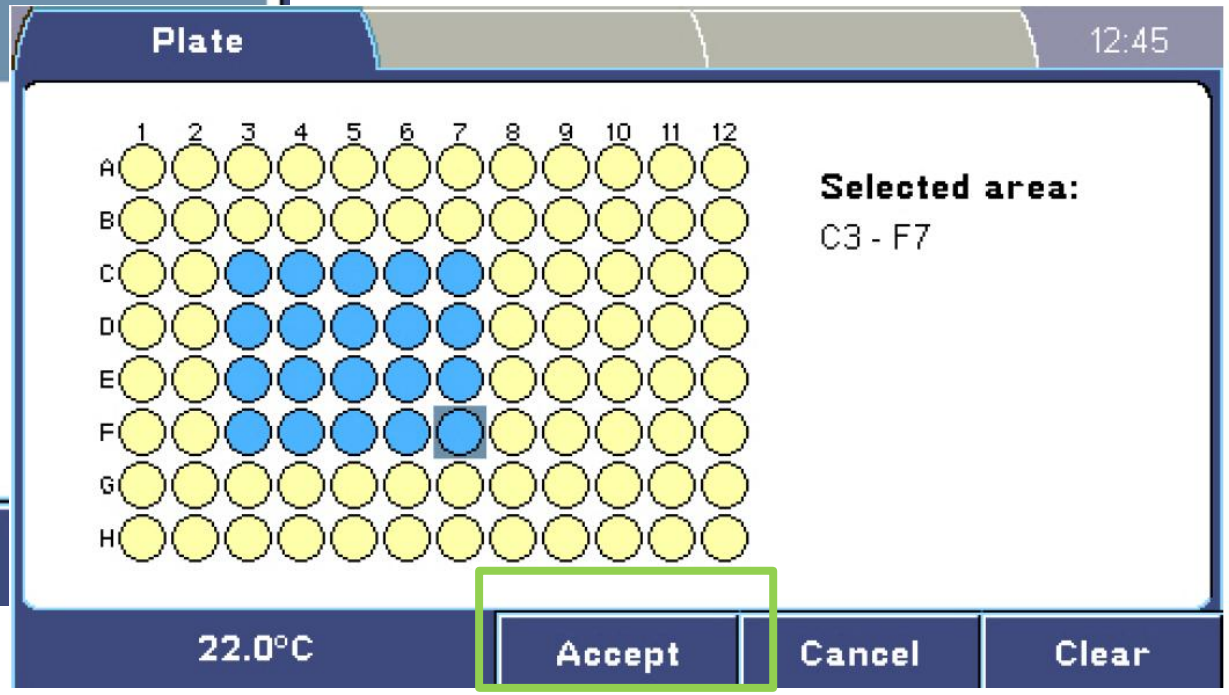
Operation-Plate measurement

- Selecting “Area”







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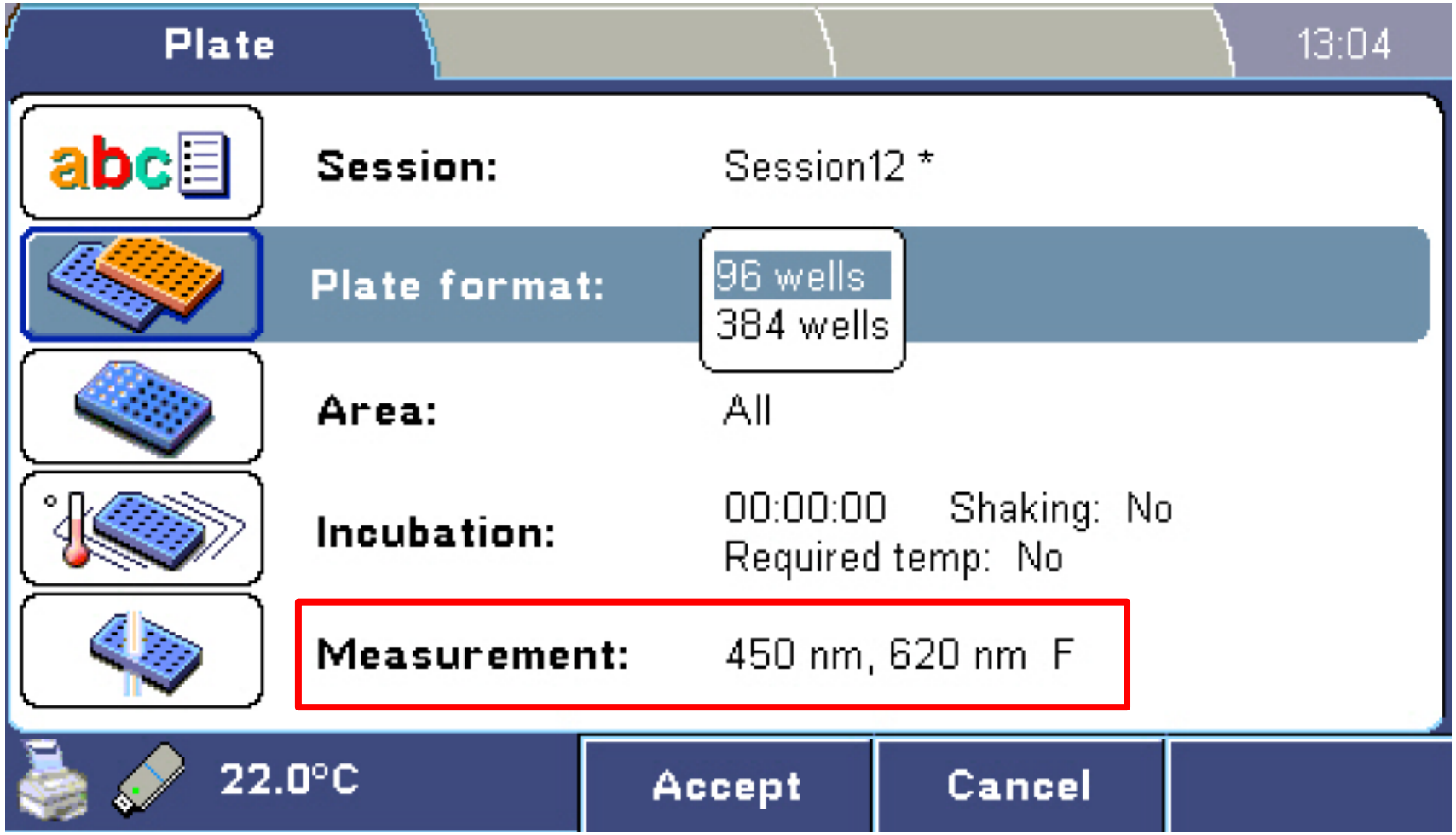
Operation-Plate measurement

- Setting “Measurement"



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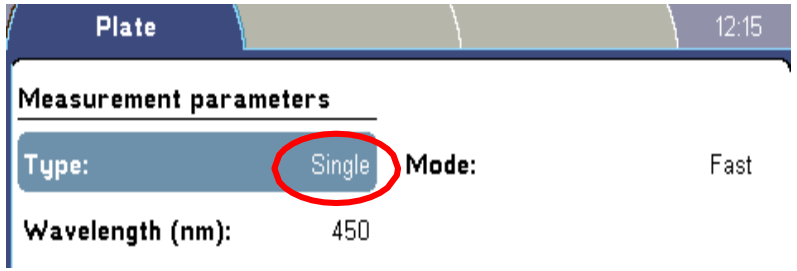
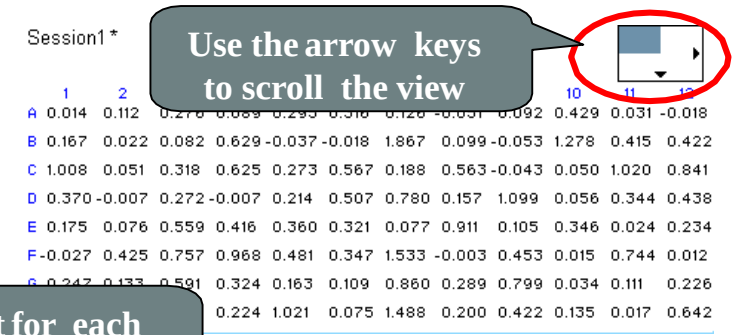
Operation-Plate measurement

Measurement types

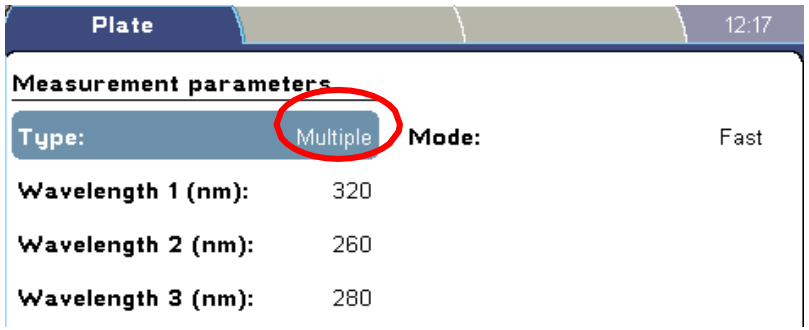
Single

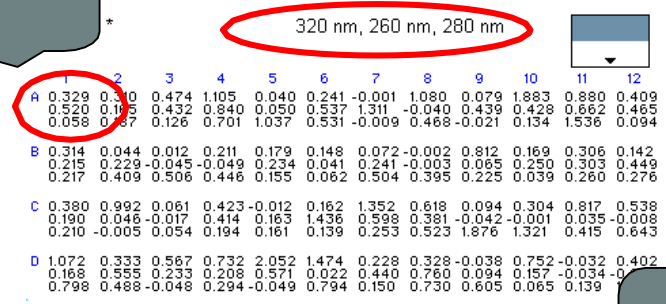




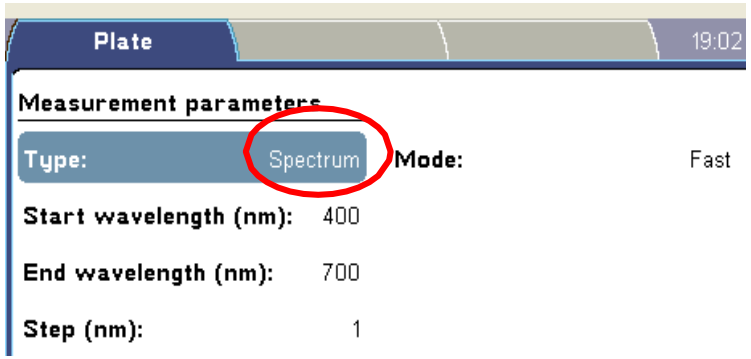
Result for each wavength

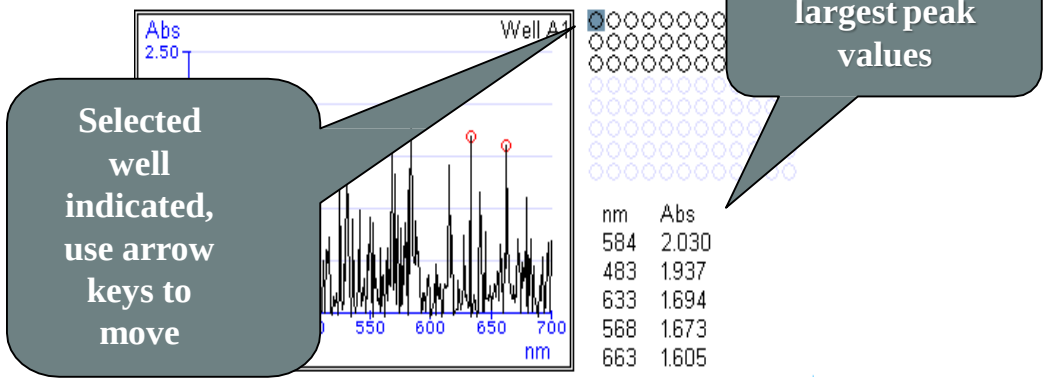
Multiple





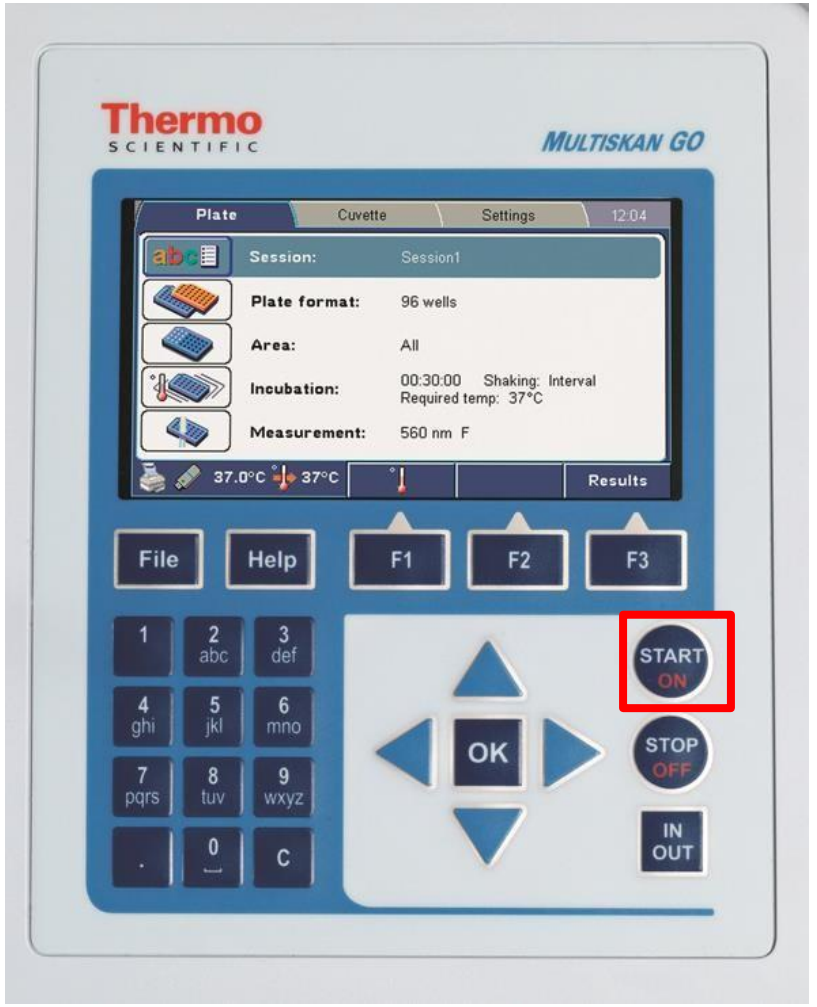
Spectrum





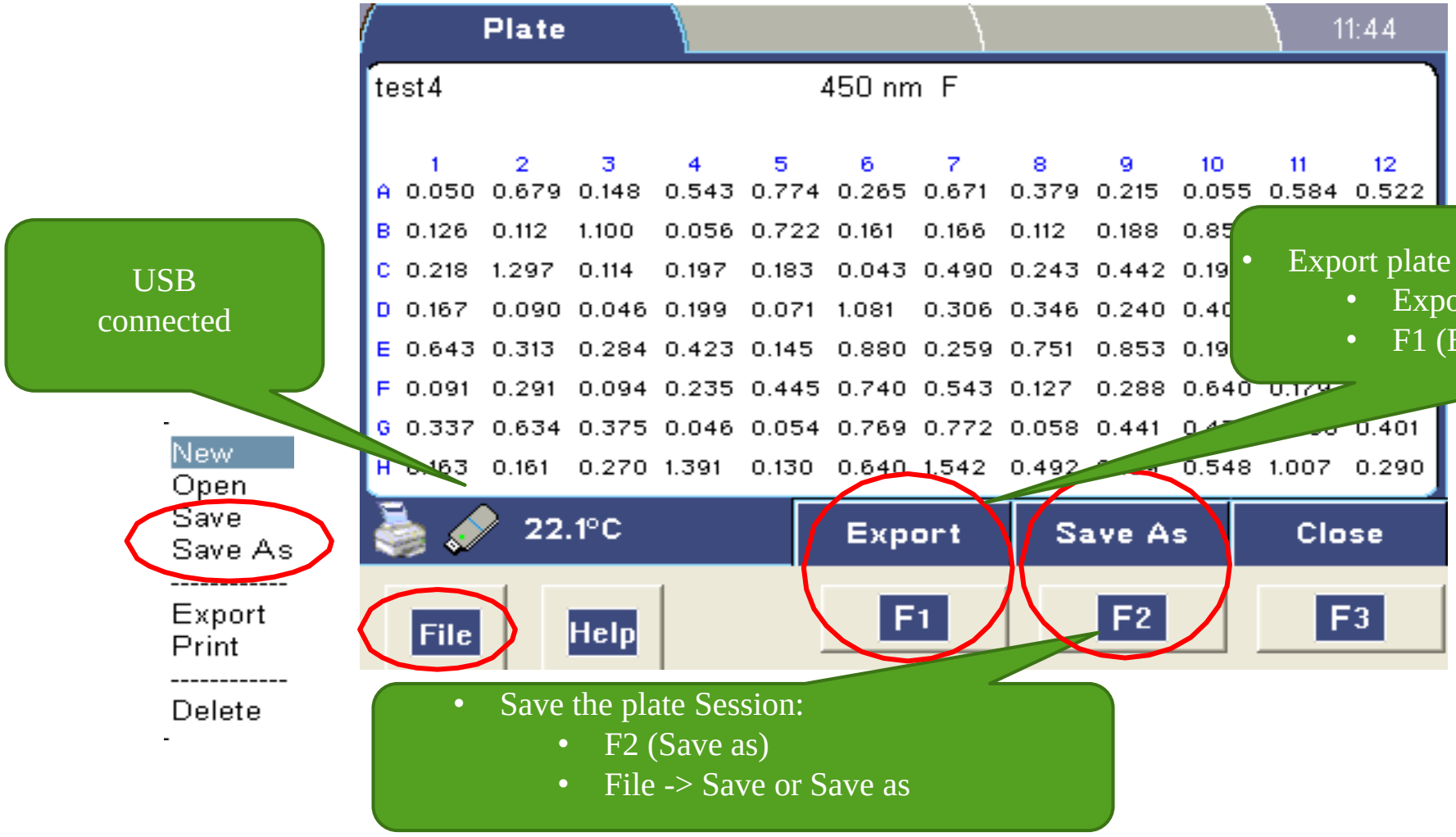
Operation-Plate measurement

- **“START“ Measurement**



Operation-Plate measurement

- **"Saving" Result**



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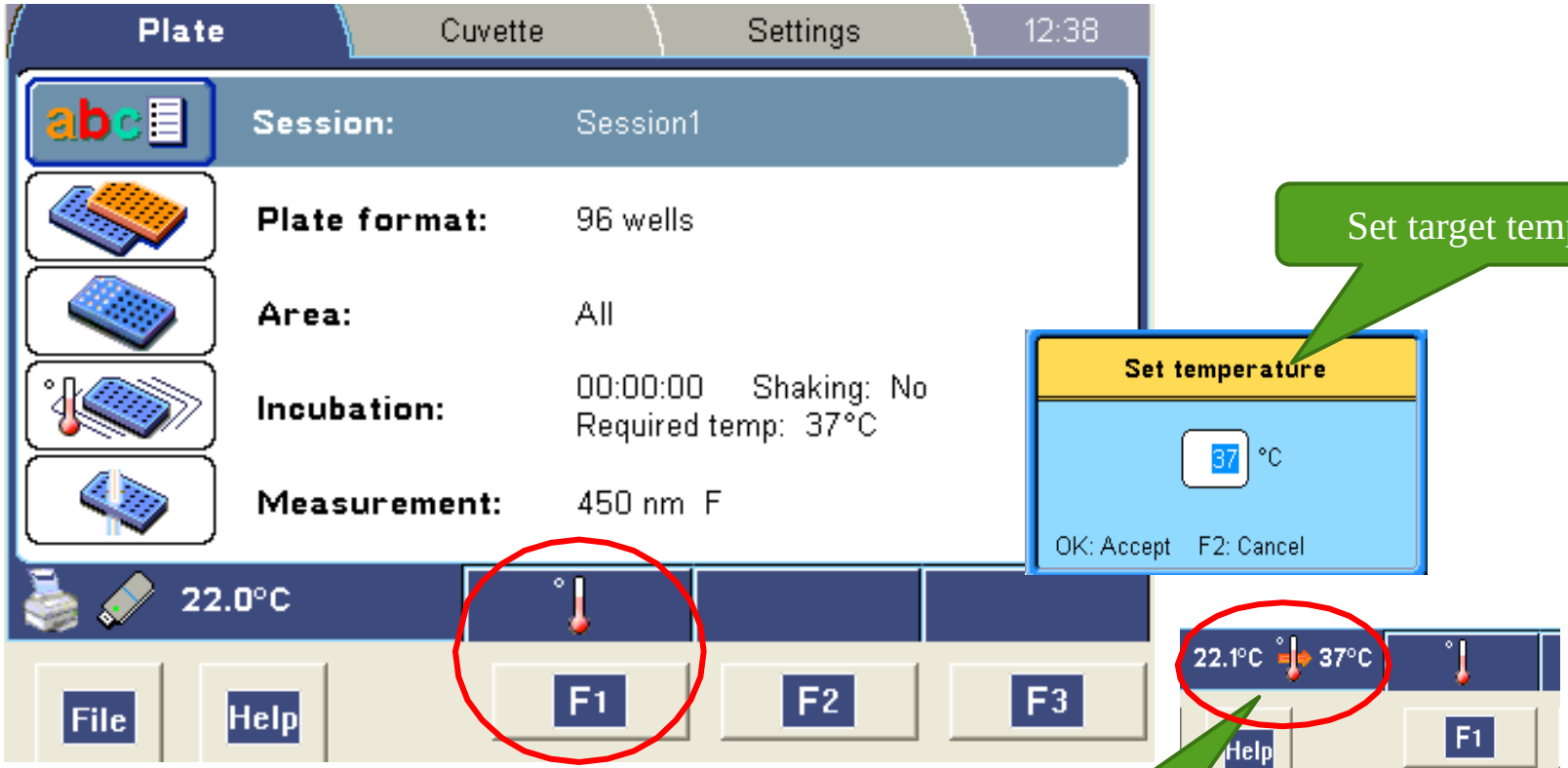
Operation-Incubator

- **“Incubation”**



- The incubator temperature can be controlled using F1 key

Instrument and Target temperature

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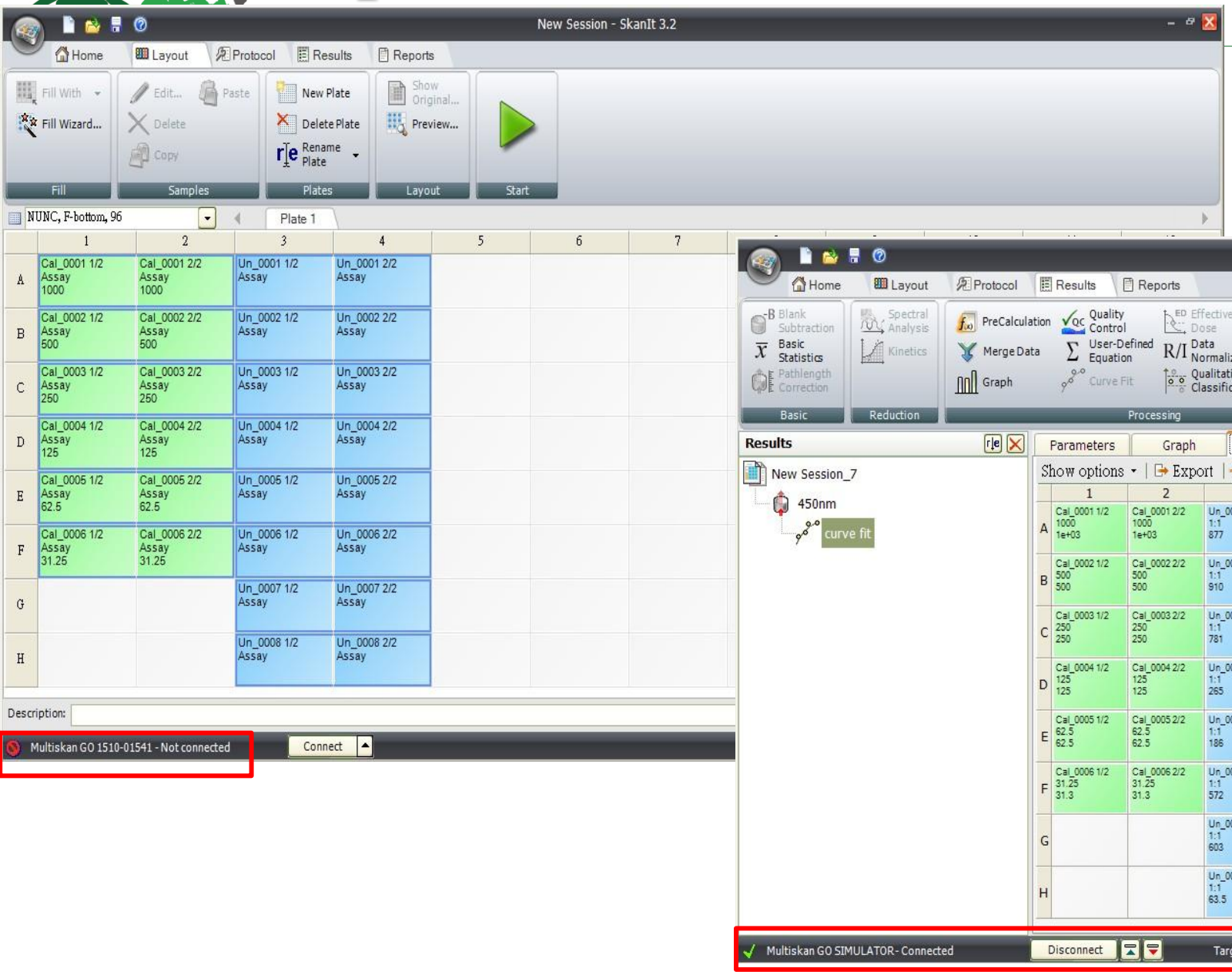
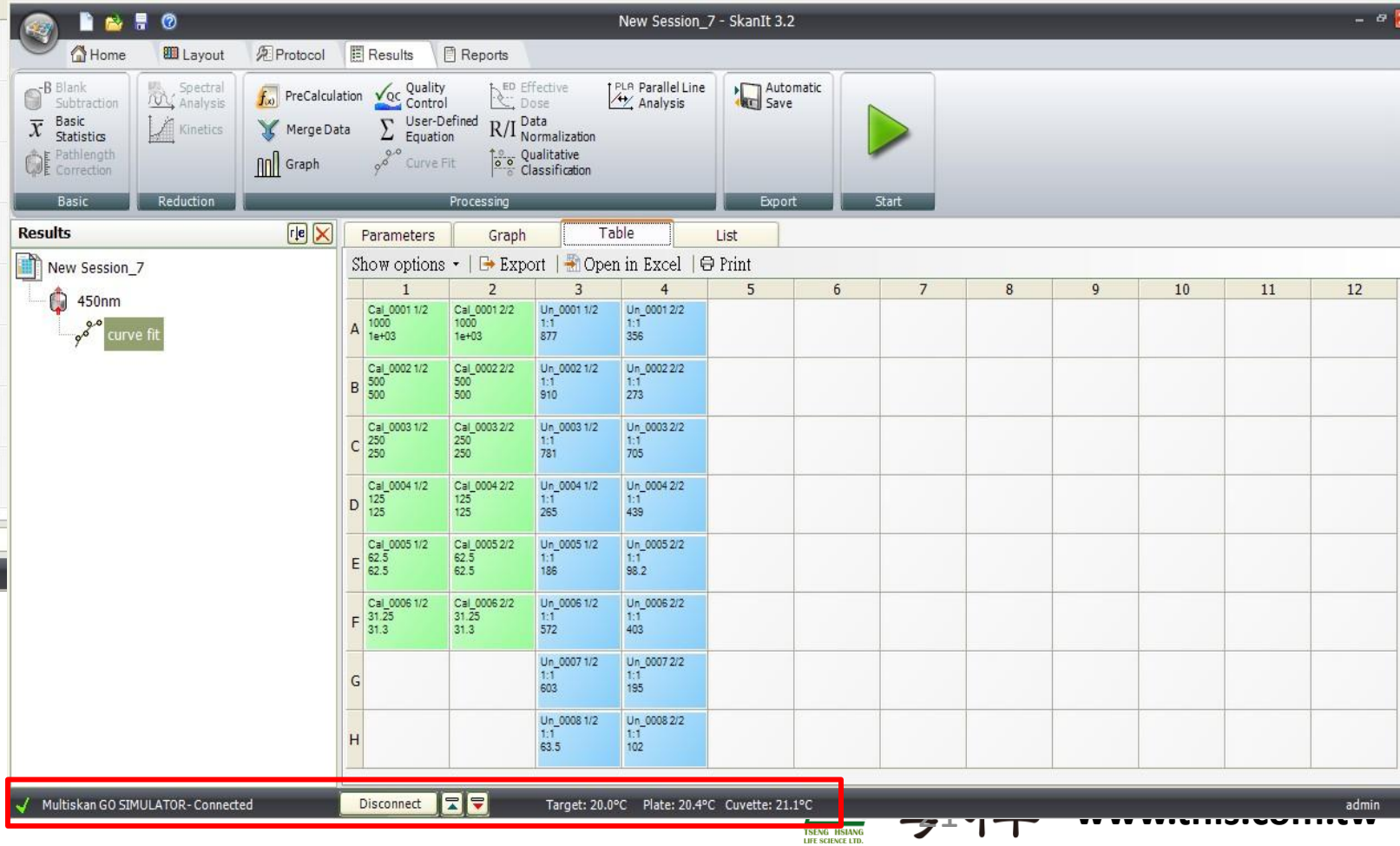
Operation

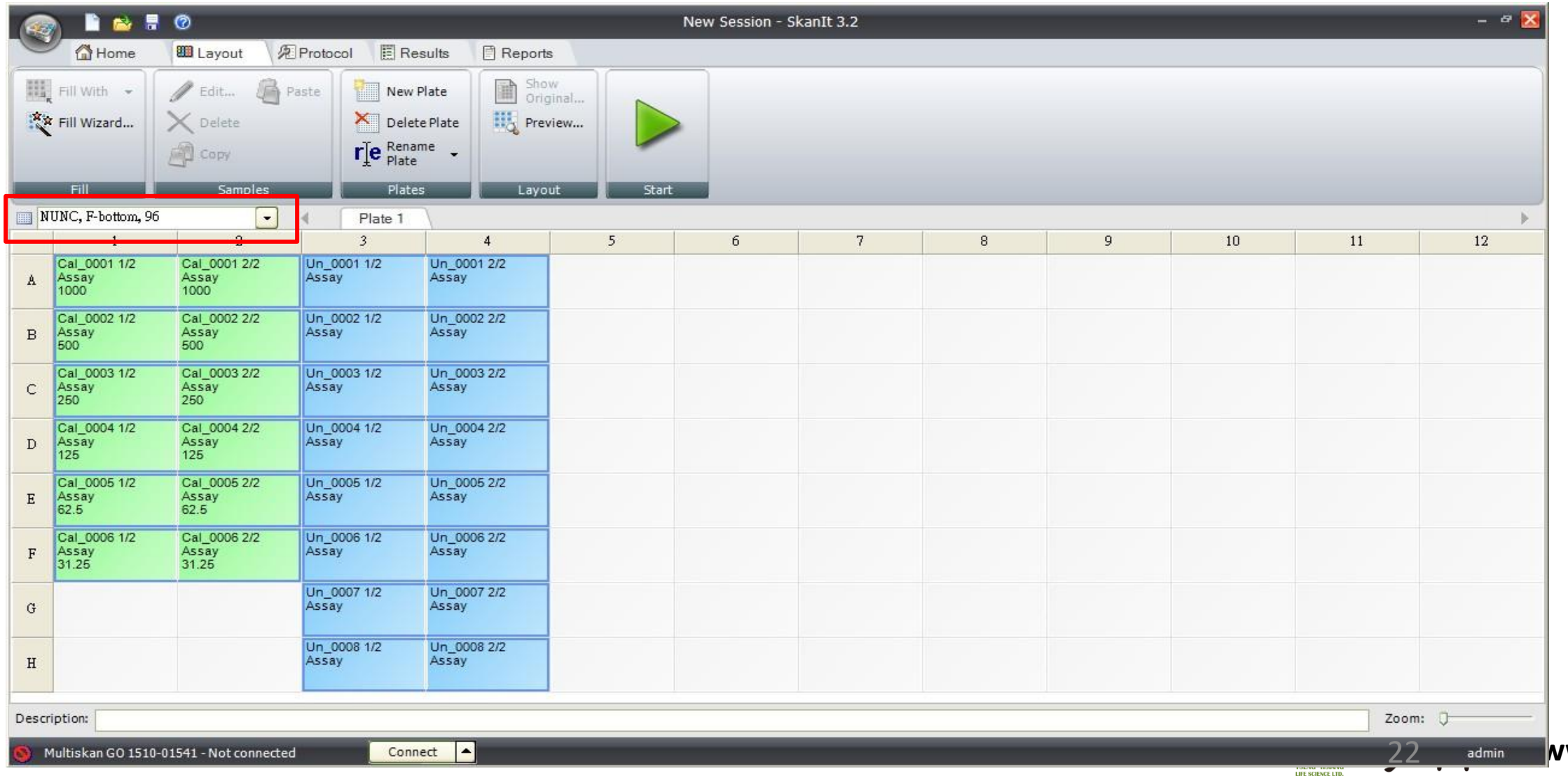
SkanIt Software





Operation-Plate measurement

- Setting “Microplate”



	1	2	3	4	5	6	7	8	9	10	11	12
A	Cal_0001 1/2 Assay 1000	Cal_0001 2/2 Assay 1000	Un_0001 1/2 Assay	Un_0001 2/2 Assay								
B	Cal_0002 1/2 Assay 500	Cal_0002 2/2 Assay 500	Un_0002 1/2 Assay	Un_0002 2/2 Assay								
C	Cal_0003 1/2 Assay 250	Cal_0003 2/2 Assay 250	Un_0003 1/2 Assay	Un_0003 2/2 Assay								
D	Cal_0004 1/2 Assay 125	Cal_0004 2/2 Assay 125	Un_0004 1/2 Assay	Un_0004 2/2 Assay								
E	Cal_0005 1/2 Assay 62.5	Cal_0005 2/2 Assay 62.5	Un_0005 1/2 Assay	Un_0005 2/2 Assay								
F	Cal_0006 1/2 Assay 31.25	Cal_0006 2/2 Assay 31.25	Un_0006 1/2 Assay	Un_0006 2/2 Assay								
G			Un_0007 1/2 Assay	Un_0007 2/2 Assay								
H			Un_0008 1/2 Assay	Un_0008 2/2 Assay								

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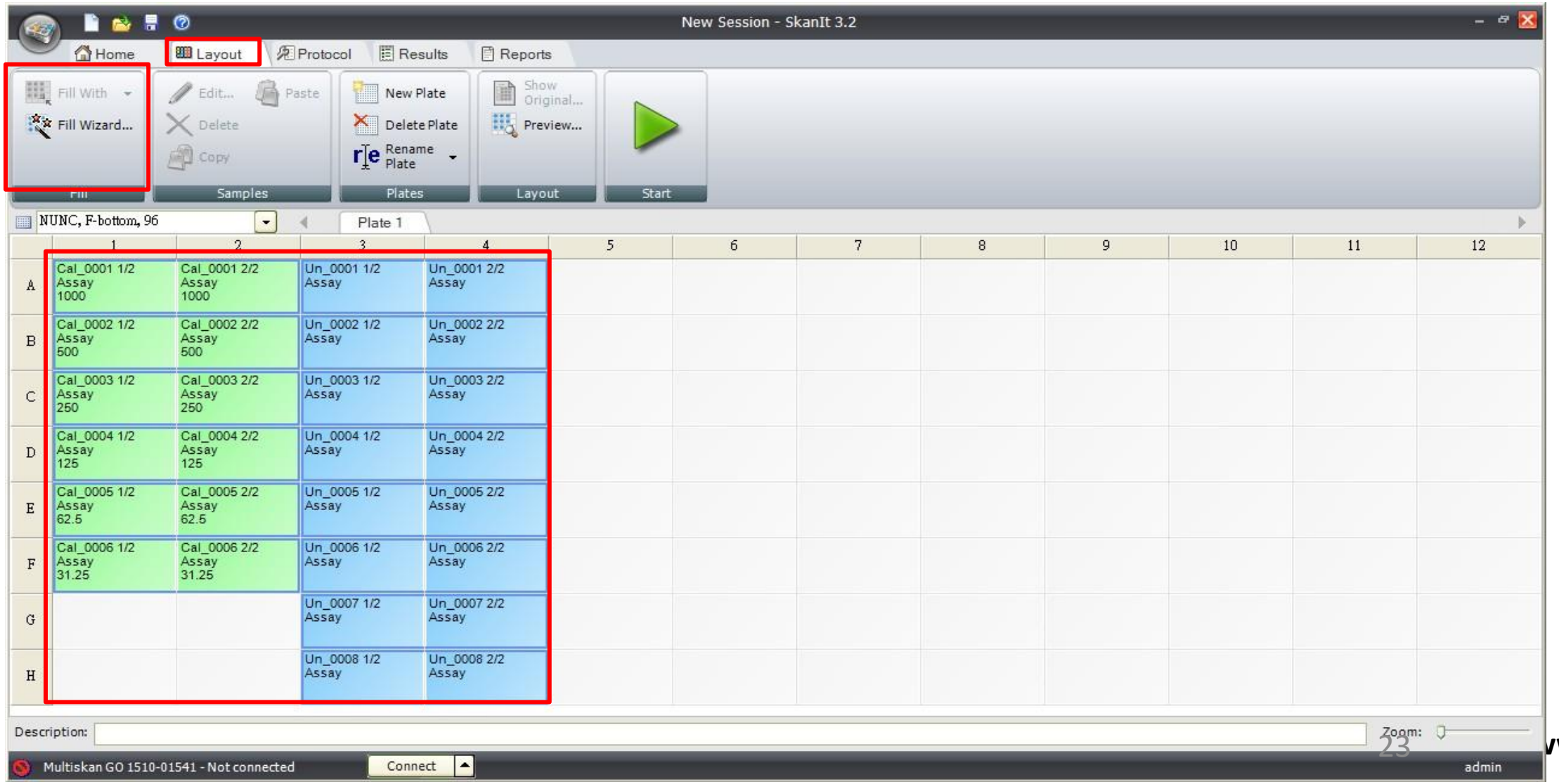
Operation-Plate measurement

- Setting "Layout"



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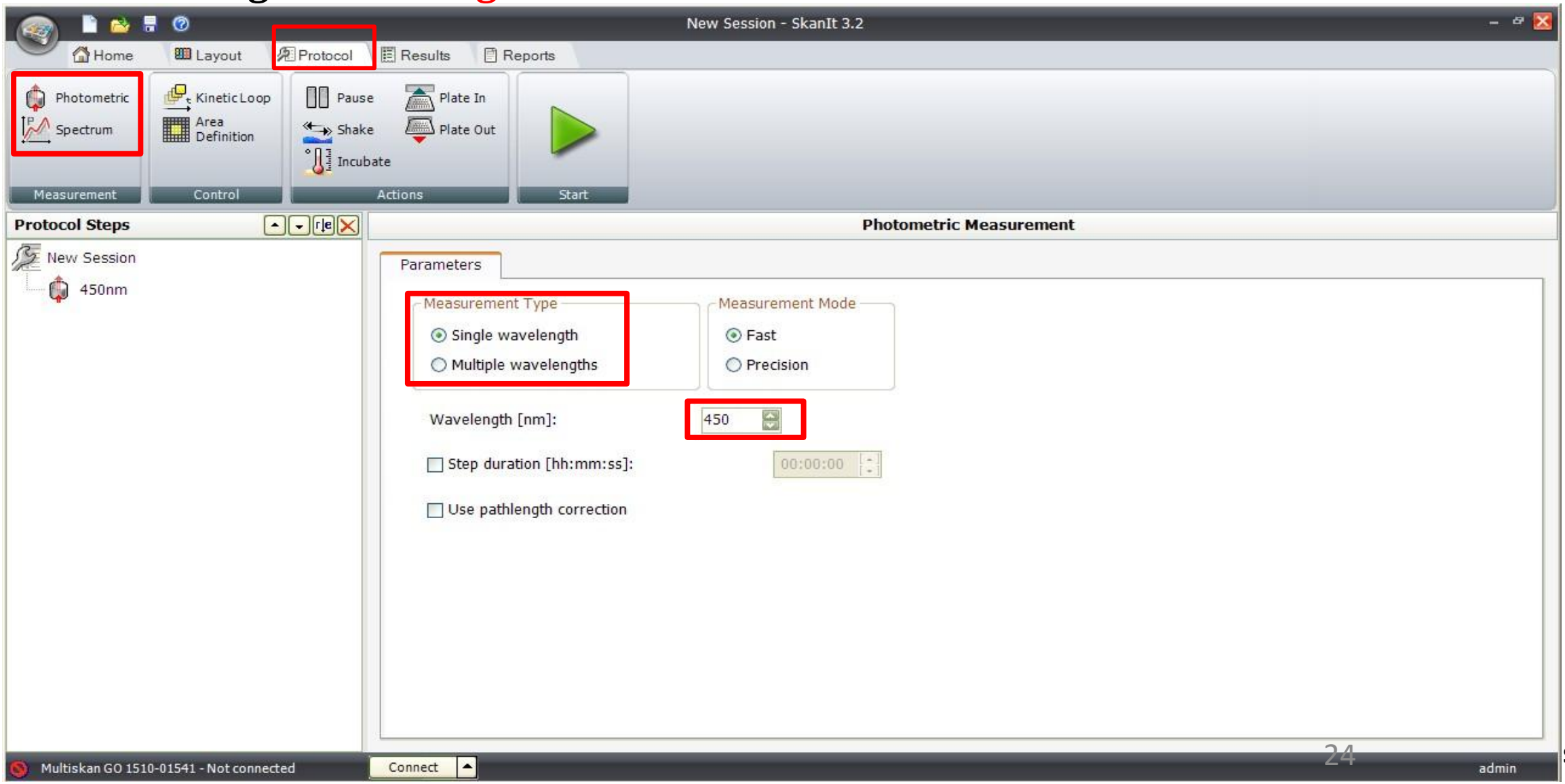
Operation-Plate measurement

- Setting “Wavelength"



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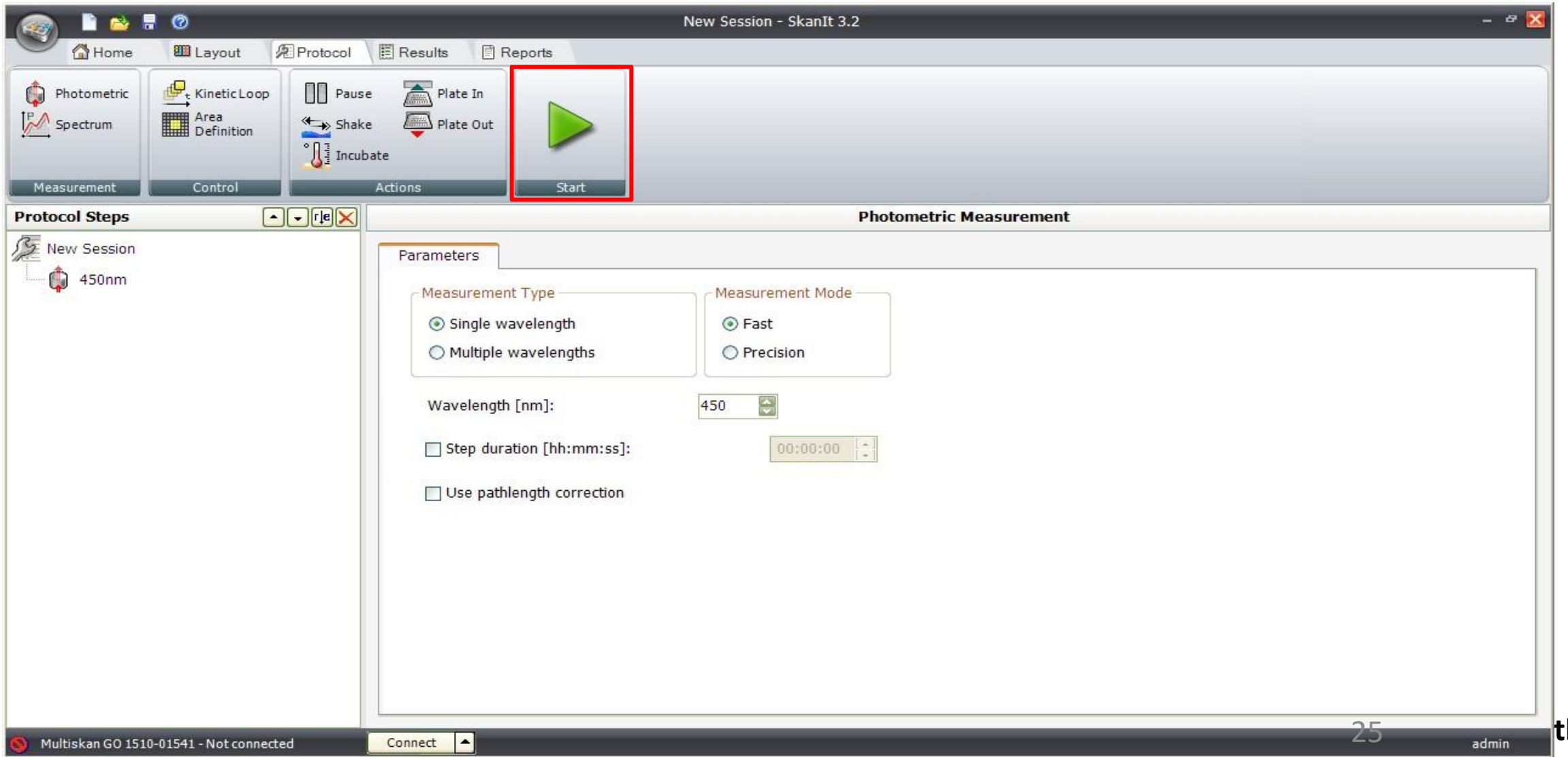
Operation-Plate measurement

- **“START“ Measurement**



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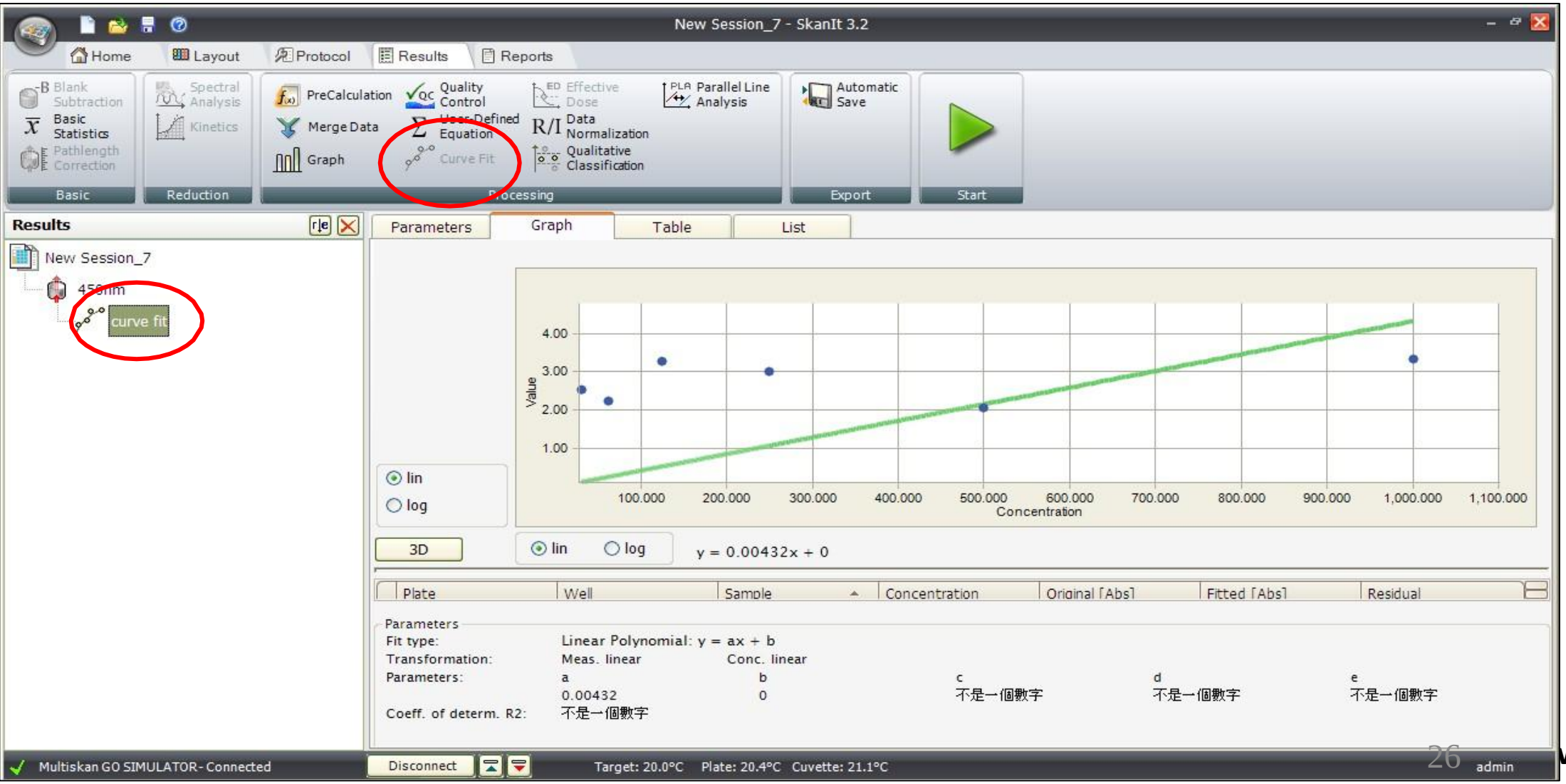
Operation

- Using “Curve fit” icon



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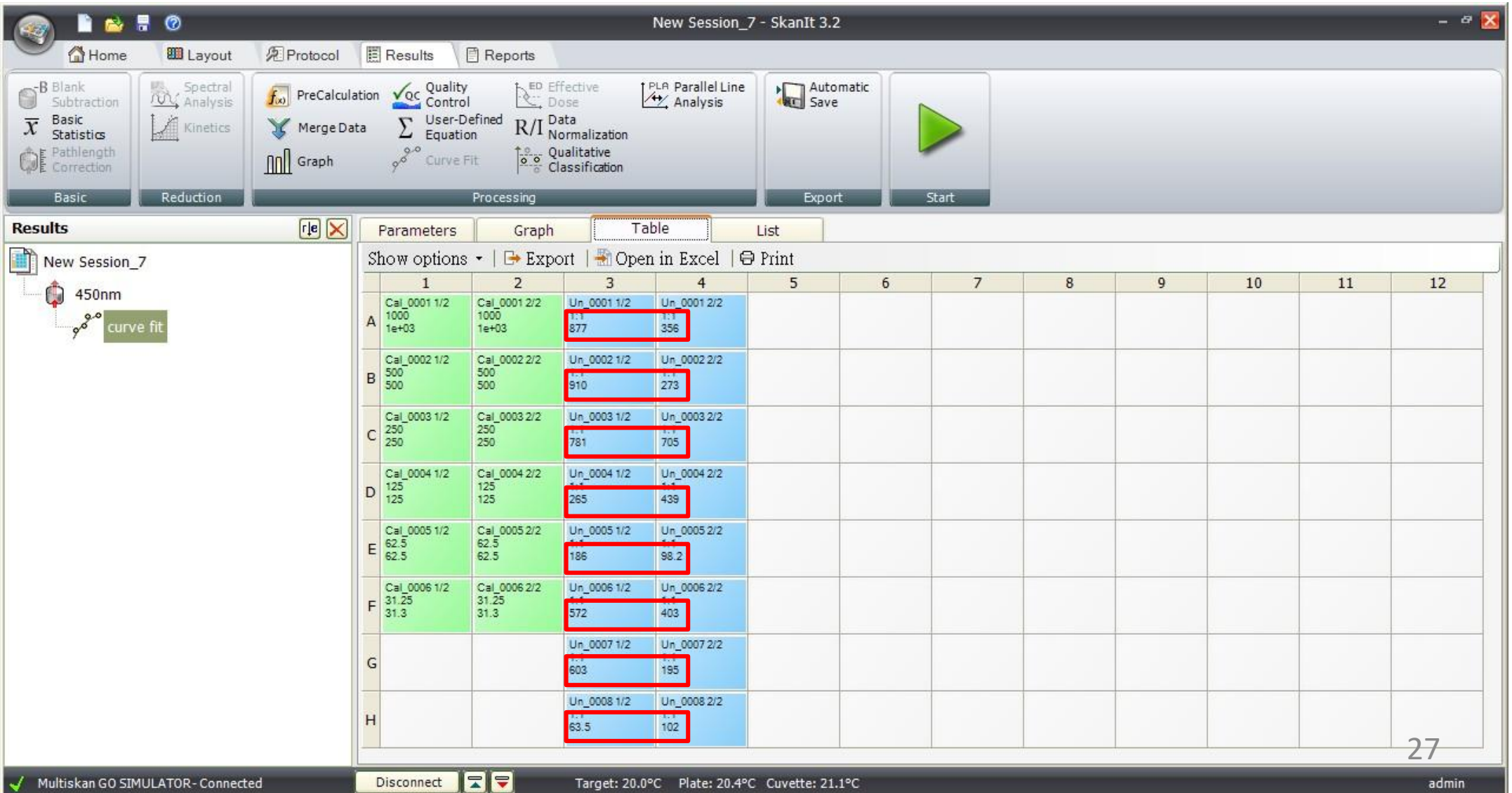
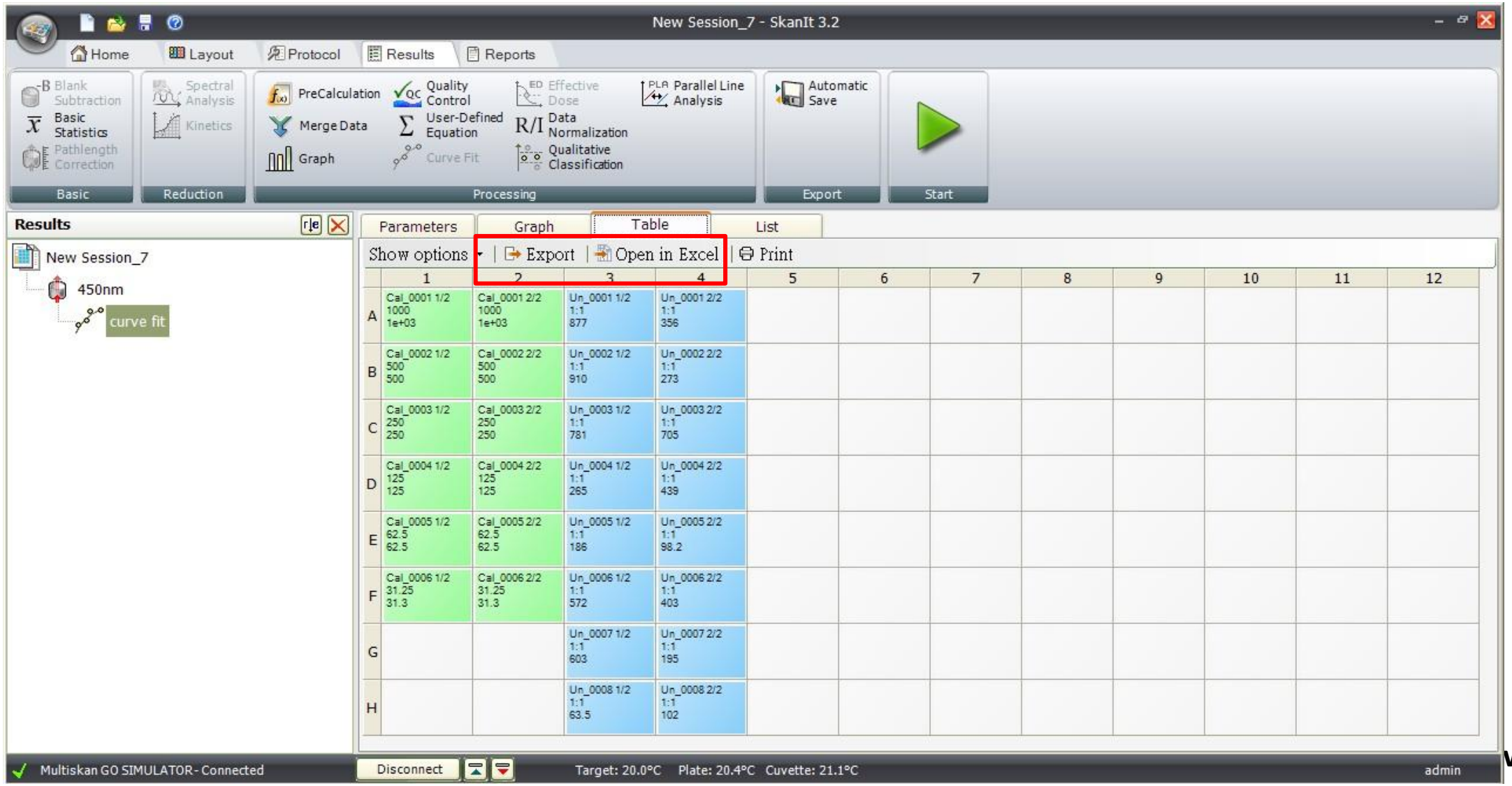
Operation-Plate measurement

- Sample concentration will be calculate **automatically**



Operation-Plate measurement

- **“Export“ Result**



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