

TM036 – Rapide Measurements

WiRE™ 5

This document aims to show the WiRE™ 5 user how to set-up Rapide measurements within WiRE 5. It assumes that the user is familiar with the basic operation of the software, the appropriate password(s) have been entered and that all necessary hardware is present which allows the capability.

Rapide enables higher speeds of data collection and is significantly faster than StreamHR and StreamLine measurements (used for static measurements only).

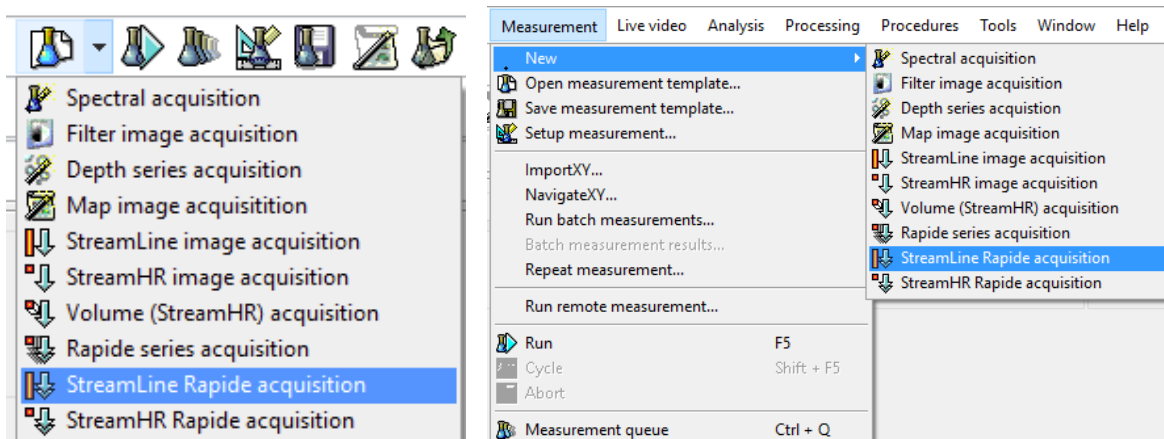
The different types of Rapide measurements which may be available are:

- **StreamLine Rapide acquisition** (high speed spectral collection of >1,400 spectra/s at varying lateral sample positions with a minimised laser power density)
- **StreamHR Rapide** (high speed spectral collection of >1,000 spectra/s at varying lateral sample positions)
- **Rapide series acquisition** (high speed data collection at a rate >1800 spectra/s at the same sample position).

StreamLine Rapide imaging

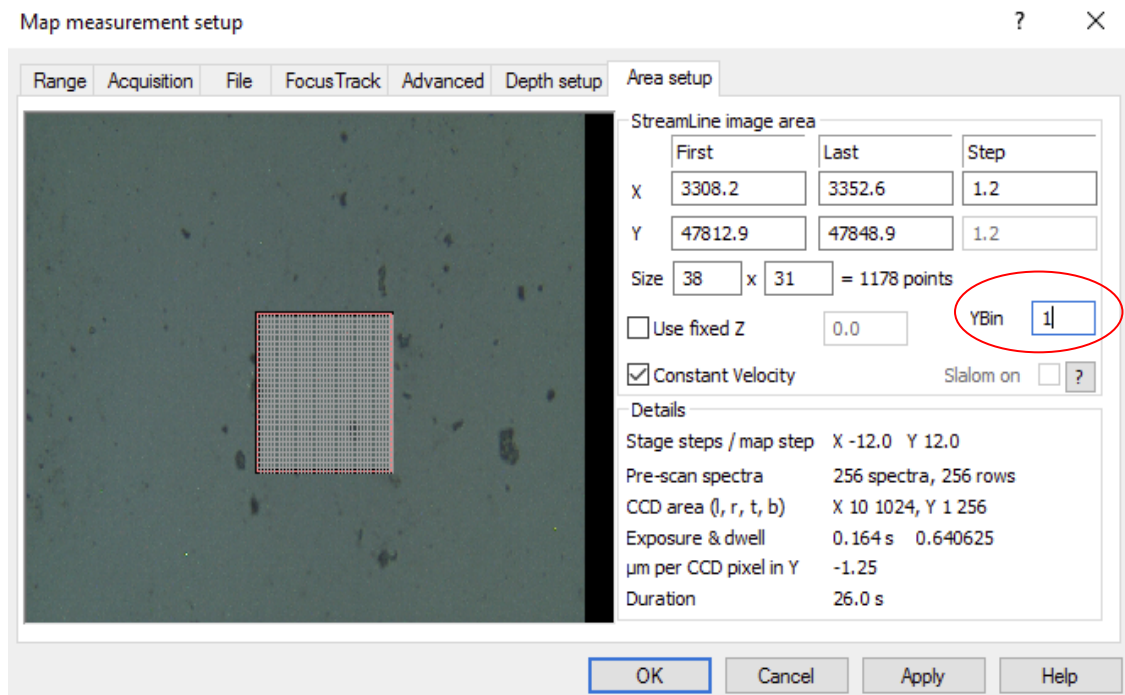
If the StreamLine map area is larger than the video field of view, take multiple white light images (montage) to define the analysis region. Ensure the correct objective for Raman data collection is selected on the sample review pane and that a **StreamLine (Linefocus) laser is selected**.

1. Position the sample in focus under the crosshairs.
2. Select **Measurement > New > StreamLine Rapide acquisition** to initiate the Map Image window.



Toolbar new measurement access (left), menu new measurement access (right).

3. Select **Video viewer** or **Active window** (containing the montage) to specify which viewer will be used to define the area to be mapped.
4. Click or drag on the video viewer or white light montage to select the area to be mapped.
5. If necessary, change the defined map area. (These parameters can also be changed in the next dialog).
6. Click **OK** to launch the measurement setup dialog.
7. In the **Area setup tab**, change the Y bin such that the Y spatial resolution is as desired (this will be a multiple of the native Y spatial resolution).



8. Constant velocity is selected by default for Rapide measurements, do not deselect this.
9. In the **Advanced tab**, the default speed/gain combination is selected as option 6: High sensitivity fastest readout mode. If very high signal levels are expected (e.g. photoluminescence) for the shorter acquisition times, consider selecting a lower gain. Data collection speed will be unaffected.

Map measurement setup

Range Acquisition File FocusTrack **Advanced** Depth setup Area setup

Scan Type

☐ SynchroScan
☐ Step

Minimum pixels in overlap / pixel: 0

☐ Match Overlap
☐ Discard overlap pixels

Camera settings

1000 s/s SLHR

Speed: high Gain: high

6: High sensitivity fastest readout mode

Pinhole

☐ In ☒ Out

Binning: 1
Laser focus / %: 0

Input polarization

Polarization: [dropdown]

OK Cancel Apply Help

10. Go to the **Range** tab and set the centre position of the scan.
11. Go to the **Acquisition** tab. The Acquisition provides additional information regarding the data collection rate during StreamLine Rapide.

As a default, the minimum exposure time is used in Rapide mode. Exposure times can be adjusted to higher values if required by imputing a value, and then clicking **Apply**. If you enter 0 s, it will ask you to select Rapide mode and reset to the minimum.

Map measurement setup

Range **Acquisition** File FocusTrack Advanced Depth setup Area setup

Exposure time / s: 0.000 Laser power / %: 100 Accumulations: 1

Exposure time = 164 ms
 Cycle time = 0.6406 ms (1560.98 Hz)
 Estimated duration = 0 days 00:00:25

Objective: 50

Live imaging

Not using live imaging.

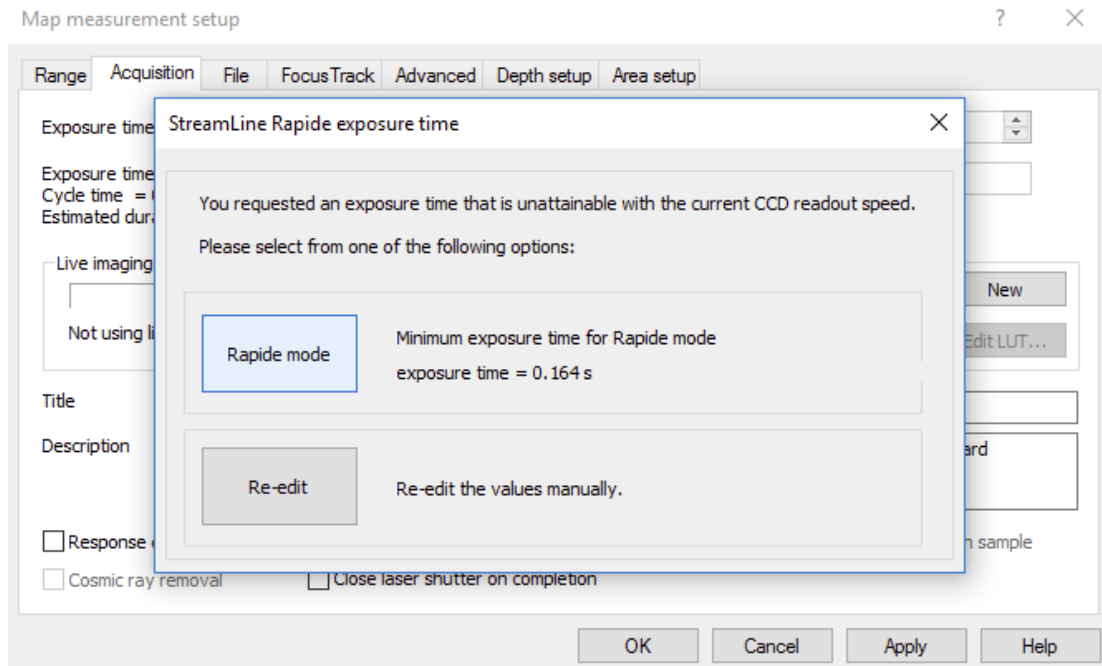
New Edit LUT...

Title: StreamLine Rapide image acquisition

Description: This is a StreamLine Rapide image measurement created by the Streamline image acquisition wizard

☐ Response calibration ☐ Restore instrument state on completion ☐ Minimize laser exposure on sample
☐ Cosmic ray removal ☐ Close laser shutter on completion

OK Cancel Apply Help

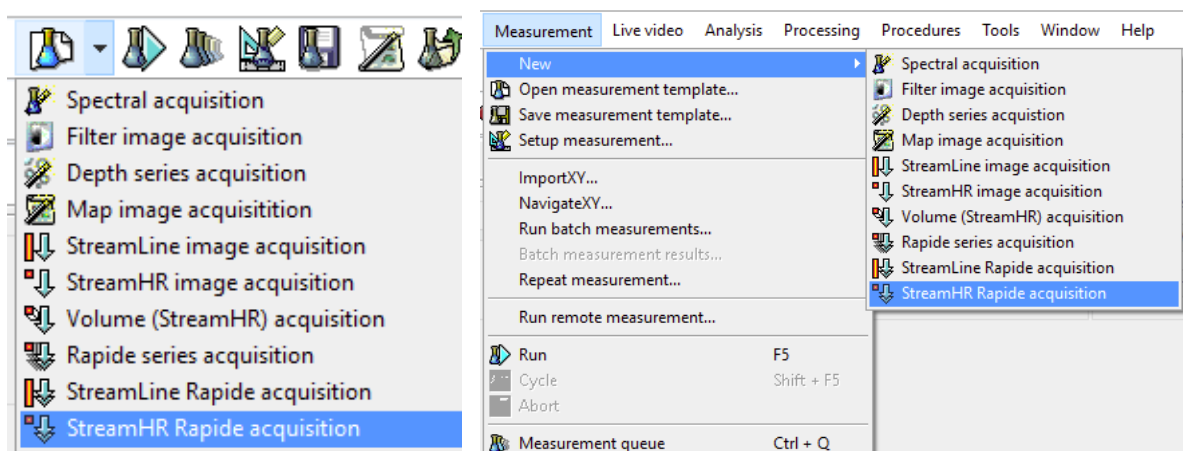


12. Click **OK** and run the measurement.

StreamHR Rapide imaging

If the StreamHR map is larger than the video field of view, take multiple white light images (montage) to define the analysis region. Ensure the correct objective for Raman data collection is selected on the sample review pane. Ensure that a point focus laser has been selected (do NOT use StreamLine or Linefocus lasers).

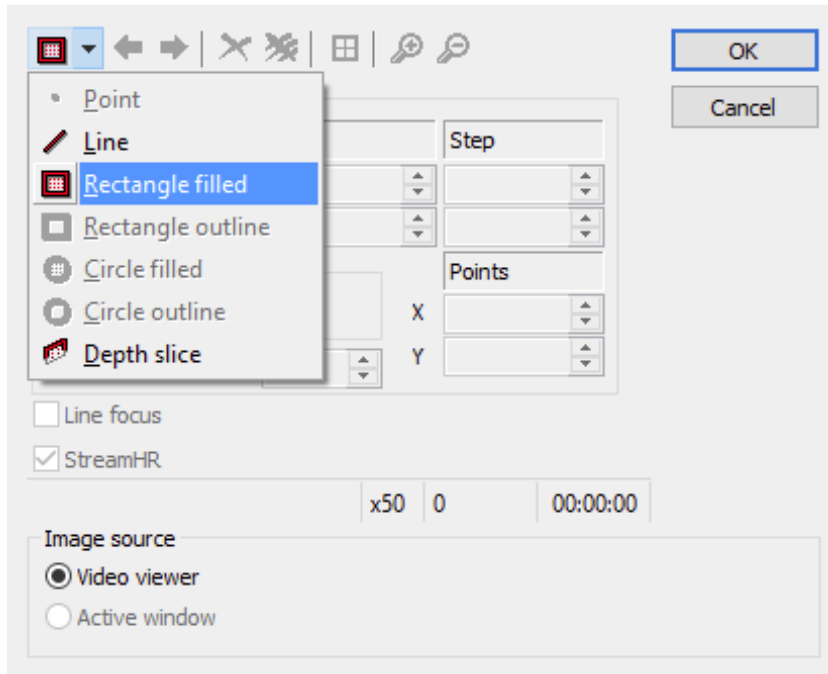
1. Position the sample in focus under the crosshairs.
2. Select **Measurement > New > StreamHR Rapide acquisition** to initiate the Map Image window.



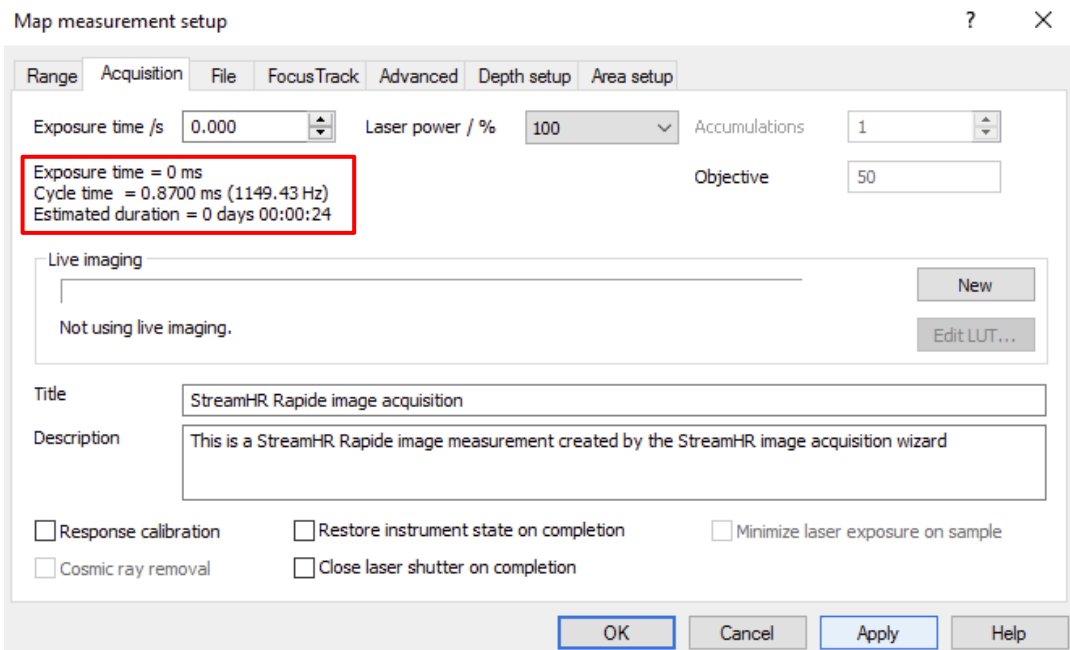
Toolbar new measurement access (left), menu new measurement access (right).

- Define the collection area on the Video viewer, or still image viewer, and then click **OK**. Use the **filled rectangle only** (do not use any other area selection type) to define the mapping area.

Map image area selection



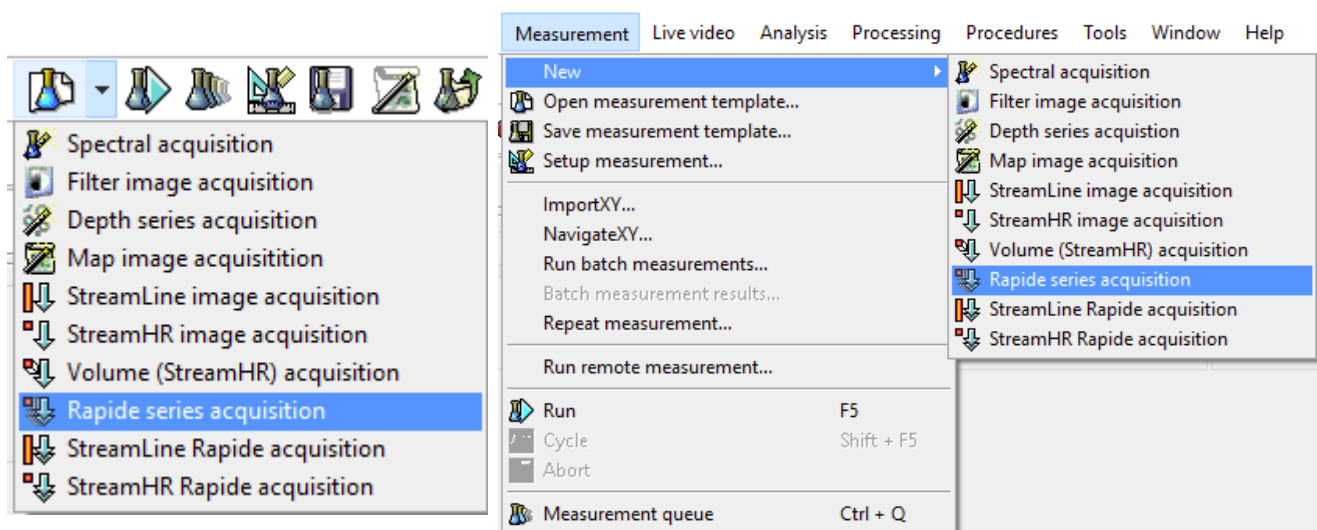
- In the Map Measurement setup dialog, set up the relevant measurement parameters. Constant velocity will be selected by default in the **Area setup** tab as well as option 6: High sensitivity fastest readout mode in the **Advanced** tab.
- In the **Acquisition** tab, a default exposure time of 0.0 s will be selected. This corresponds to the minimum exposure time that can be used (approx. 0.6 ms). Cycle time is the rate at which the signal is being collected by the detector. Increase the exposure to get sufficient signal from your sample.



6. Click **OK** and run the measurement.

Rapide series measurement

1. Position the sample in focus under the crosshairs.
2. Select **Measurement > New > Rapide series acquisition** from the drop down menu.



Toolbar new measurement access (left), menu new measurement access (right).

3. Set the relevant measurement parameters in the **Range tab** of the spectral acquisition tab.
4. In the **Rapide series tab**:
 - Increasing spectral axis binning decreases spectral resolution but increases signal levels (as a default, this is set to 1).
 - Row binning changes the number of CCD rows which are binned together
 - When a binning of 1 (by default) is used, spectra are taken from one row of the CCD that has moved down the detector before being read out. It is therefore an average spectrum over the time taken to travel down the rows of the CCD (defined for that configuration) which are used for the measurement.
 - Binning rows takes slightly more time (so measurements with row binning greater than 1 will take longer). Spectra from the binned number of rows are read out at exactly the same time point but do not produce more signal.

Spectral acquisition setup

Range Rapide Series File Advanced

Spectral axis binning 1 Row binning 1 Laser power / % 100

Rapide series

Spectra to collect 1000 Spectra to discard 256

Minimum cycle time: 541 μ s 0 μ s additional delay

Total cycle time: 541 μ s
 Spectral rate: 1848.43 spectra per second
 Total measurement time: 00 seconds

Live imaging

Not using live imaging.

New

Edit LUT...

Title Single scan measurement

Description A single scan measurement generated by the WiRE spectral acquisition wizard.

☐ Close laser shutter on completion ☐ Restore instrument state on completion ☐ Minimize laser exposure on sample

OK Cancel Apply Help

- Spectra to collect is the total number of spectra collected in the measurement.
- The minimum cycle time (effectively the acquisition time) will then be calculated after selecting **Apply**. An additional delay can be added to this cycle time, increasing the exposure time used to acquire each spectrum in the series.

5. Select **OK** and run measurement.