

HighFinesse  
The Standard of Accuracy

HighFinesse Tutorial

# Setting up the HighFinesse LWA-10k and LWA-100k

## How to ...

# ... set up the HighFinesse LWA-10k and LWA-100k

This tutorial does not replace reading the linewidth analyzer (LWA) user manual.

Make sure that your laser input fulfills the following requirements:





- a) The **laser must be cw.**
- b) The **laser must not be scanned during the measurement.**
- c) **Provide 0.5 to 10 mW in a SM Fiber with FC/APC connector.**  
Ideally provide 5 to 10 mW for the best performance of the instrument.
- d) The **laser must not exceed the maximum linewidth specified for the LWA-10k - 30 MHz @ 100 ms and LWA-100k - 100 MHz @ 100 ms.**
- e) In case the **laser is sensitive to back reflection** the **use of an isolator with 55 dB between laser and LWA** is recommended.



LWA products brochure

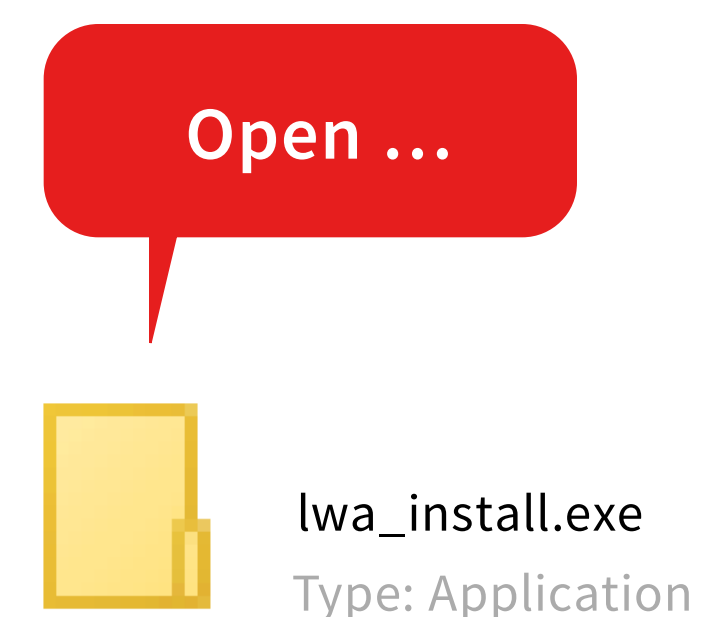
[https://www.highfinesse.com  
/en  
/linewidthanalyzer  
/linewidthanalyzer-further-information  
/product-brochure-linewidthanalyzer.pdf](https://www.highfinesse.com/en/linewidthanalyzer/linewidthanalyzer-further-information/product-brochure-linewidthanalyzer.pdf)

1

 bin	24.08.2022 09:38	Dateiordner
 drivers	24.08.2022 09:38	Dateiordner
 Control Measurement.pdf	04.07.2022 10:08	PDF Document
 lwa_install.exe	04.07.2022 17:25	Anwendung

Install the Software that is located on the USB Flash Drive by clicking on lwa\_install.exe.

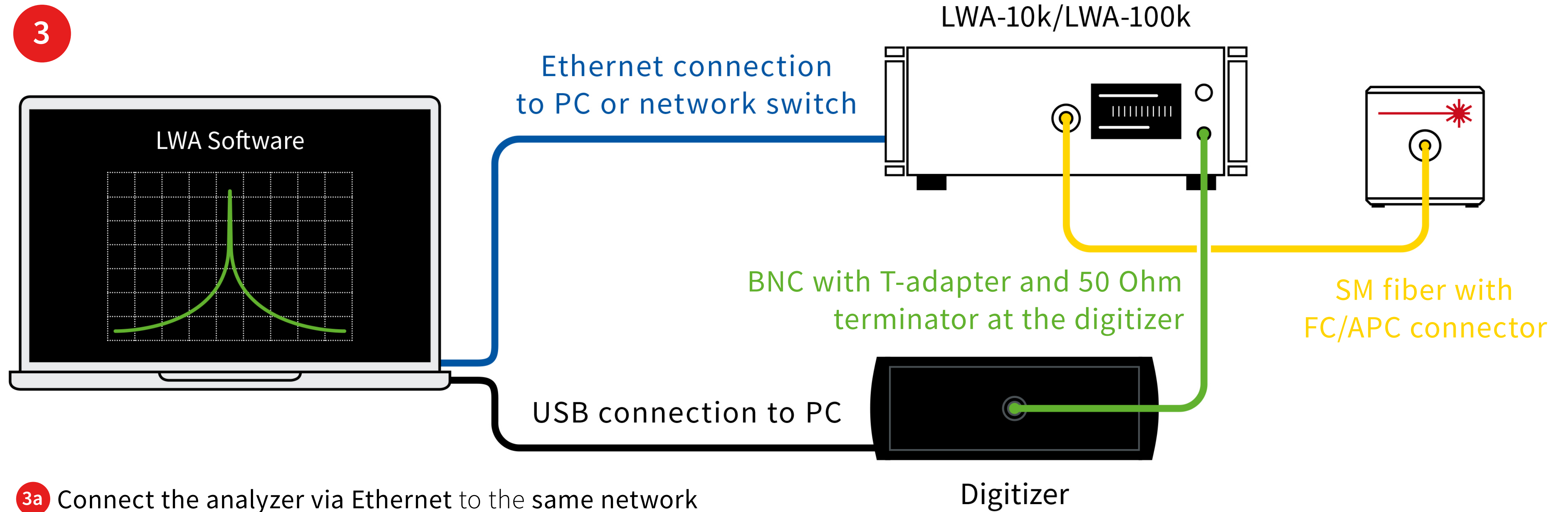
2



We recommend the following specs for the computer:

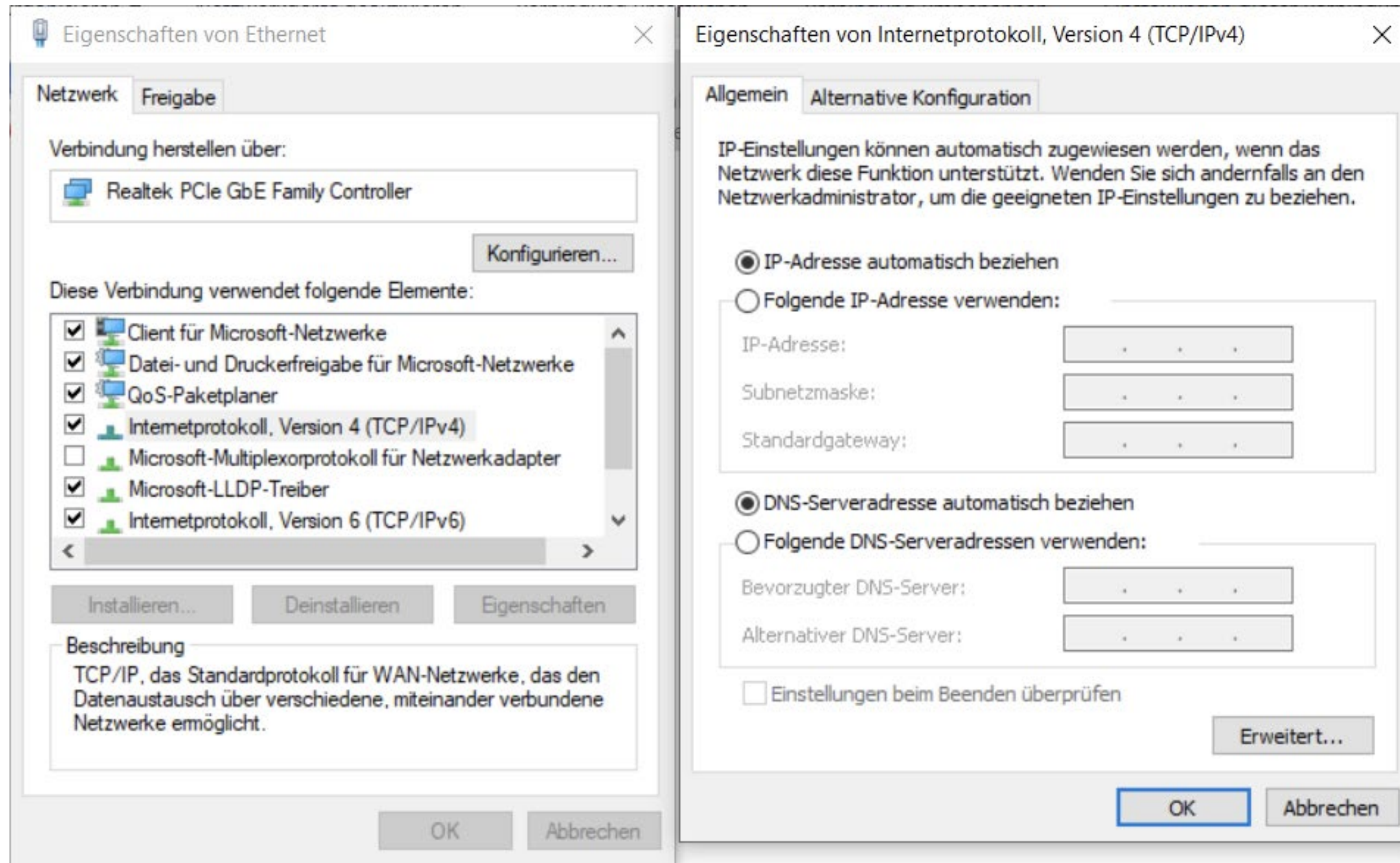
- Windows 10, 64 bit or higher
- Intel® Core™ i5 equivalent or better
- Memory 16 GB or better
- At least 1 Ethernet and 1 USB 3.0 Port





- 3a** Connect the analyzer via Ethernet to the same network as the computer running the Software.
- 3b** Connect the digitizer via USB to the same computer running the software.
- 3c** Connect the analyzer output to the digitizer input using the BNC cable (with T-adapter with 50 Ohm termination at the digitizer).
- 3d** Connect the laser via an SM fiber with FC/APC connector.



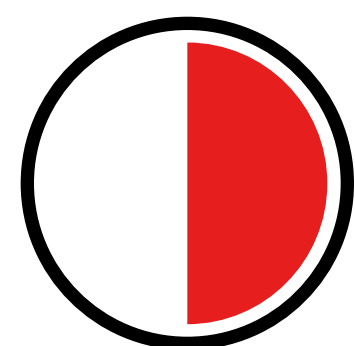


In case you would like to **directly connect** the instrument to the computer using an **Ethernet cable** make sure the **TCP/IP** protocol of the network adapter is set to automatic.

5



HighFinesse  
Linewidth Analyzer  
Control

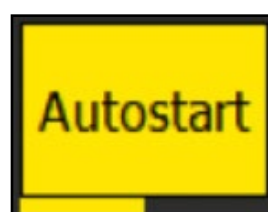


30 sec.

Turn on the Analyzer and start the LWA Software.

Wait for the LWA to adapt to the laser. This can take up to 10 minutes but typically takes 30 seconds.

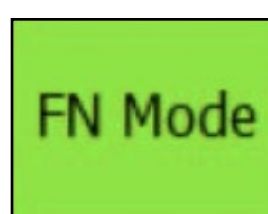
6



**Autostart:** the instrument is warming up and initializing.



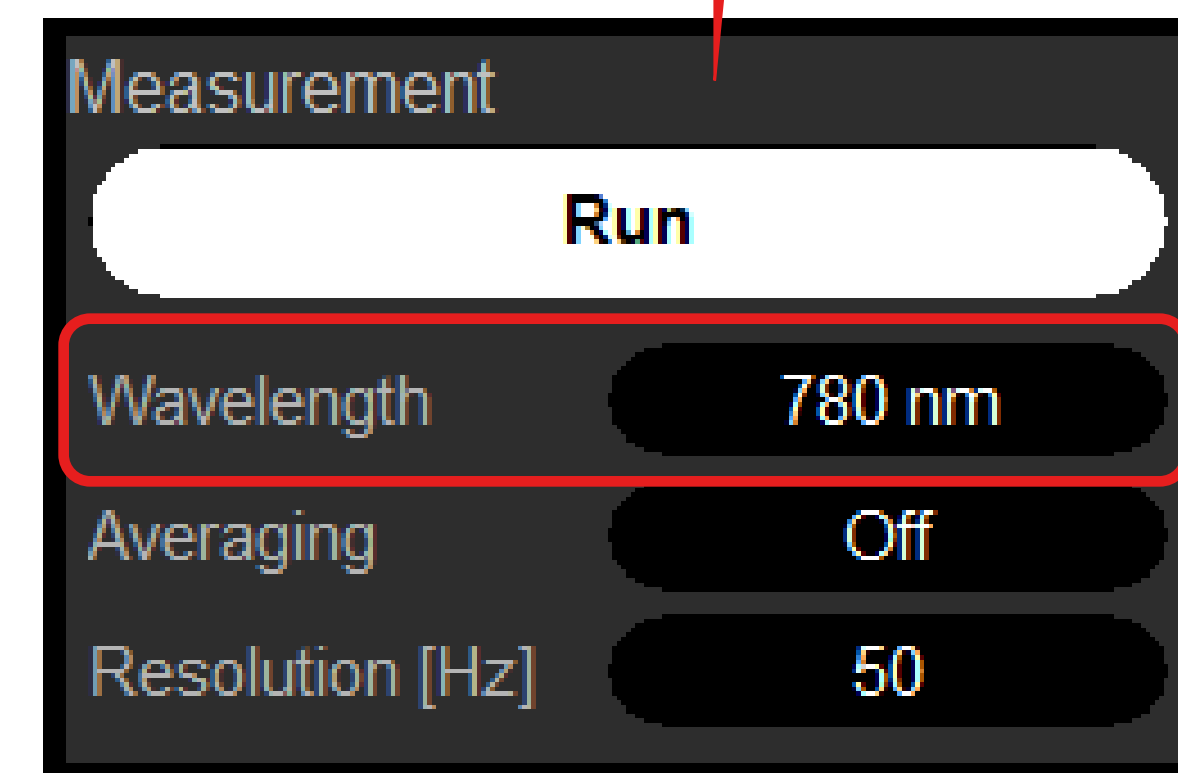
**Adapting:** the instrument is adjusting to the laser.



**FN Mode:** the instrument is attuned to the laser and the frequency deviations can be measured.

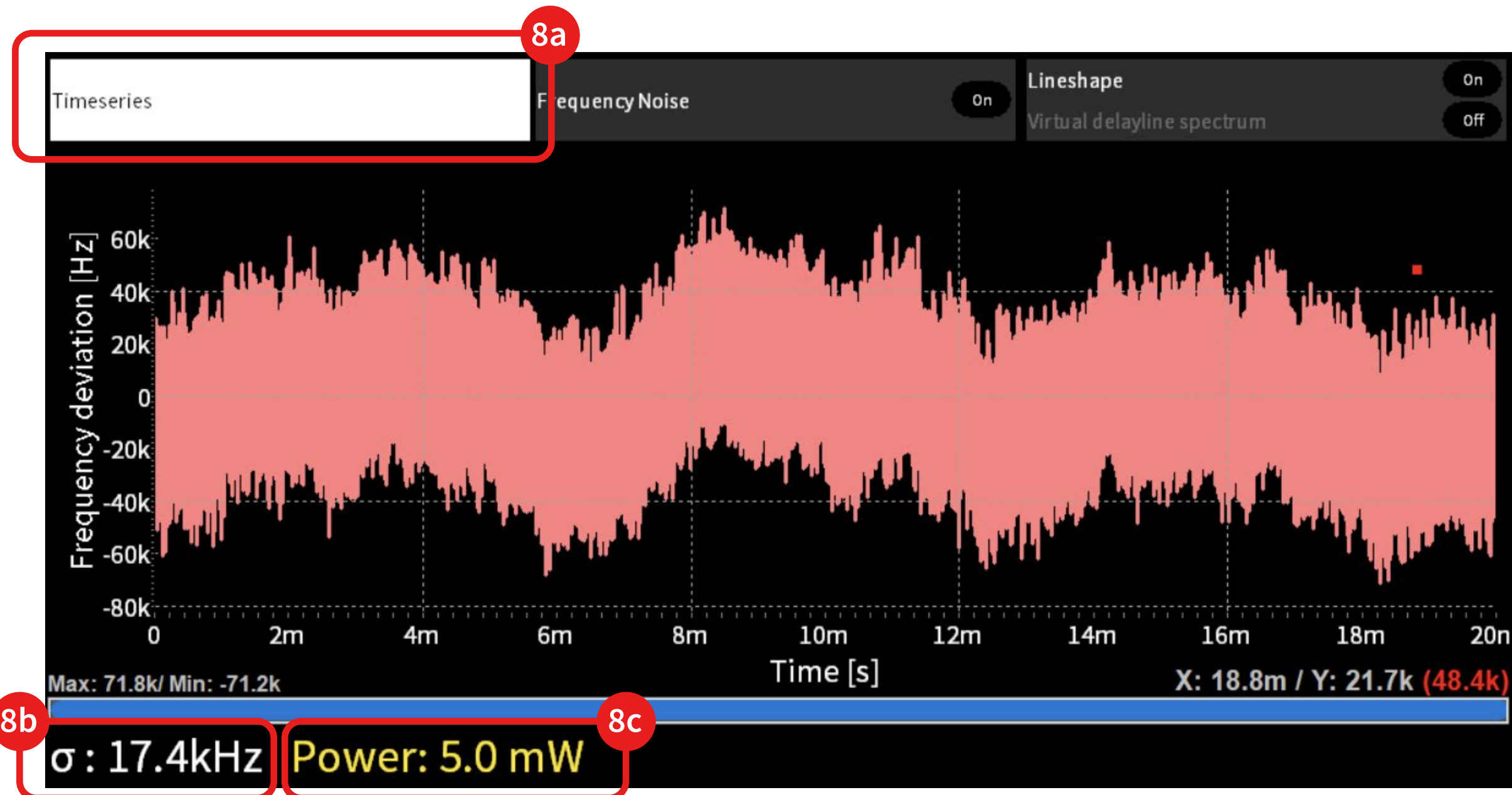
7

Enter the wavelength and click to run ...



Enter the wavelength and start the Measurement by clicking on “Run”.

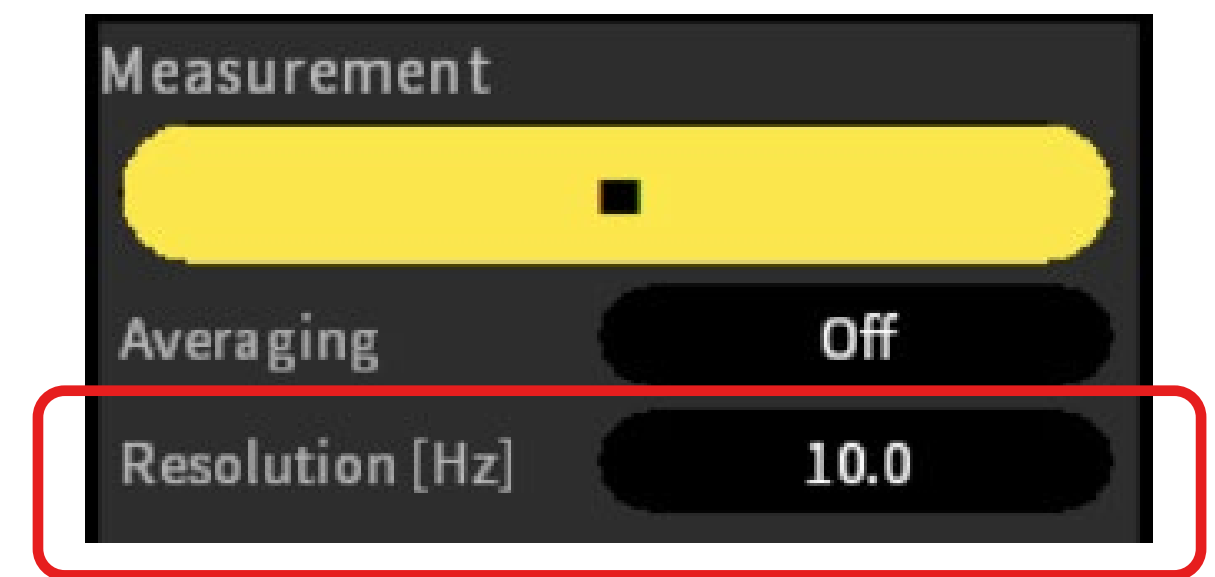
8



Click to the “Timeseries” frame **8a** to display the fundamental data measured by the instrument: The frequency deviations are displayed as a function of time.

The indicator **8b** shows the standard deviation of the observed frequency deviations. This should not be mistaken by the linewidth. The indicator **8c** shows an estimation of the laser power.

9



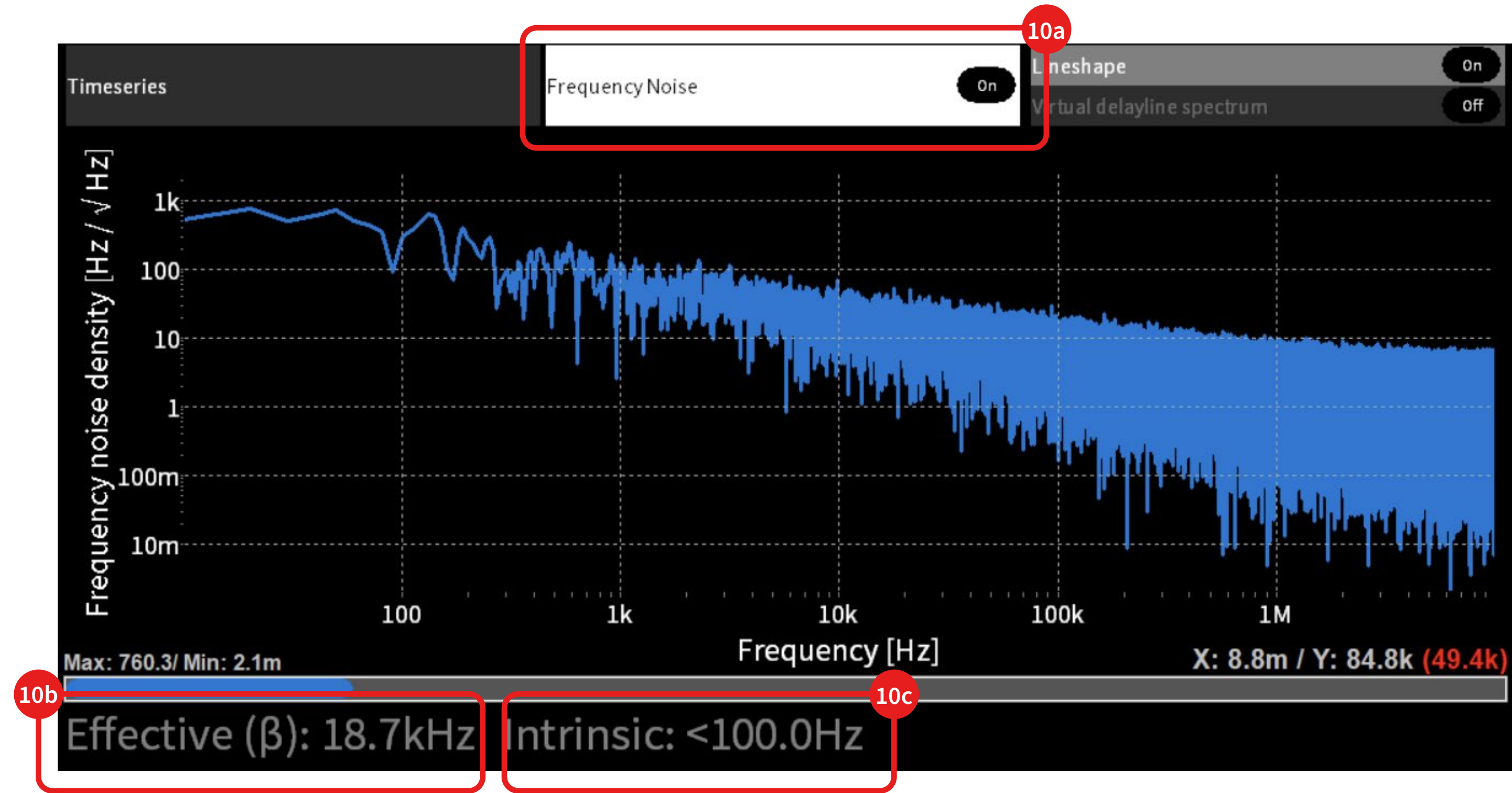
Adjust the Resolution [Hz]/measurement time.

10 Hz corresponds to the maximum measurement time of 100 ms.

This will both affect the measurement time and resolution in the frequency noise density spectrum.



10



The effective linewidth displayed in the lower left corner **10b** gives you the linewidth over the measurement time as specified in “Resolution[Hz]/ measurement time”.

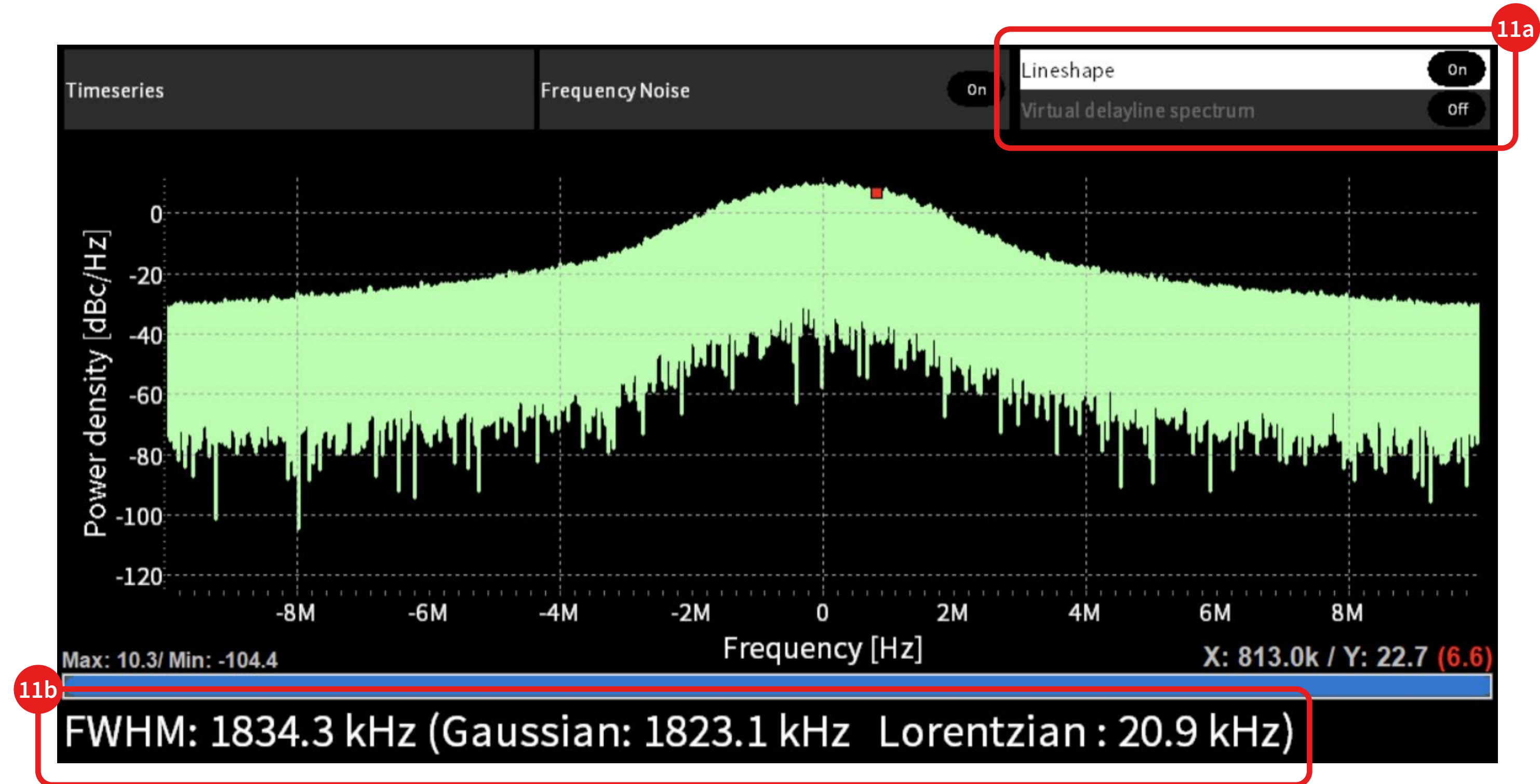
The intrinsic linewidth **10c** is derived from the noise between 1 and 10 MHz and corresponds to an observation time of 1  $\mu$ s.

Move to the “Frequency Noise” frame **10a** to display the frequency noise density as a function of the perturbation frequency.





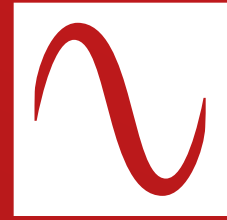
11



Move to the “Lineshape” frame **11a** to display the lineshape.

A Voigt model is fitted to the lineshape yielding the Gaussian and Lorentzian linewidth **11b**.





HighFinesse  
The Standard of Accuracy



HighFinesse GmbH  
Wöhrdstraße 4  
72072 Tübingen, Germany



T + 49 (0) 7071 - 53 918 0



F + 49 (0) 7071 - 53 918 99



M [info@highfinesse.com](mailto:info@highfinesse.com)



Additional information  
and distributors:



[www.highfinesse.com](http://www.highfinesse.com)