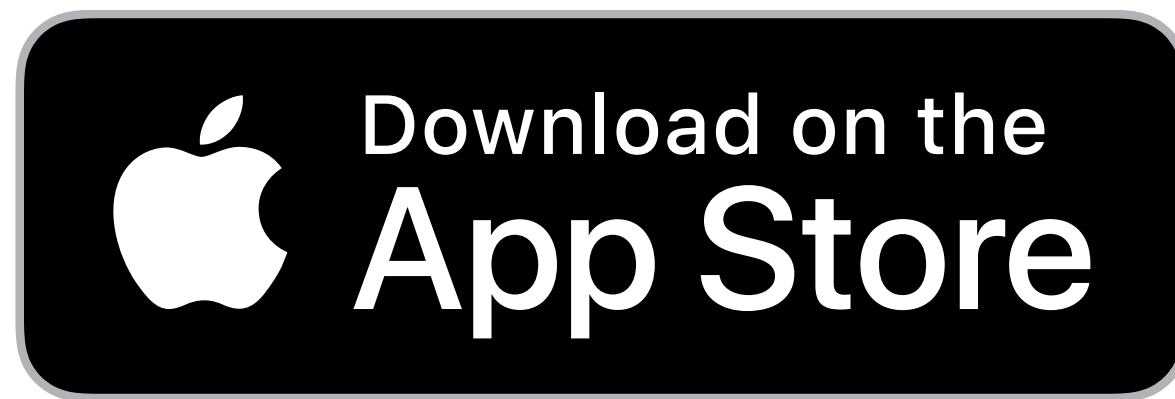


Open Sound Meter



Overview v1.1

iPad OS



Version for the iPadOS available at App Store by commerce license.



What is Open Sound Meter

Cross-platform
measurement application
for tuning sound systems
in real-time



Main goals

- **K**eeep only really needed functions
- **I**ndividual functions should be easily and quickly accessible
- **S**imple interface
- **S**upport young engineers

Similar to a design principle noted by the [U.S. Navy](#) in 1960: keep it simple, stupid



Supported systems

iPad	from iOS12
macOS	from 10.13
Windows x64	from 7
Linux	ApplImage (Glibc 2.29 or above)

If you can't find binaries for your system, build it with Qt5.15



Is it free? Really?

Desktop versions are distributed by the model
pay what you want

Just remember, every donation is a great help for
further development.

iPad version are distributed by low reasonable price.

<https://opensoundmeter.com/about>

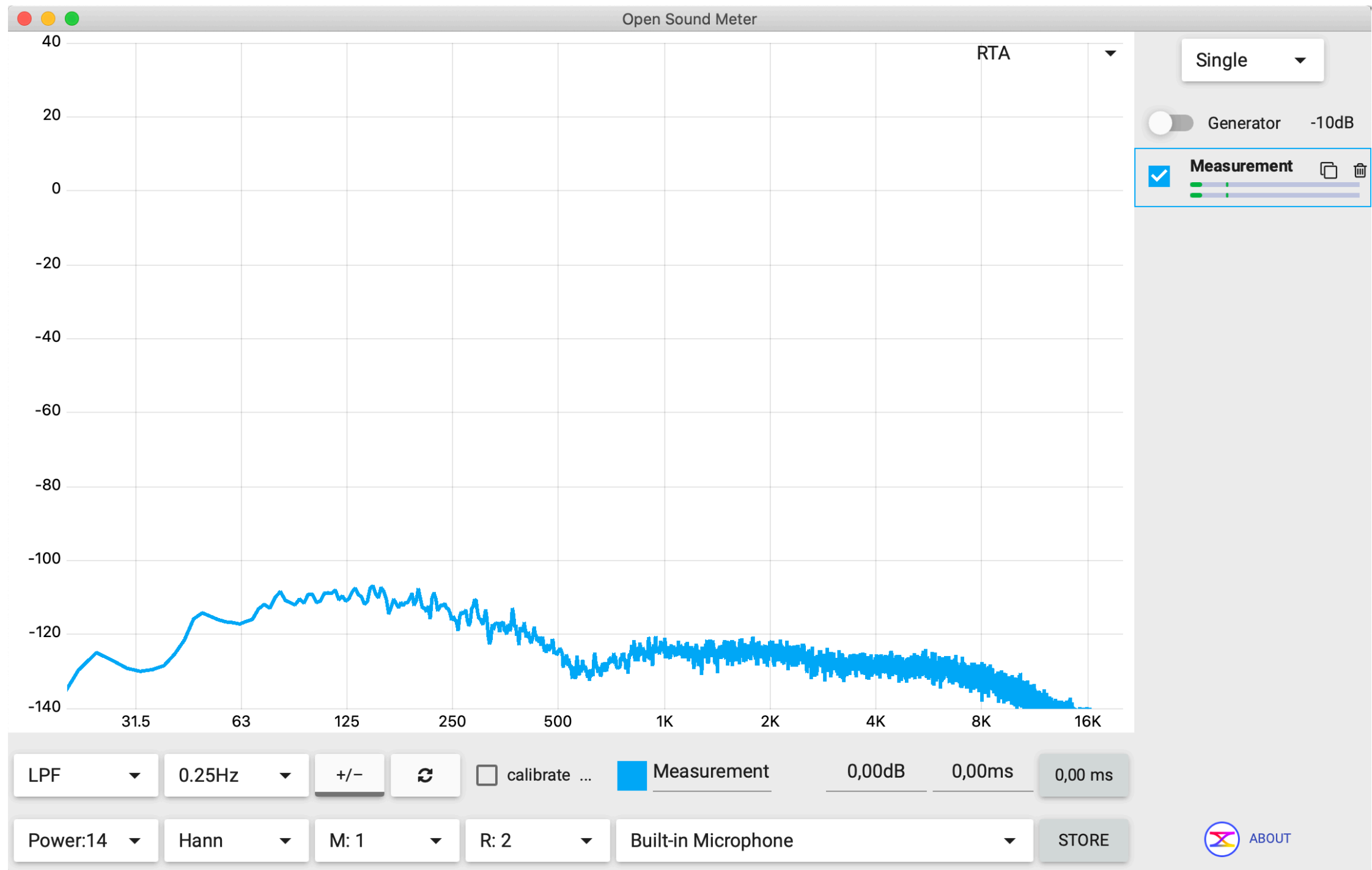


Where can I get it?

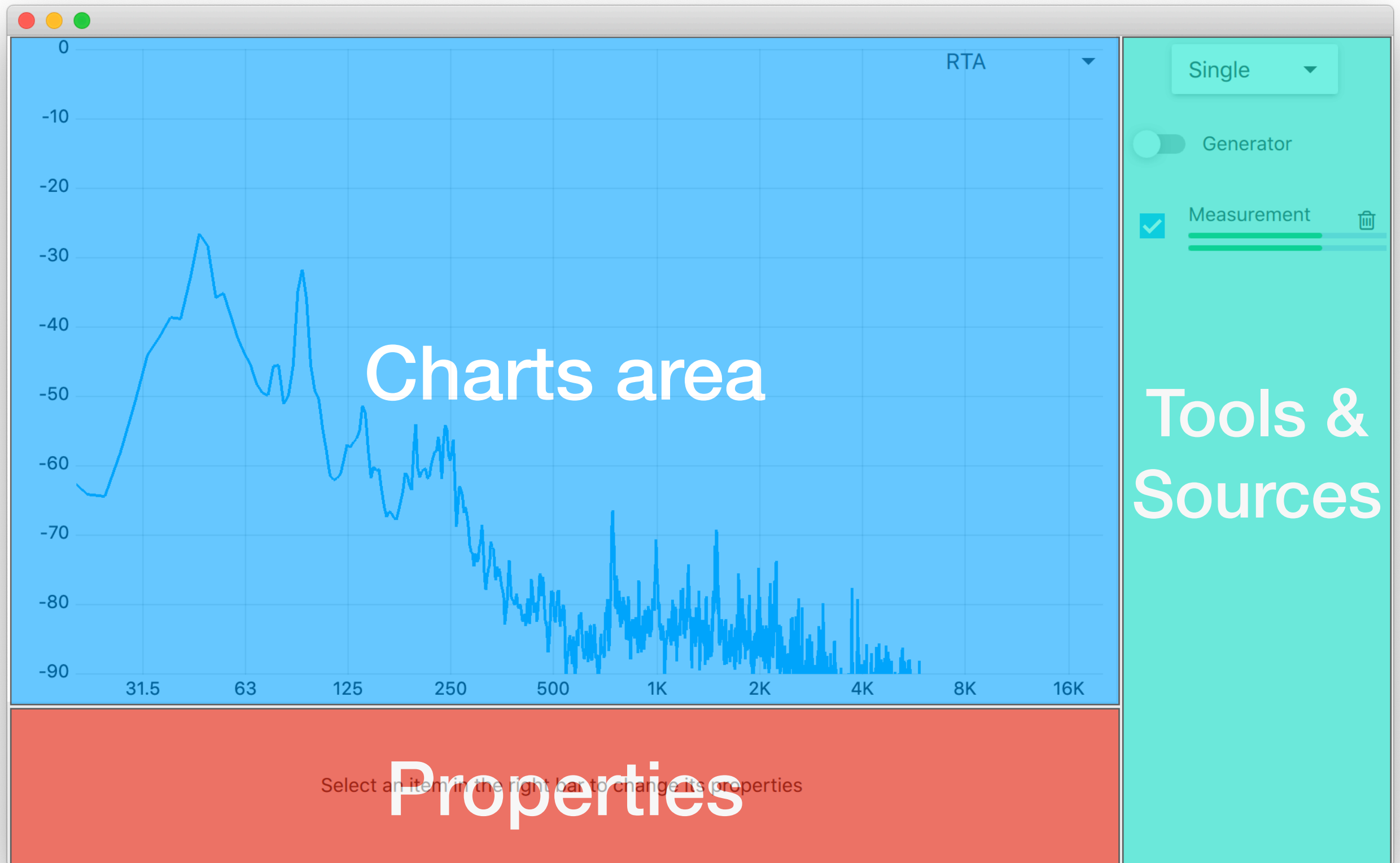
opensoundmeter.com



Let's run



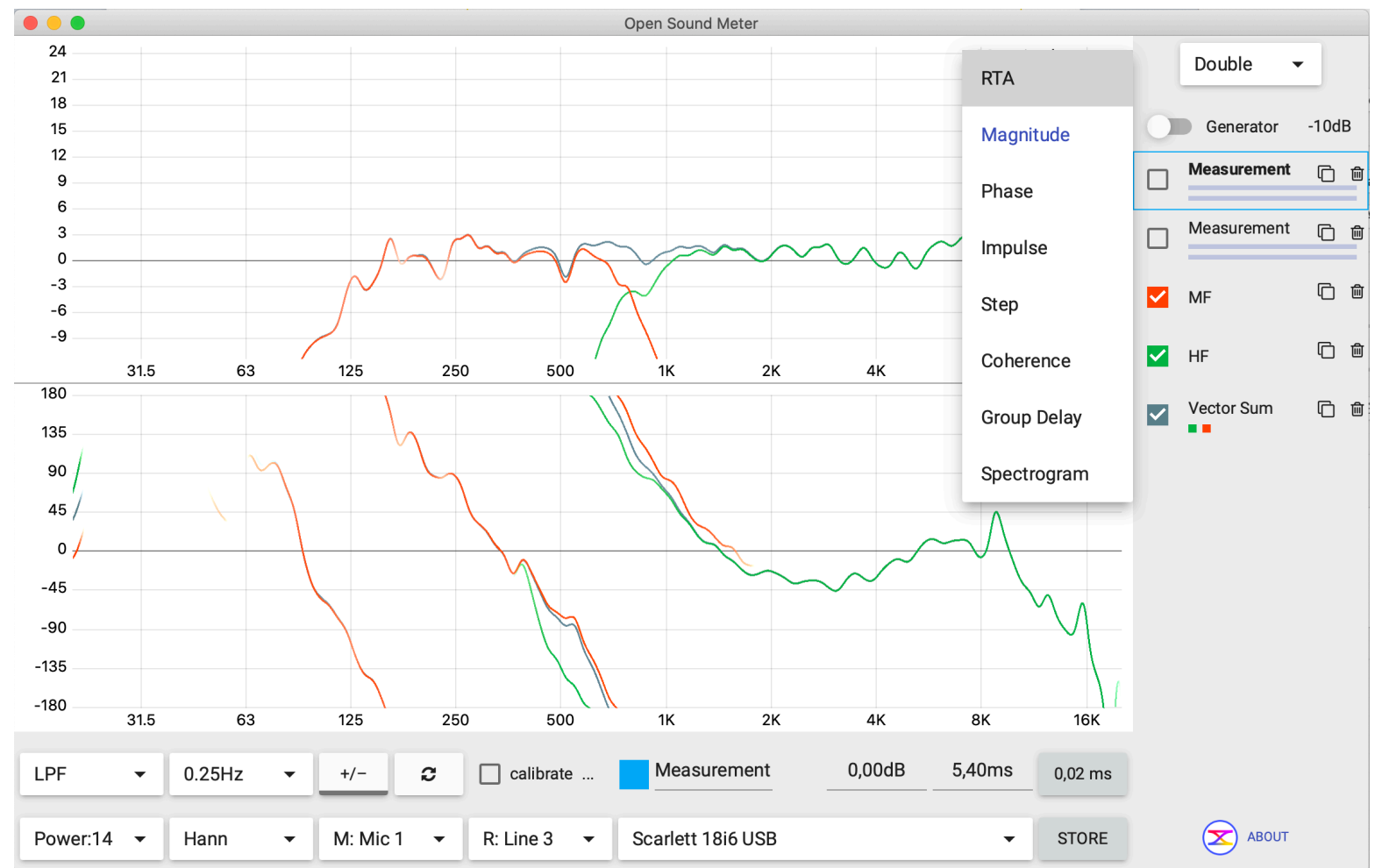
Layout



Charts area

Up to three charts of different types:

- RTA
- Magnitude
- Phase
- Impulse
- Step
- Coherence
- Group delay
- Spectrogram

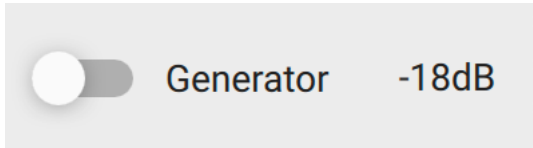


Tools and sources



Single

Charts count



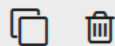
Generator -18dB

Generator's output

Click label to open properties



Measurement



Measurement's processing and visibility

Click label to open properties

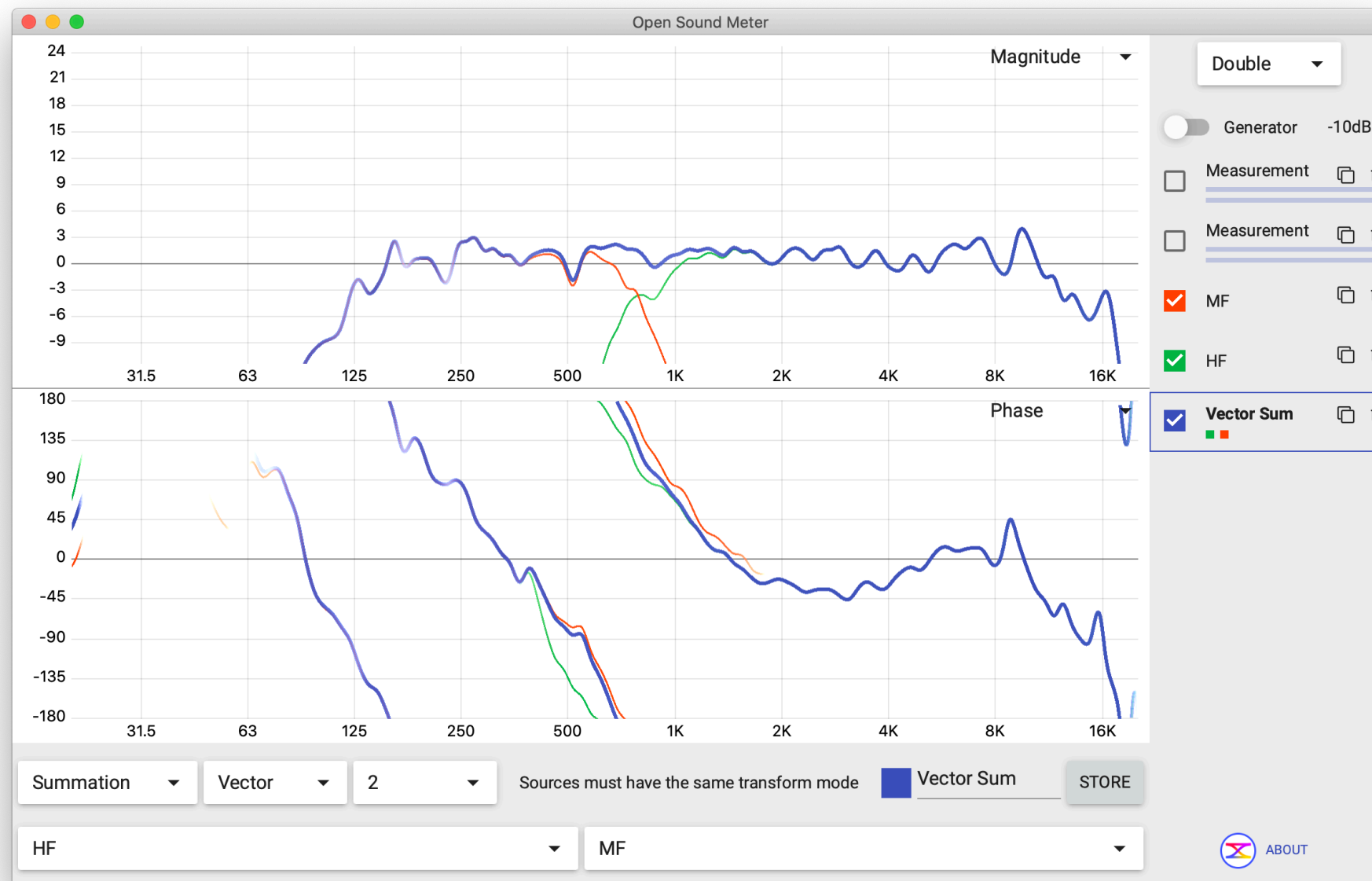
Checkbox color = series' color

Levels meter for measuring and reference channels

Icons for delete and clone



Charts area



Selected source has bold line and always on top on other charts
z-order of charts corresponds to the sources order



Properties

Click any object (chart, measurement, generator etc) to open properties in the bottom bar.



Generator properties

signal's type

gain

Pink ▼ — -6dB +

Soundflower (2ch) ▼ ch: 1 ▼ aux: 2 ▼

audio device

output channels



Generator properties

frequency for *sin* type

current $\div 2$ $\times 2$

↓ ↓ ↓

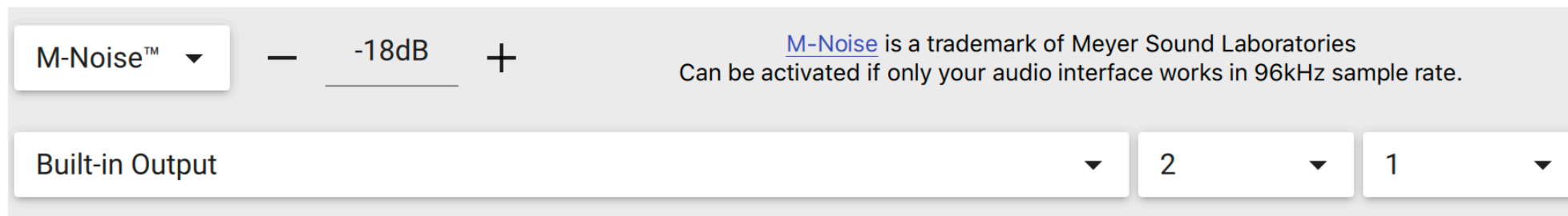
Sin — -6dB + — 1000Hz + OCTAVE DOWN OCTAVE UP

Soundflower (2ch) ch: 1 aux: 2

Generator properties

M-Noise™

<https://m-noise.org/>



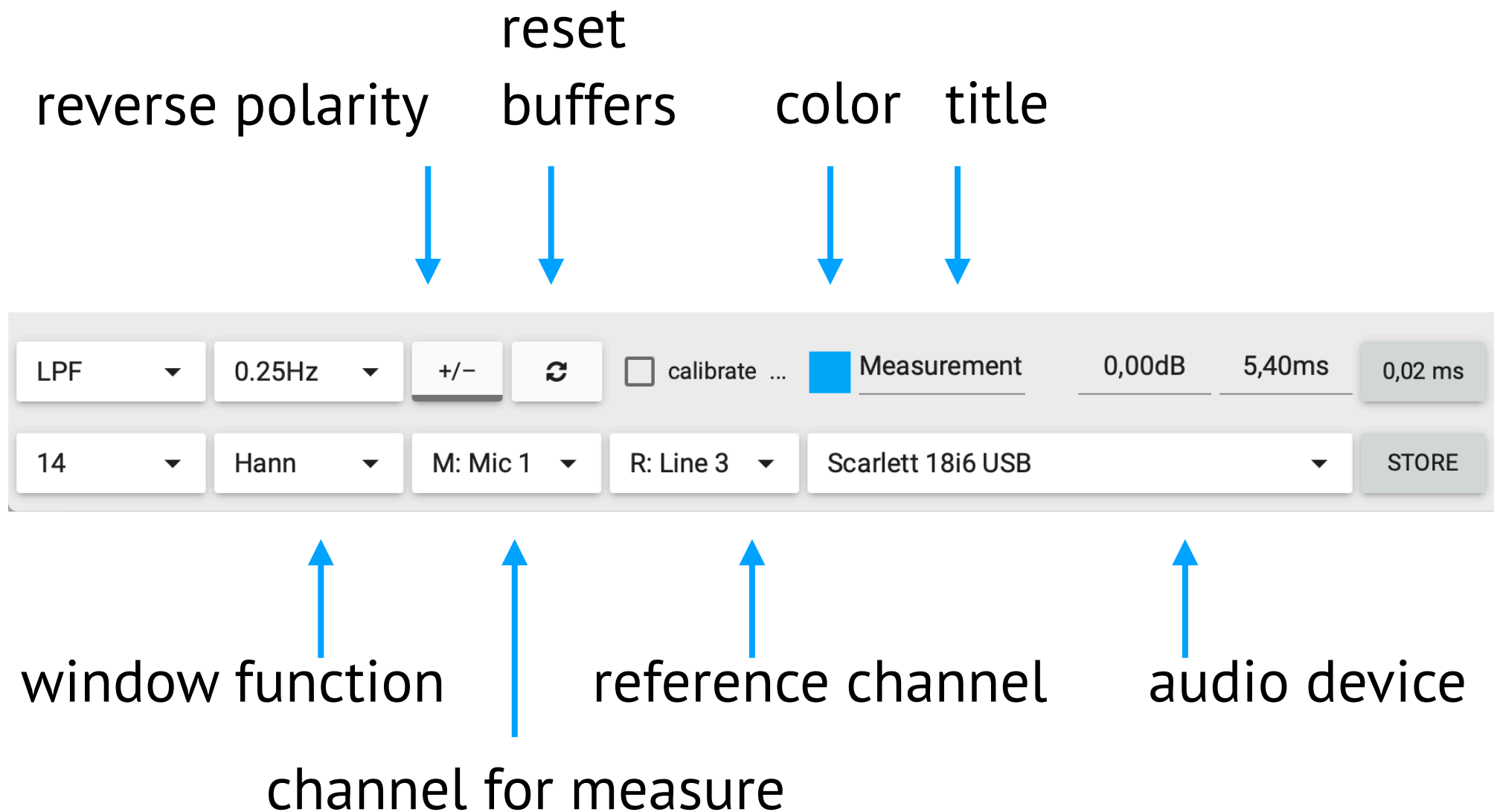
The M-Noise test signal was created by Meyer Sound Laboratories, Incorporated (“Meyer Sound”) for the use and benefit of the professional audio community.

How to use it: <https://m-noise.org/procedure/>

M-Noise is a trademark of Meyer Sound Laboratories



Measurement properties

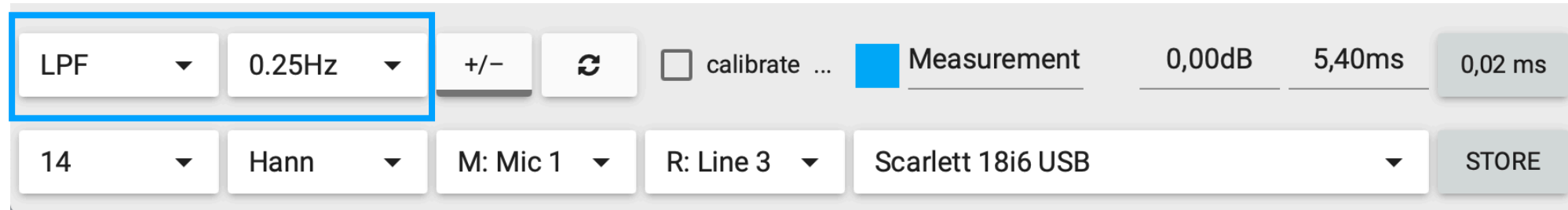


right click on the color checker applies next color from application's palette



Measurement properties

Averaging



LPF ▼ 0.25Hz ▼ +/- ↺ ☐ calibrate ... Measurement 0,00dB 5,40ms 0,02 ms

14 ▼ Hann ▼ M: Mic 1 ▼ R: Line 3 ▼ Scarlett 18i6 USB ▼ STORE

Averaging type: off, FIFO, LPF (low pass filter)

FIFO size from 1 to 100

LPF frequencies: $\frac{1}{4}$ Hz, $\frac{1}{2}$ Hz, 1Hz

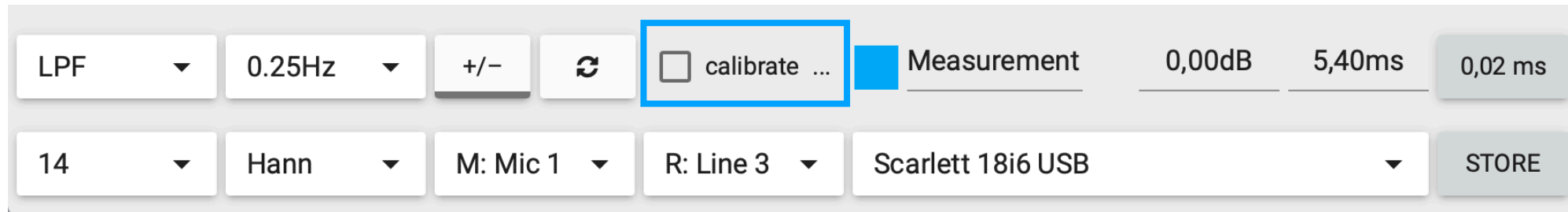
What is LPF and why use it:

facebook.com/notes/pavel-smokotnin/averaging-of-the-measurements/1070092436507447/



Measurement properties

Applying a calibration file



Click to enable or disable

File selection dialogue will appear on first click

If you want to change the file click at ...

Measurement properties

Gain and delay

LPF ▼ 0.25Hz ▼ +/- ↻ ☐ calibrate ... Measurement 0,00dB 5,40ms 0,02 ms

14 ▼ Hann ▼ M: Mic 1 ▼ R: Line 3 ▼ Scarlett 18i6 USB ▼ STORE

Input value

Use keys ↑ and ↓ to adjust value,

Use Shift key for fine adjustment

Button shows the calculated estimated delay value, click to apply

On mouseover tooltip shows delta between current and estimated

Measurement properties

FFT power

LPF ▾

0.25Hz ▾

+/-

↺

☐ calibrate ...

☒ Measurement

0,00dB

5,40ms

0,02 ms

14 ▾

Hann ▾

M: Mic 1 ▾

R: Line 3 ▾

Scarlett 18i6 USB ▾

STORE

Select time window size: $2^{\text{power value}}$ samples

power	10	11	12	13	14	15	16
samples	1024	2048	4096	8192	16384	32768	65536
time window*, ms	21,3	42,6	85,3	170,5	341	682,6	1365,3
frequency step*, Hz	47	23,5	11,7	5,9	2,93	1,46	0,73

* - for sample rate: 48 000Hz



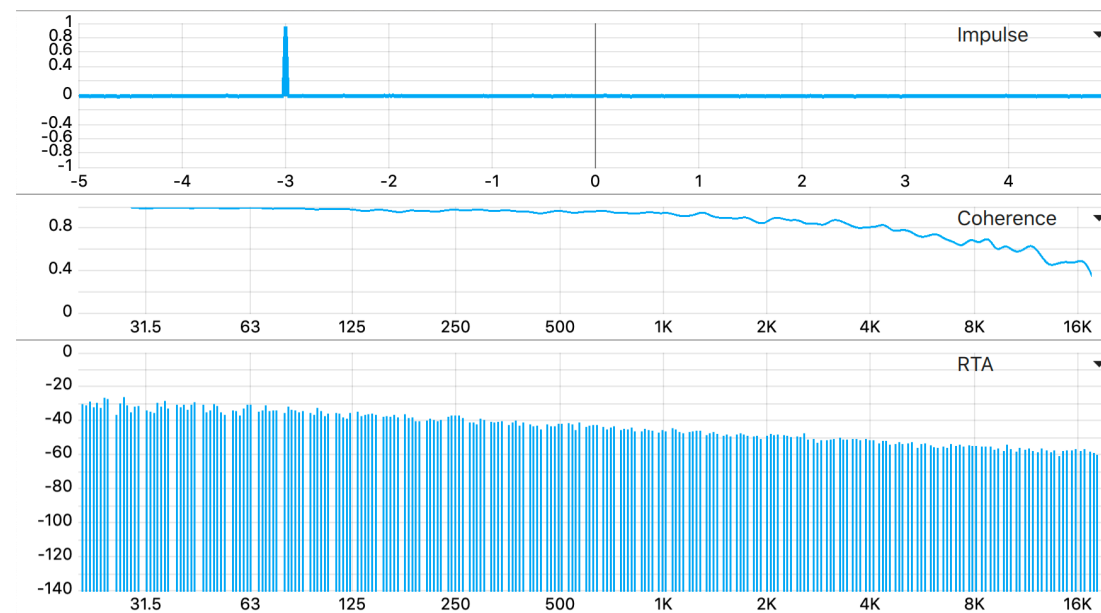
Measurement properties

Logarithm time window

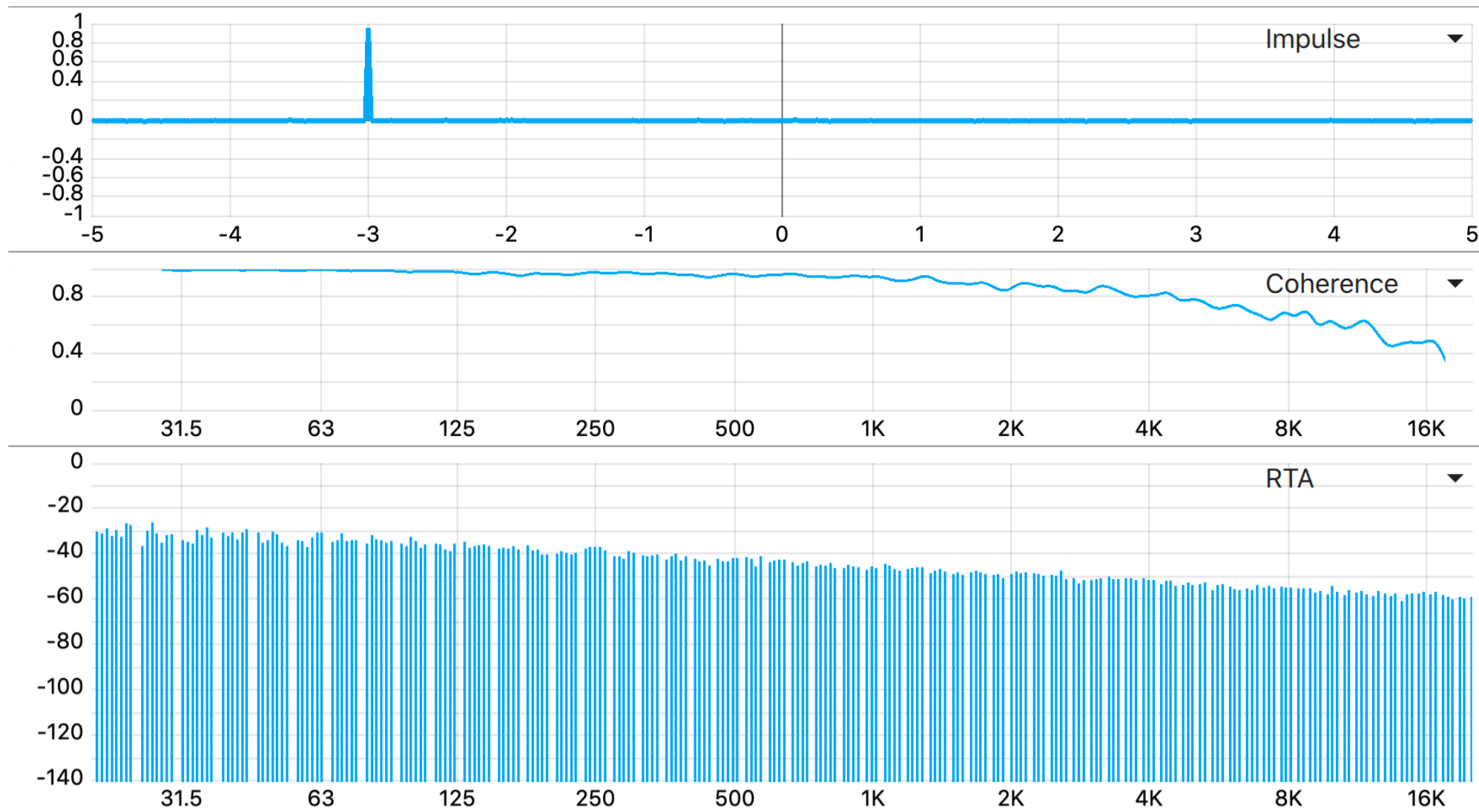
LPF ▼ 0.25Hz ▼ +/- ↺ ☐ calibrate ... Measurement 0,00dB 5,40ms 0,02 ms

LTW ▼ Hann ▼ M: Mic 1 ▼ R: Line 3 ▼ Scarlett 18i6 USB ▼ STORE

- 24 frequencies per octave
- each has its own time window



Logarithm time window



Measurement properties

Storing your measurements

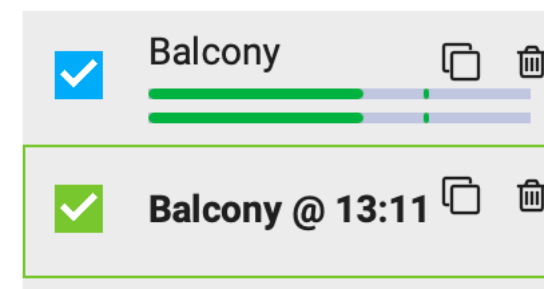
LPF ▼ 0.25Hz ▼ +/- ↺ ☐ calibrate ... Measurement 0,00dB 5,40ms 0,02 ms

LTW ▼ Hann ▼ M: Mic 1 ▼ R: Line 3 ▼ Scarlett 18i6 USB ▼ **STORE**

Push the button to store current measuring data

Stored series will appear at the charts and its label in the right bar

Name of the store will contain the name of the original measurement and time.



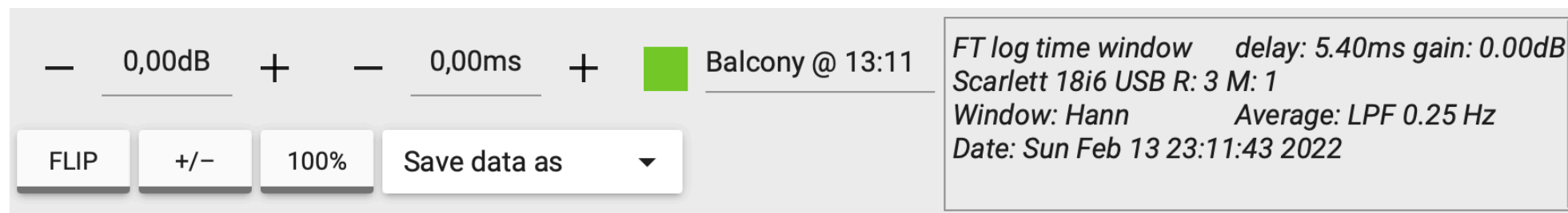
Enable/disable checkbox = view/hide the series

Stored properties

color

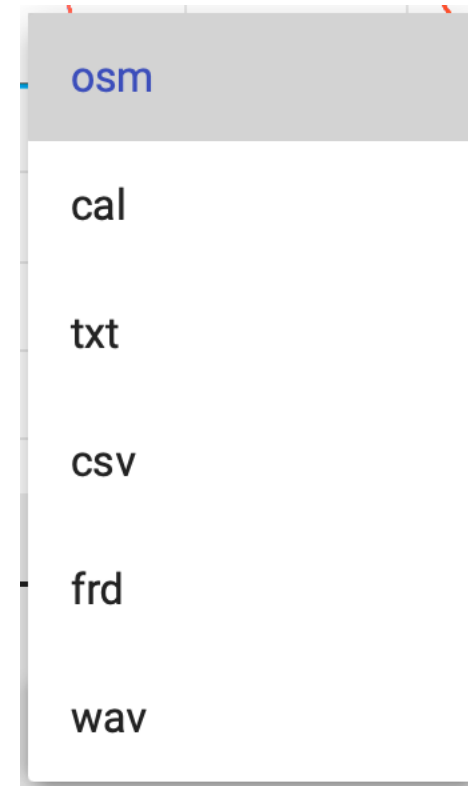
title

editable automatically
created notes



export stored data as:

- OSM file
- calibration file
- TXT
- CSV
- FRD file type
- impulse WAV file

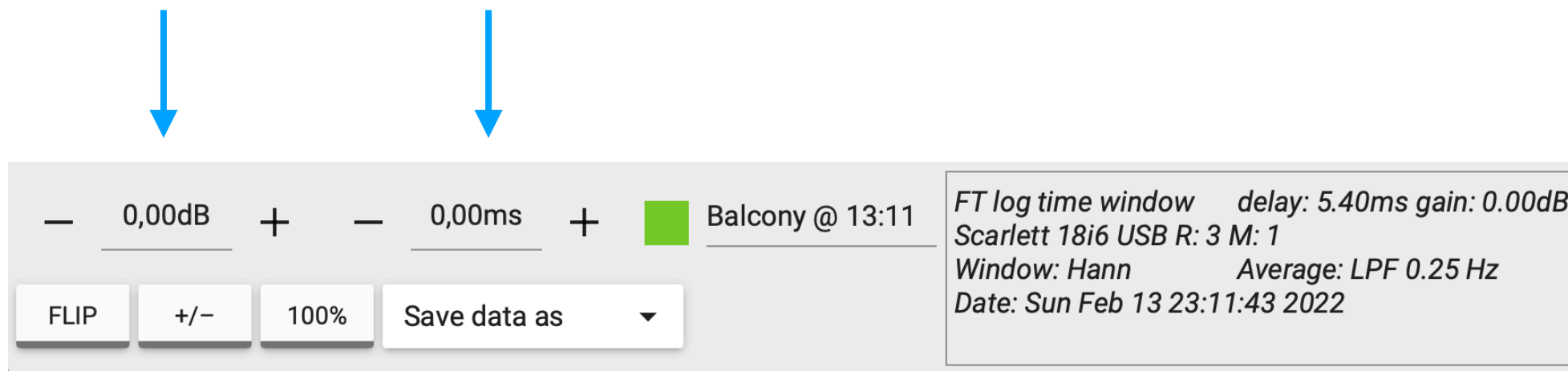


Stored properties

Offline adjustment

gain

delay



The screenshot shows the 'Stored properties' window of the Open Sound Meter software. It features a control bar with a gain slider set to 0.00dB, a delay slider set to 0.00ms, and a green square icon. Below the sliders are buttons for 'FLIP', '+/-', '100%', and 'Save data as'. To the right, a text box displays the following information: 'FT log time window delay: 5.40ms gain: 0.00dB', 'Scarlett 18i6 USB R: 3 M: 1', 'Window: Hann Average: LPF 0.25 Hz', and 'Date: Sun Feb 13 23:11:43 2022'. Blue arrows point from the 'gain' and 'delay' labels to their respective sliders, and a blue arrow points from the 'inverse magnitude' label to the 'FLIP' button.

— 0,00dB + — 0,00ms +  Balcony @ 13:11

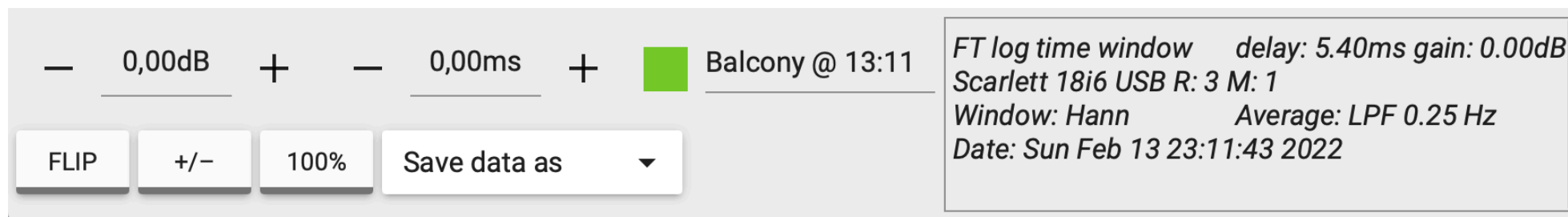
FLIP +/- 100% Save data as ▼

FT log time window delay: 5.40ms gain: 0.00dB
Scarlett 18i6 USB R: 3 M: 1
Window: Hann Average: LPF 0.25 Hz
Date: Sun Feb 13 23:11:43 2022

inverse magnitude

Stored properties

Offline adjustment



inverse
polarity

force 100% coherence

Math source

function type count color title store the result

↓ ↓ ↓ ↓ ↓ ↓

Summation ▾

Vector ▾

2 ▾

Sources must have the same transform mode

☒ Vector Sum

STORE

HF ▾

MF ▾

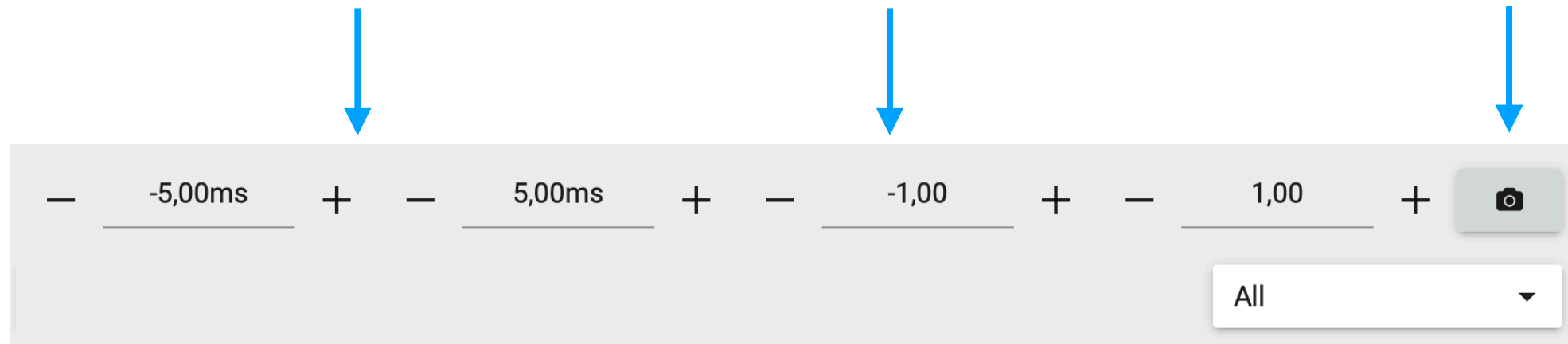
select from 2 to 10 sources: measurements or stored

Basic chart properties

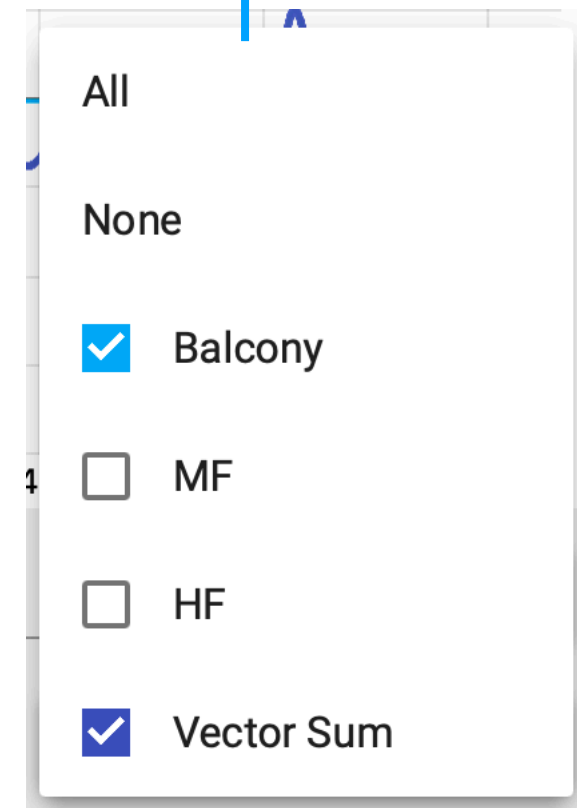
Horizontal
axis range

Vertical
axis range

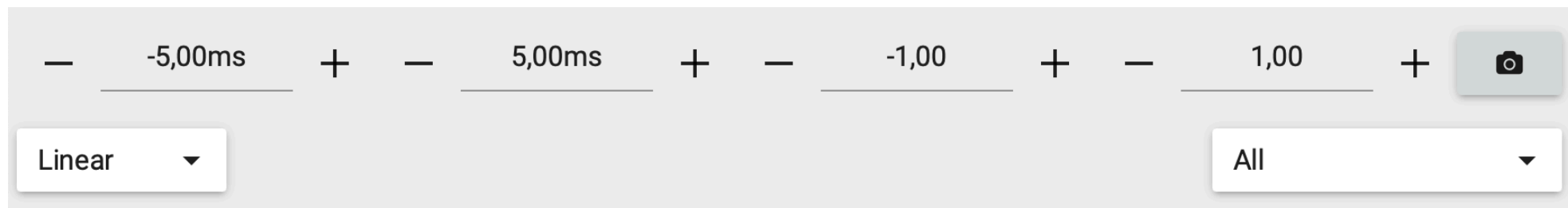
save chart
as an image



If source is selected, just that
will be shown.

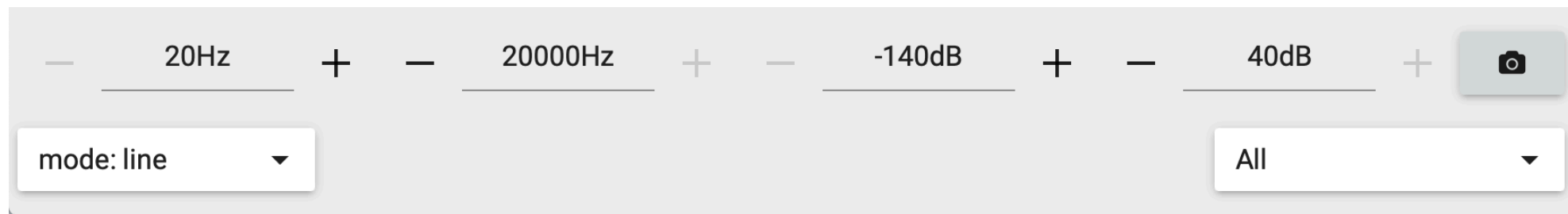


Impulse chart properties

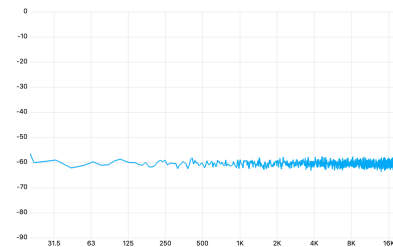


Select linear or log (dB) vertical scale

RTA chart properties

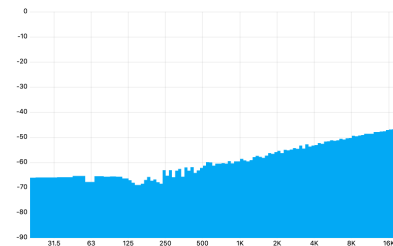


line



one continuous line

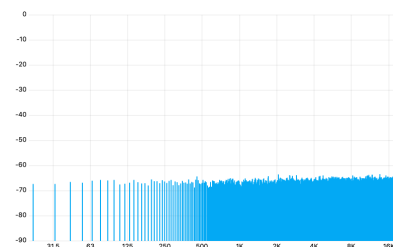
bars



ppo 12

points per octave define the bar width

lines



one line per frequency



Magnitude chart properties

— 20,00Hz + — 20 000,00Hz + — -18,00dB + — 18,00dB + ☐ invert

dB ▼ ppo: 12 ▼ ☒ use coherence — 0,70 + All ▼

Y-axis
scale

Points per octave

Apply coherence value
for the series opacity

Coherence threshold for
the alpha channel

Invert Y axis

Phase chart properties

— 20Hz + — 20000Hz + — 9° + — 360° +

ppo 12 ▼ ±180° ▼ ☒ use coherence — 0,70 + All ▼

Points per octave

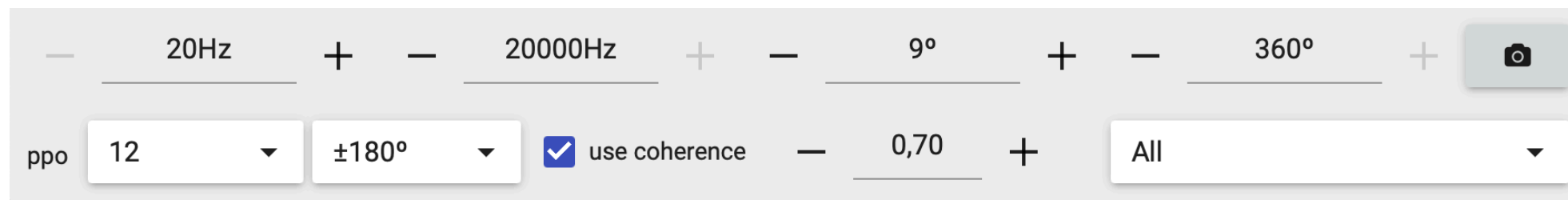
Apply coherence value
for the series opacity

Coherence threshold for
the alpha channel

Phase chart range

center angle

range



— 20Hz + — 20000Hz + — 9° + — 360° + 

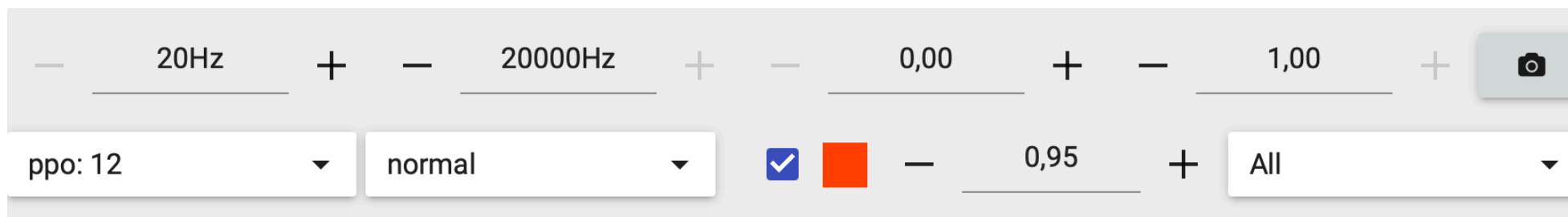
ppo 12 ▼ ±180° ▼ ☒ use coherence — 0,70 + All ▼

Show values:

- -180° to +180°
- 0° to 360°



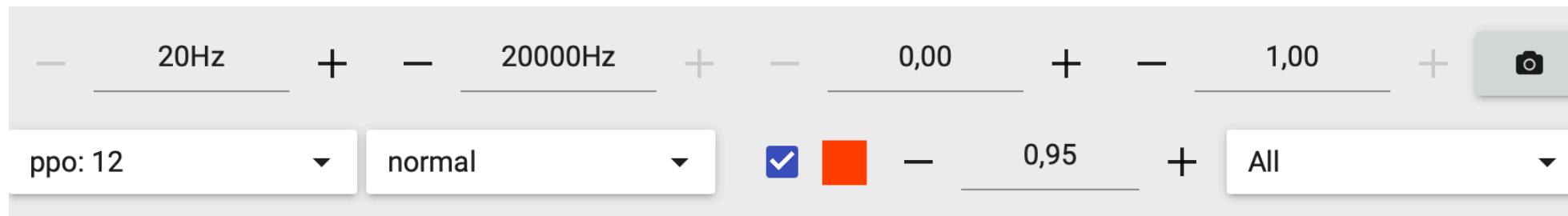
Coherence chart properties



Show normal, squared or SNR value

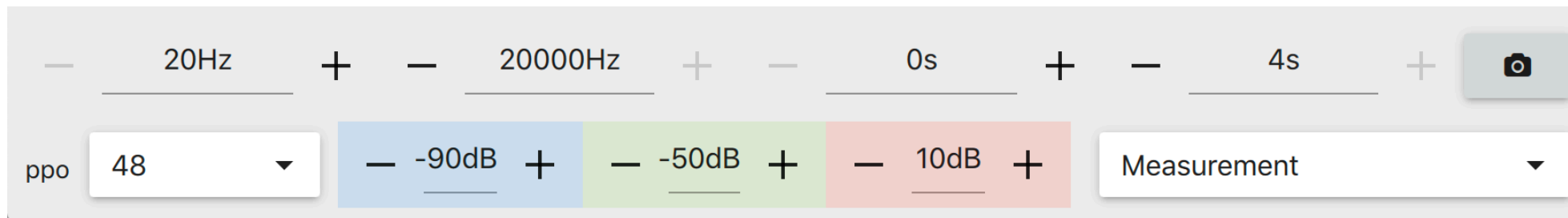
Points per octave

Coherence chart properties



Show help line and its value

Spectrogram chart properties



Points per octave

Set colours thresholds

Select a source



Wavelength calculator

—	<u>1000 Hz</u>	+	—	<u>1,000 ms</u>	+		—	<u>20°C</u>	+	<u>343,3 m/s</u>
—	<u>0,343 m</u>	+	—	<u>0,171 m</u>	+					meter ▼

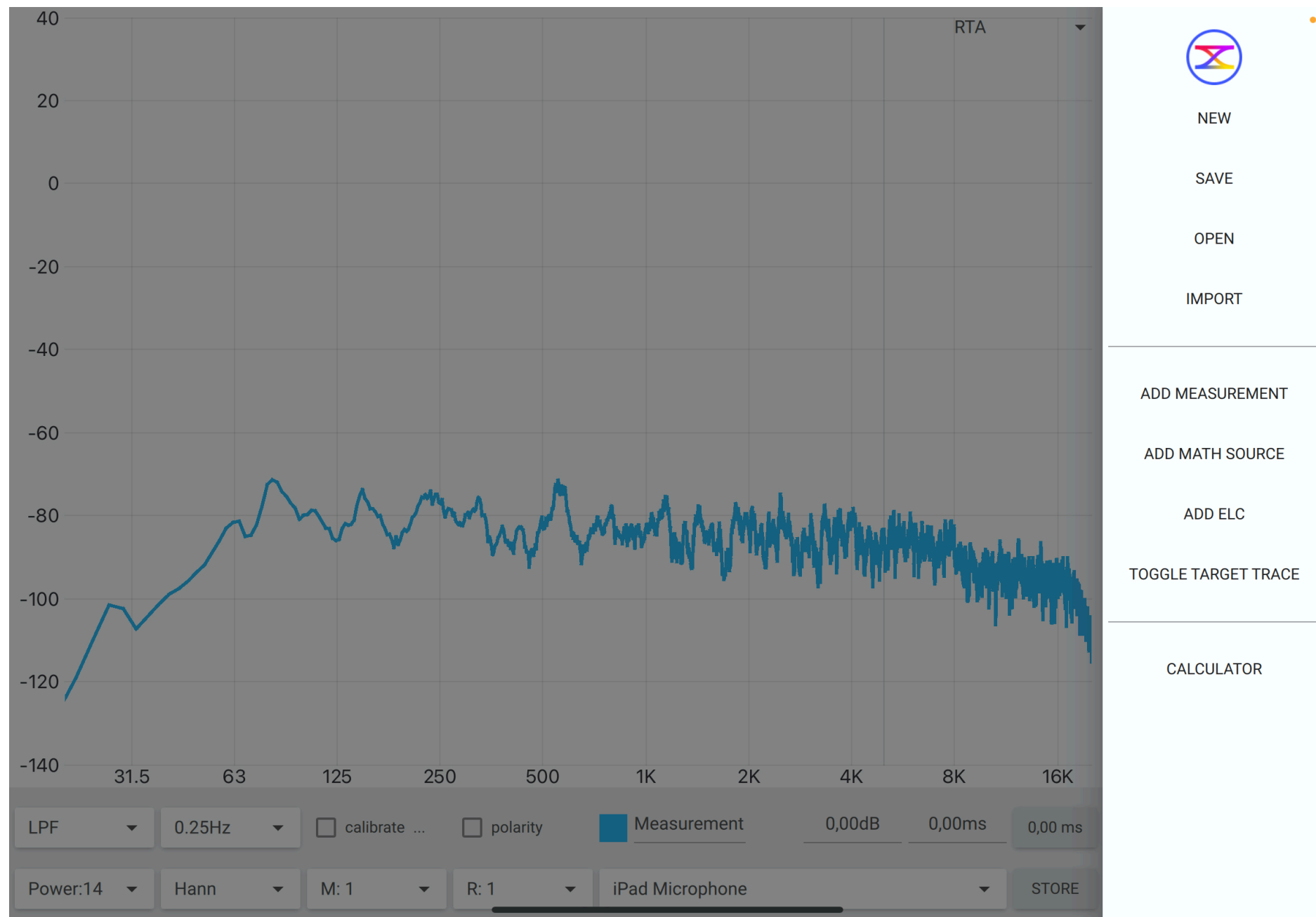
Allows you calculate between frequency, period and wavelength.
You can change any value and get others.
Use Shift key to fine adjust value

To quick open calculator for interested frequency click the right mouse button on a chart.

On iPad put one finger at the interesting point and touch the chart with second one.



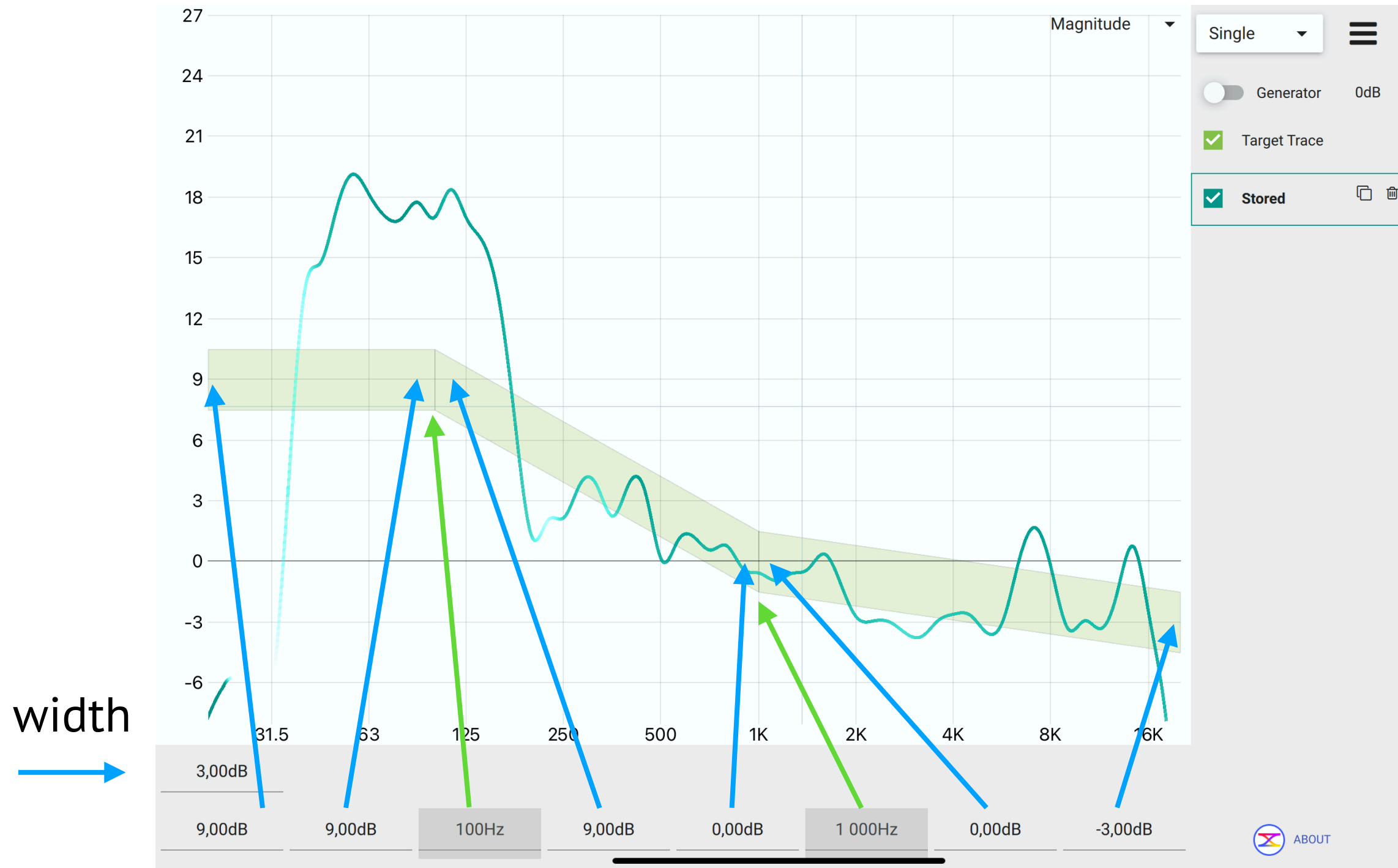
Application menu (iPad)



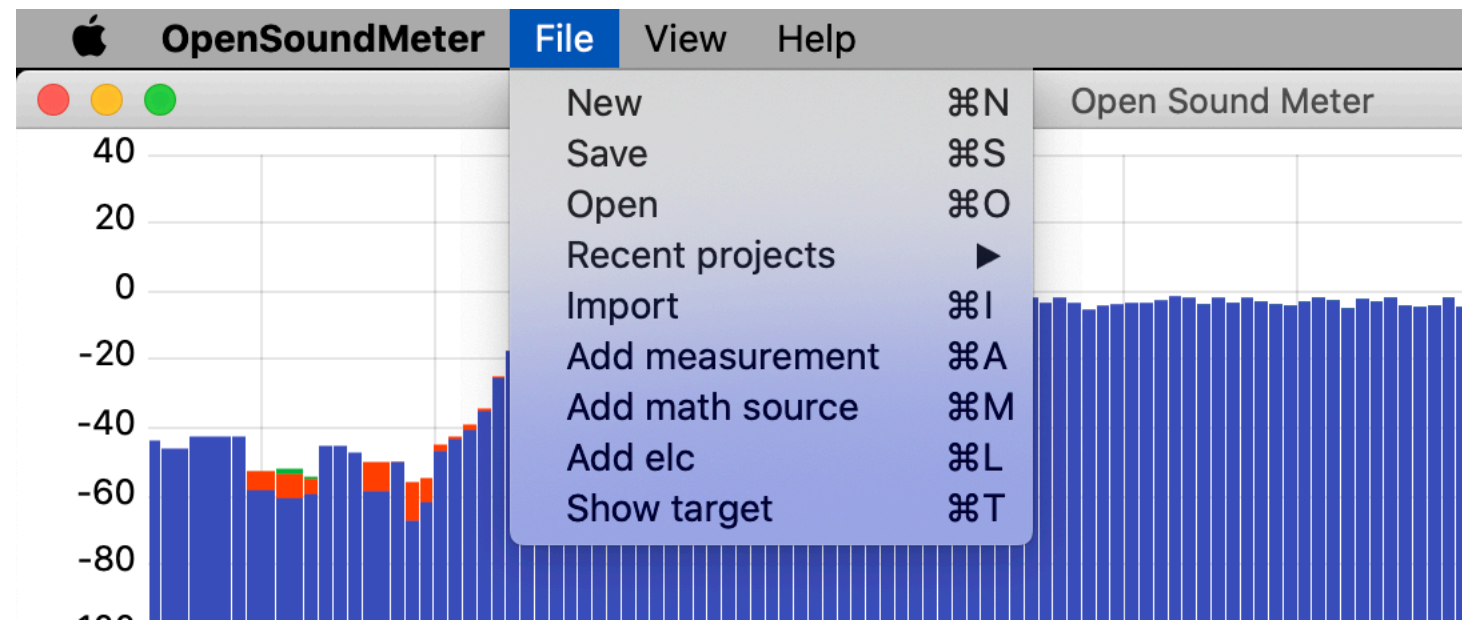
Swipe from left side to the right to open menu.
Or click menu button in the top right corner.



Target trace



Application menu



New – create empty measuring project

Save – save all current measurements and stored data to a file

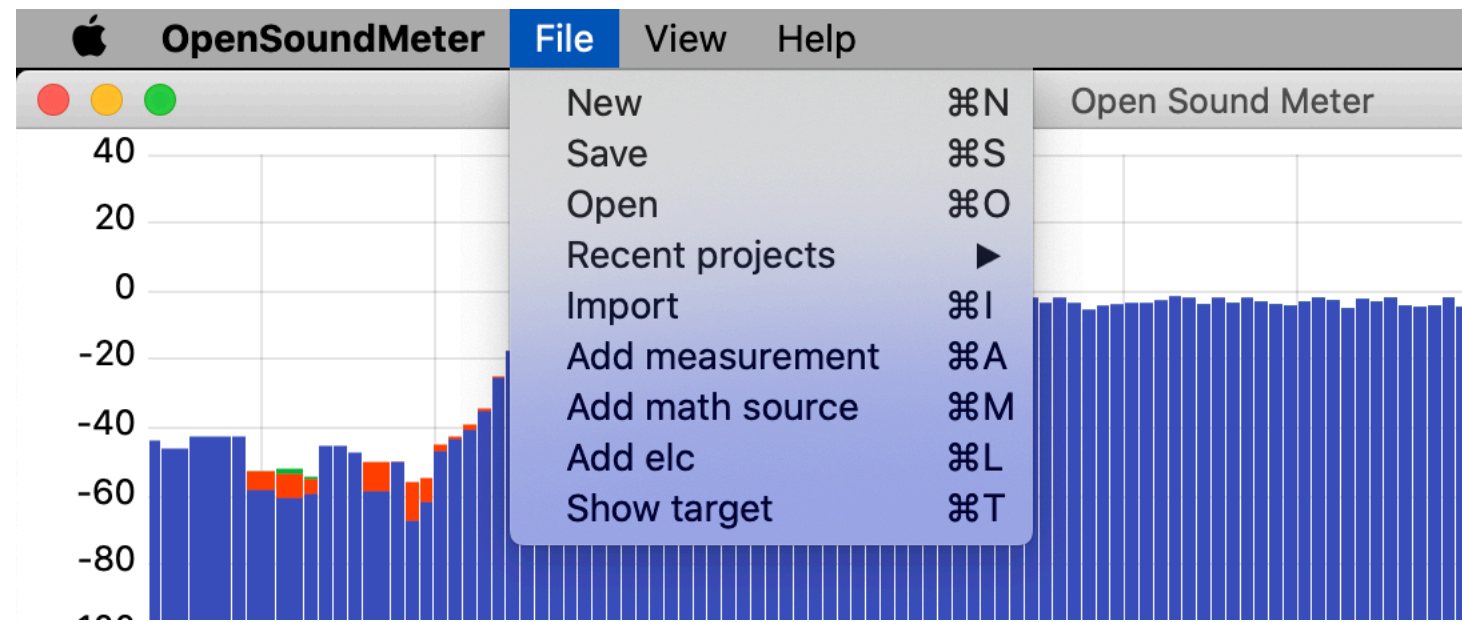
Open – load project file or single stored data

Recent projects – list of the last opened files

Import – data from txt or csv format



Application menu



Append measurement – add a single measurement to the project

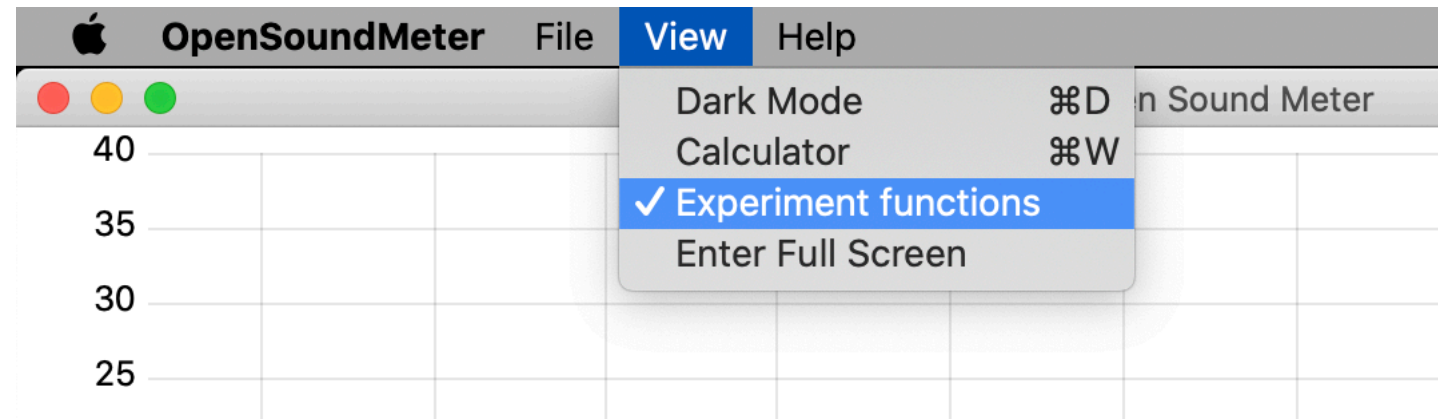
Add math source – add a single virtual math source

Add elc – add equal loudness contour

Show target – toggle target trace



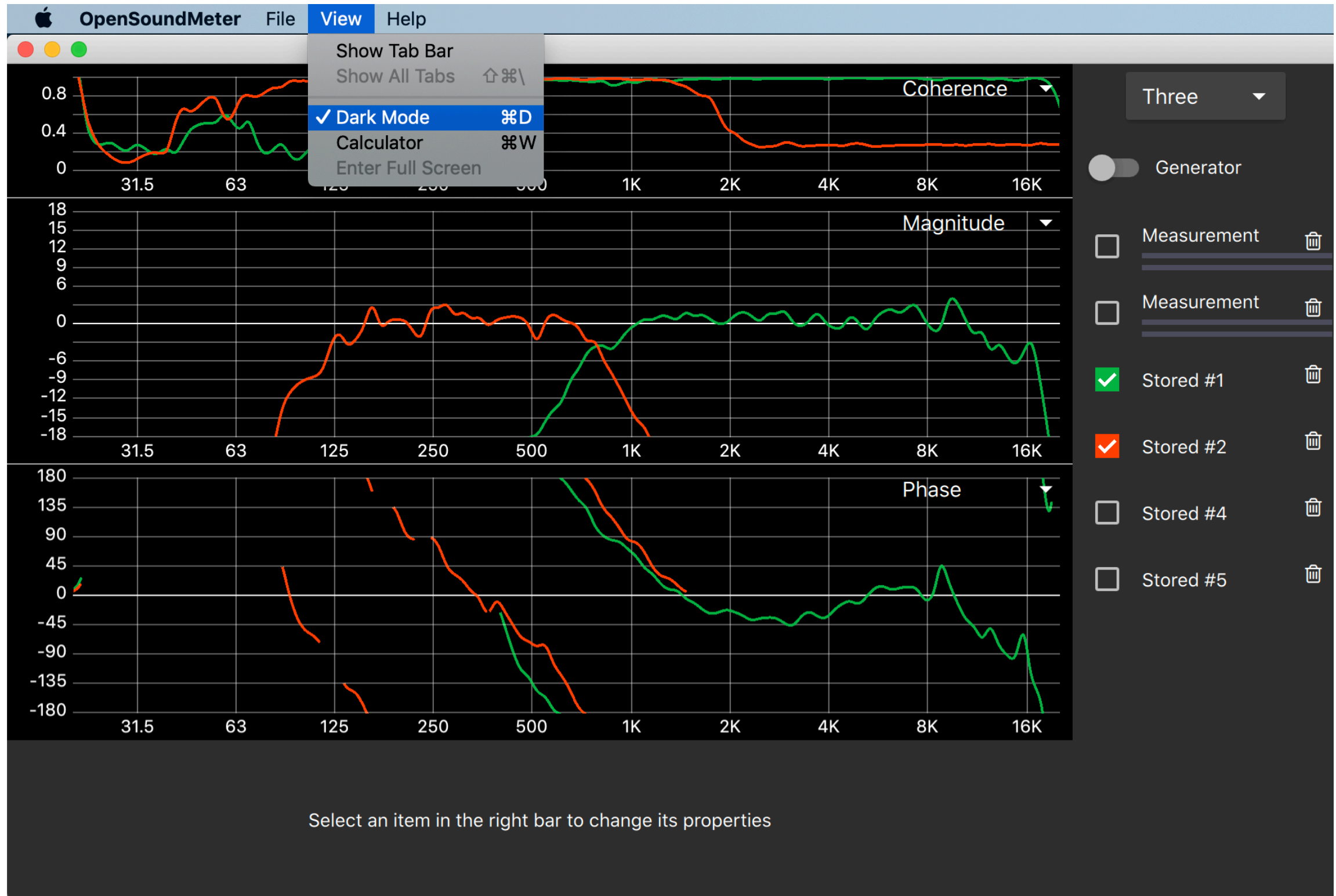
Experimental functions



Adds three more available charts:

- Crest factor of the measurements
- Nyquist plot
- Phase delay

Dark mode



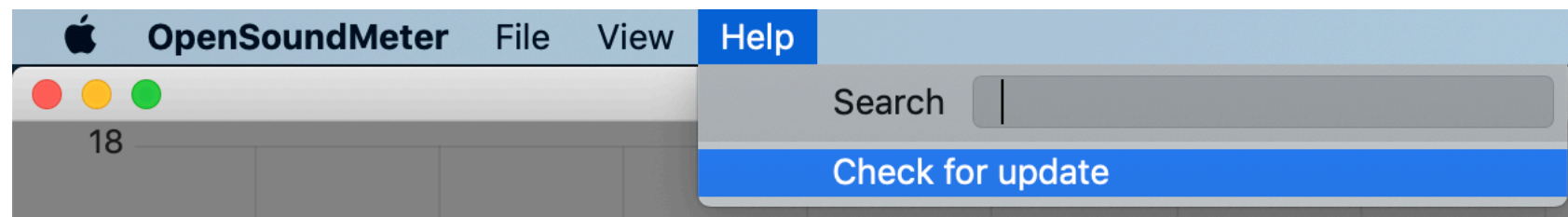
Thanks to Josh Barker for contribution



Update application

Open Sound Meter checks for updates at every start if internet connection is available.
You will see a message about update.

For manually check, use the menu item:
“Help > Check for update”.



Shortcuts

Action	macOS	Windows and Linux
new project	⌘+N	Ctrl+N
save	⌘+S	Ctrl+S
open	⌘+O	Ctrl+O
append measurement	⌘+A	Ctrl+A
append math source	⌘+M	Ctrl+M
add ELC	⌘+L	Ctrl+L
store all measurements	⌘+X	Ctrl+X
store current measurement	⌘+C	Ctrl+C
reset averages	⌘+R	Ctrl+R
apply estimated delay	⌘+E	Ctrl+E
Toggle target trace	⌘+T	Ctrl+T



Shortcuts

Action	macOS	Windows and Linux
toggle generator	⌘+G	Ctrl+G
show 1 chart	⌘+1	Ctrl+1
show 2 chart	⌘+2	Ctrl+2
show 3 chart	⌘+3	Ctrl+3
open wavelength calculator	⌘+W	Ctrl+W
toggle dark mod	⌘+D	Ctrl+D
show shortcuts	F1	F1
show info	F2	F2
check for update	F3	F3



How can you contribute?

- Donate opensoundmeter.com/about
- Share this overview with all the sound engineers
- Send me your ideas and wishes about the project
- Give me detailed reports about the errors or crashes
- Create new functions and fix issues if you are a programmer

Thank you for support!



Consulting

We provide consulting service and trainings for users.

Visit <https://opensoundmeter.com/consulting> for the details.



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