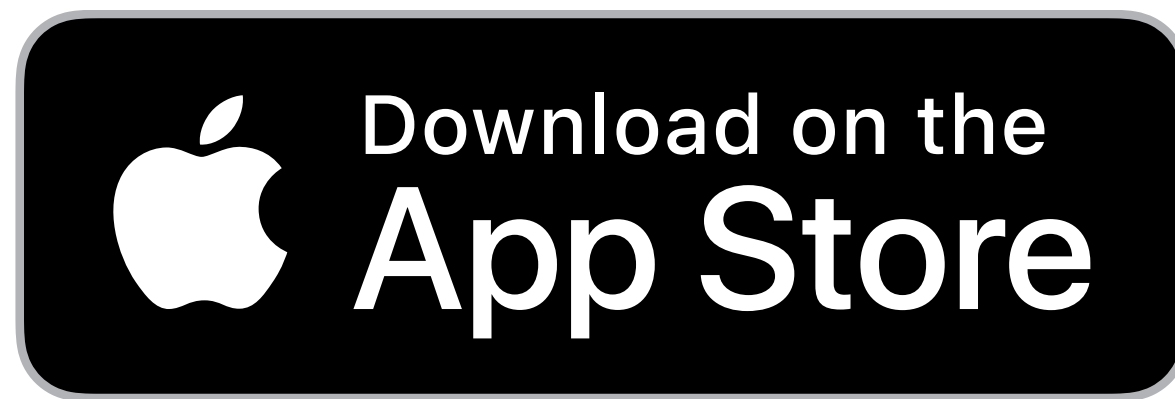# Open Sound Meter

Overview v1.0.5

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**eep 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	10.13 − 11.1
Windows x64	7 − 10
Linux	AppImage (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.
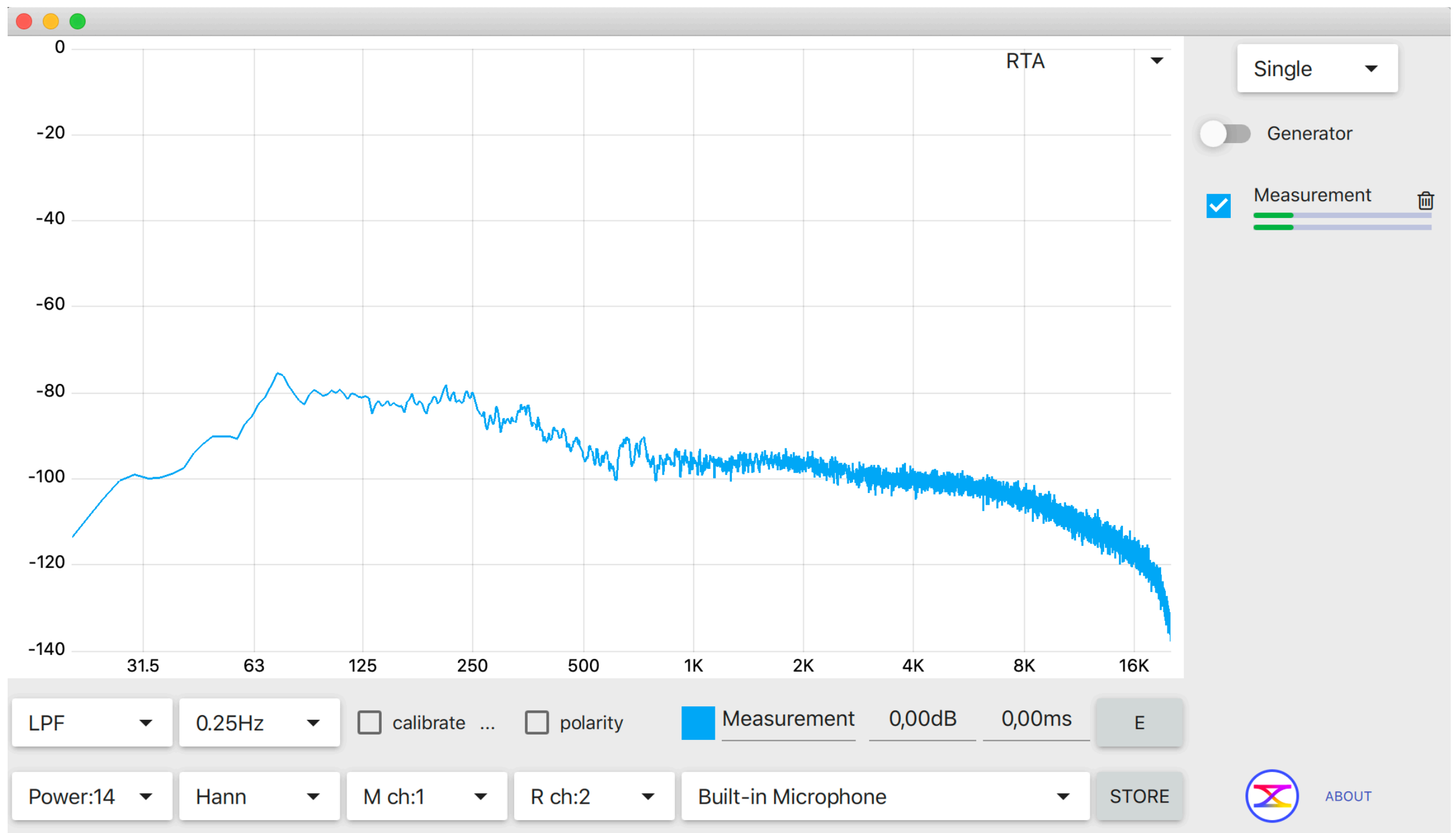
opensoundmeter.com/about

Where can I get it?
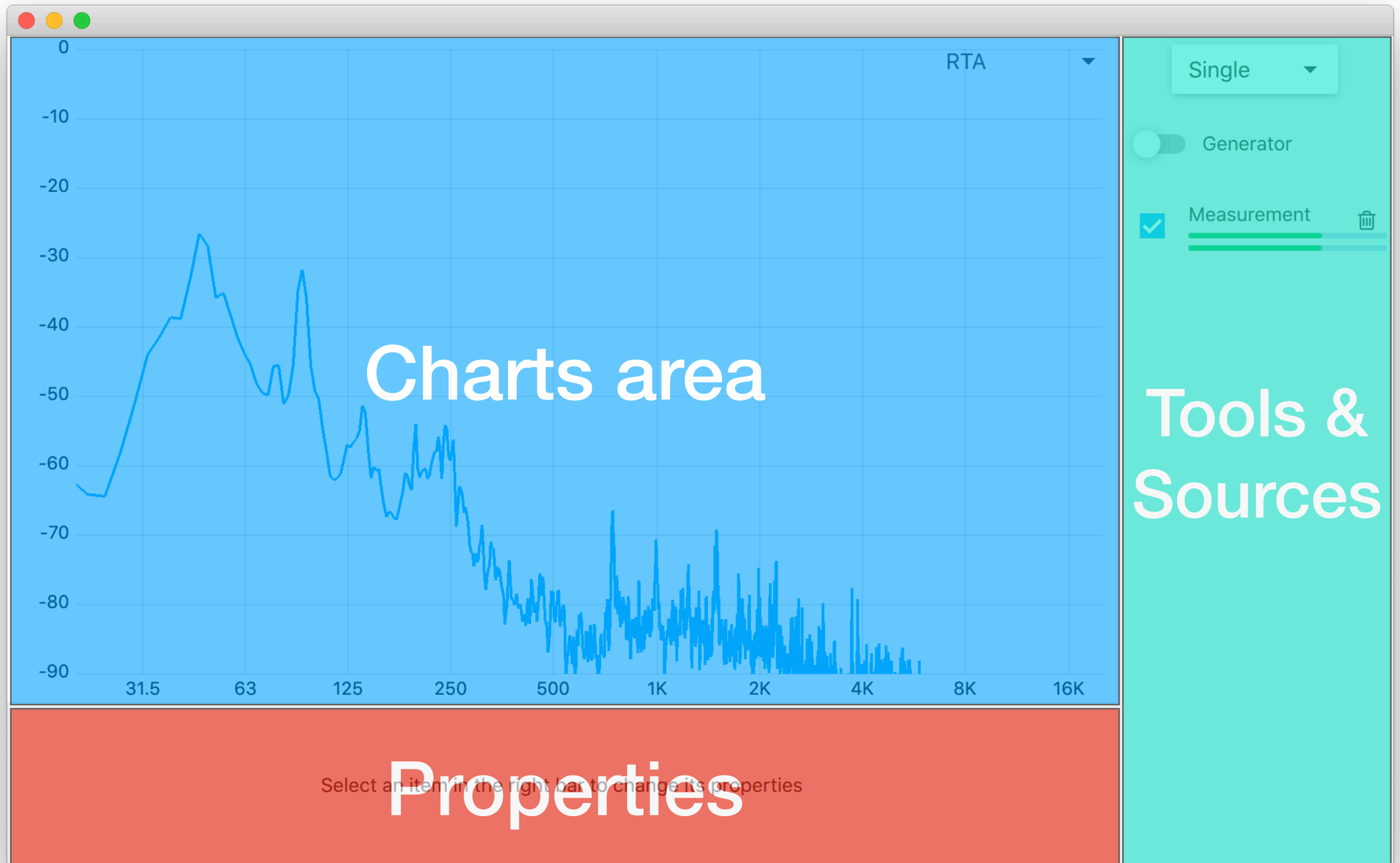
opensoundmeter.com
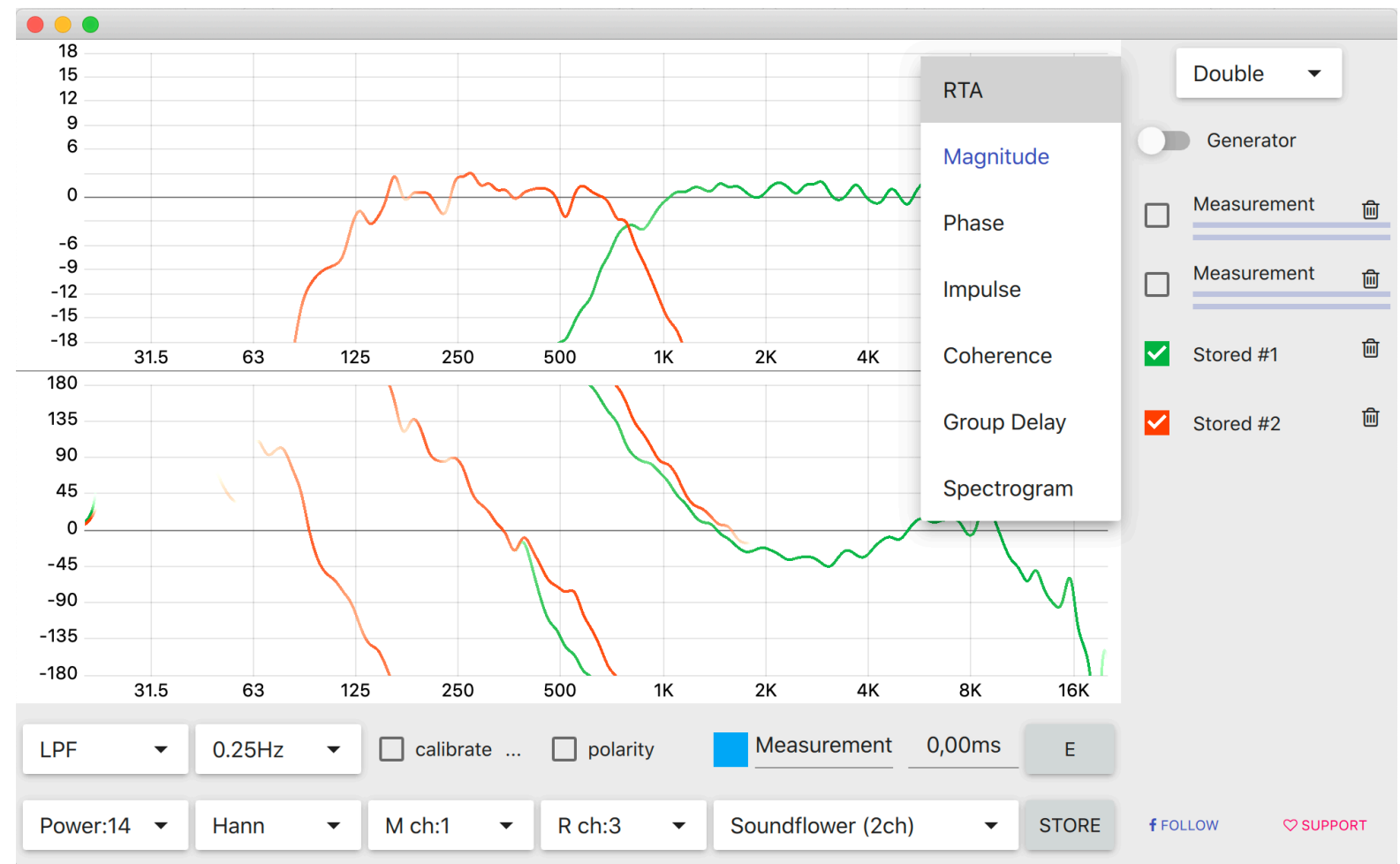
Let's run

Layout

Charts area

Up to three charts of different types:

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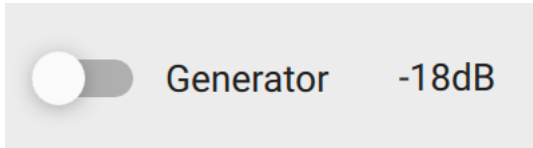- Impulse
- Step
- Coherence
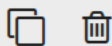- Group delay
- Spectrogram

Tools and sources

Charts count

Generator's output
Click label to open properties

Measurement's processing and visibility
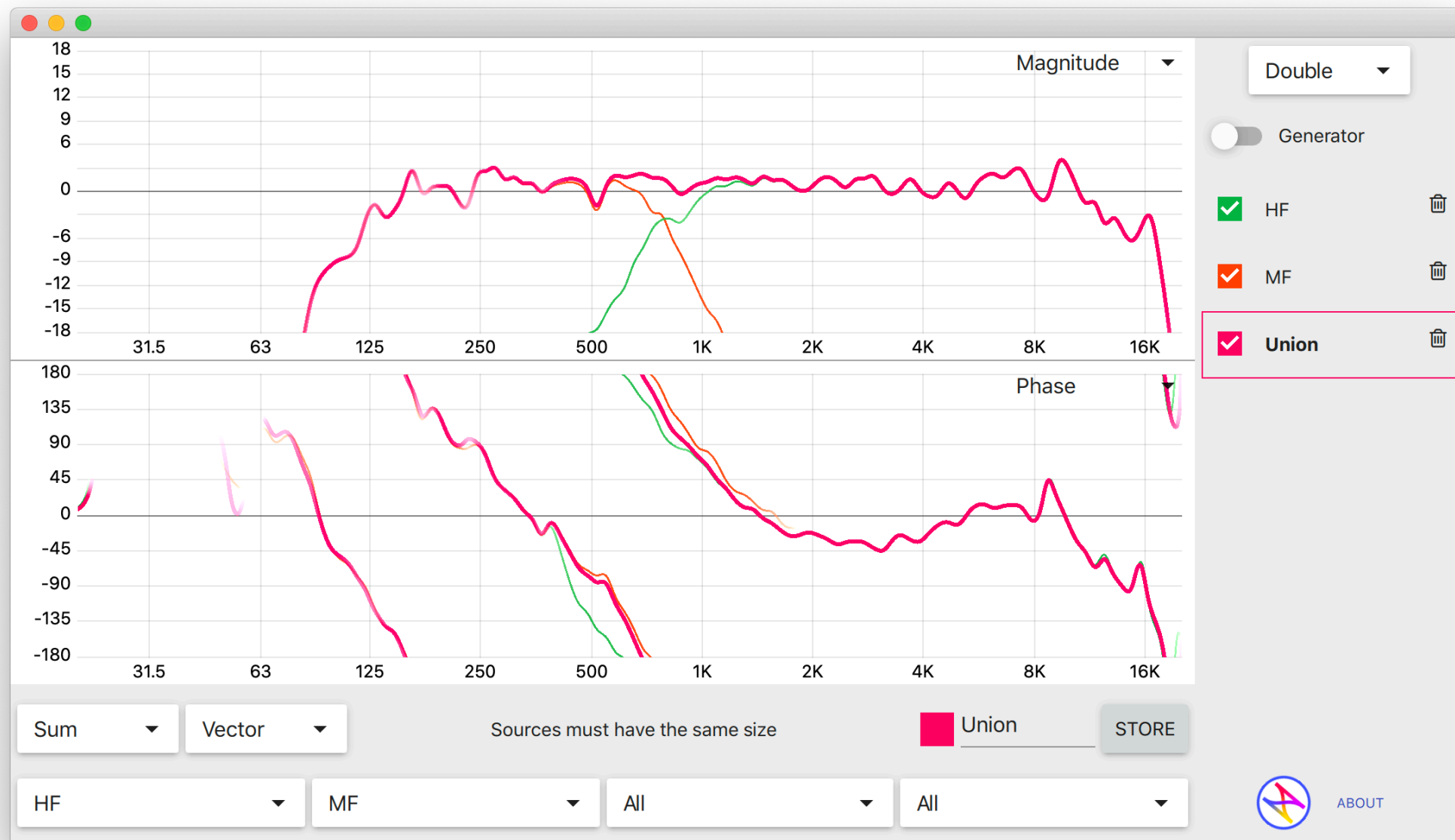Click label to open properties
Checkbox color = series' color
Levels meter for measuring and reference channels
Icons for delete and clone

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   ÷2   x2

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

| Soundflower (2ch) ▾ | ch: 1 ▾ | aux: 2 ▾ |
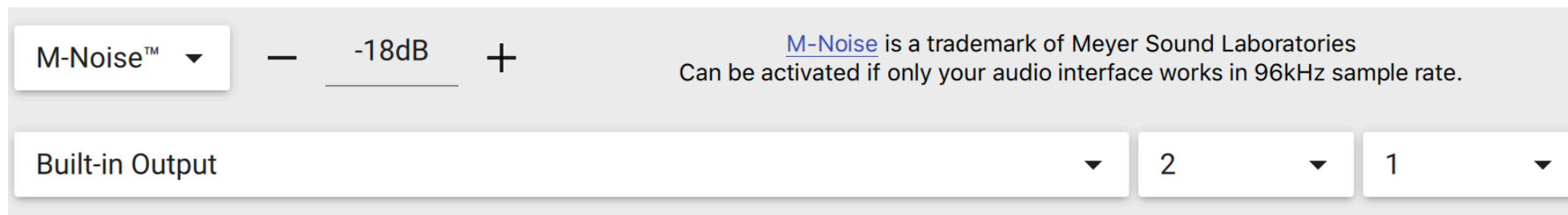
Generator properties

M-Noise™

https://m-noise.org/

M-Noise™ ▼	—	-18dB	+	M-Noise is a trademark of Meyer Sound Laboratories Can be activated if only your audio interface works in 96kHz sample rate.
Built-in Output			▼	2 ▼ 1 ▼

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

reverse polarity   color   title

| LPF ▼ | 0.25Hz ▼ | ☐ calibrate ... | ☐ polarity | ▮ Measurement | 0,00dB | 0,00ms | 0,00 ms |
| Power:14 ▼ | Hann ▼ | M: 1 ▼ | R: 2 ▼ | Built-in Microphone ▼ | | | STORE |

window function   reference channel   audio device

channel for measure

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

Measurement properties

Averaging

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

FIFO size from 1 to 100
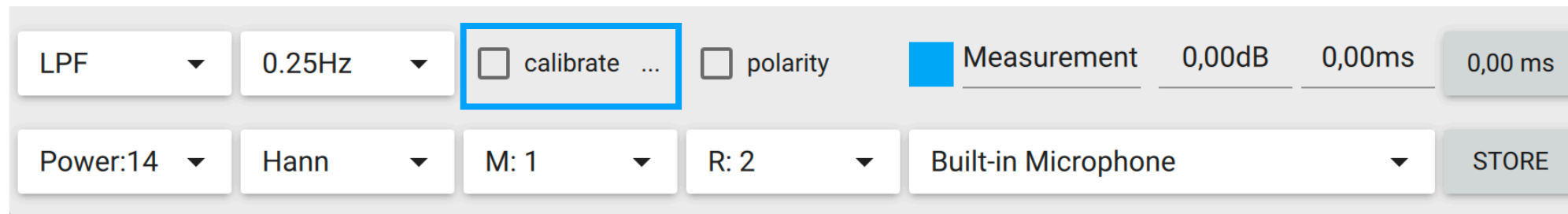
LPF frequencies: ¼Hz, ½Hz, 1Hz

What is LPF and why use it:

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

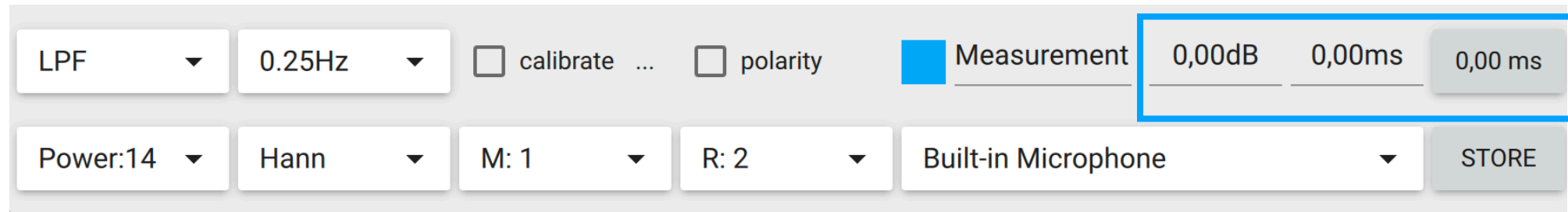# Measurement properties

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

Input value

Use keys ↑ and ↓ to adjust value

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 ... | ☐ polarity | ■ Measurement | 0,00dB | 0,00ms | 0,00 ms |
| Power:14 ▼ | Hann ▼ | M: 1 ▼ | R: 2 ▼ | Built-in Microphone ▼ | | | STORE |

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

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

* - for sample rate: 48 000Hz

Measurement properties

Logarithm time window

- 24 frequencies per octave
- each has its own time window
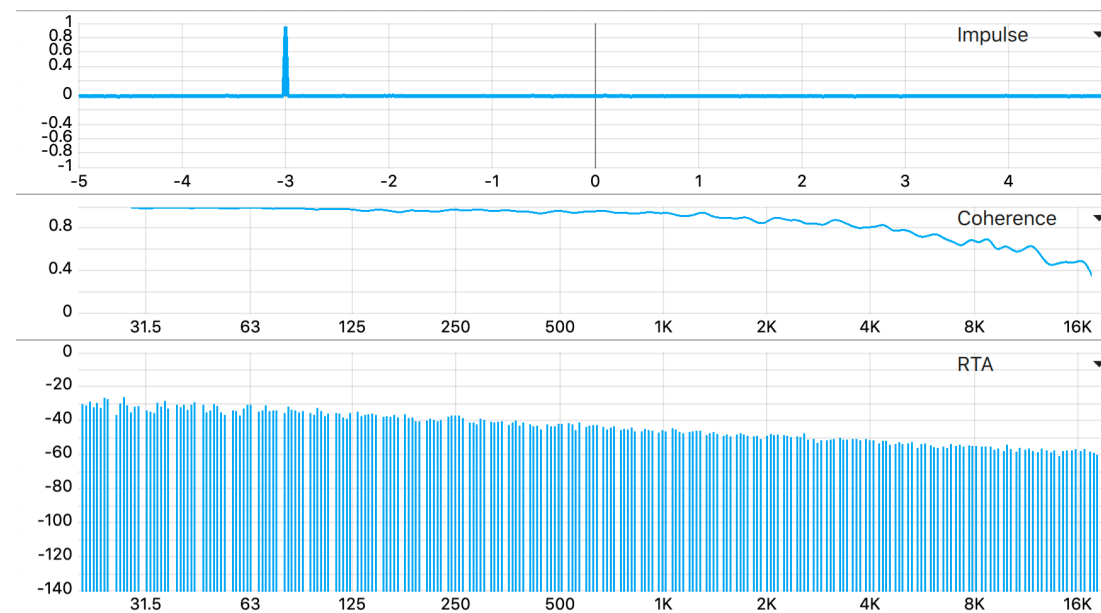
Logarithm time window
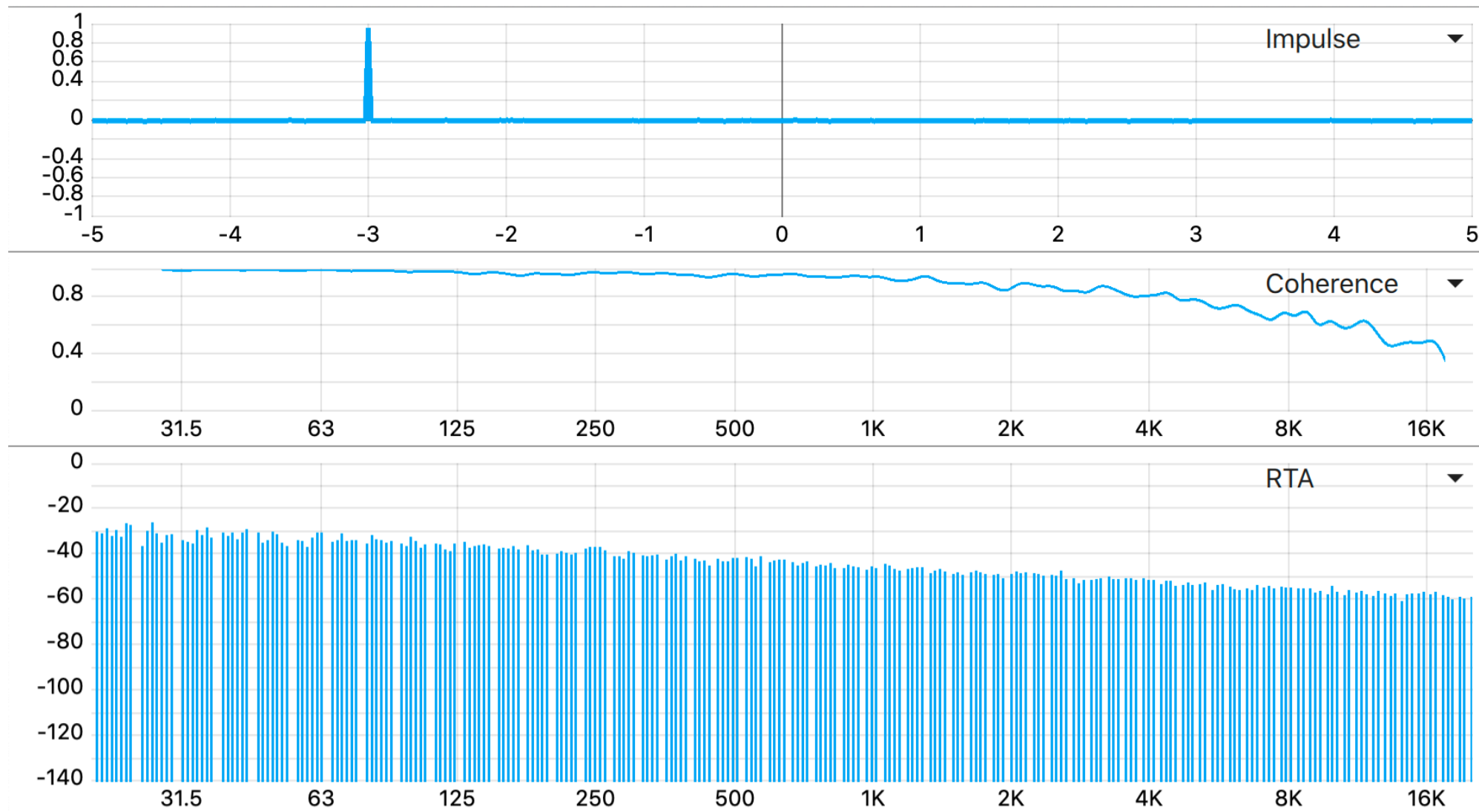
Measurement properties

Storing your measurements
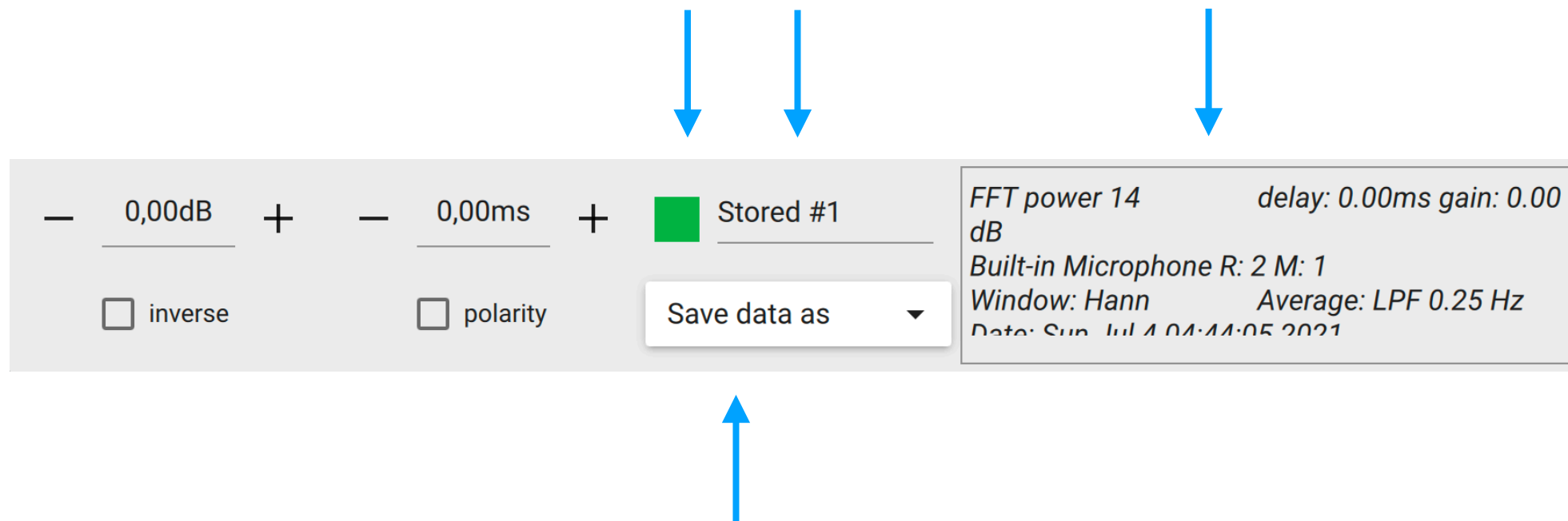

Push the button to store current measuring data

Stored series will appear at the charts and its label in the right bar
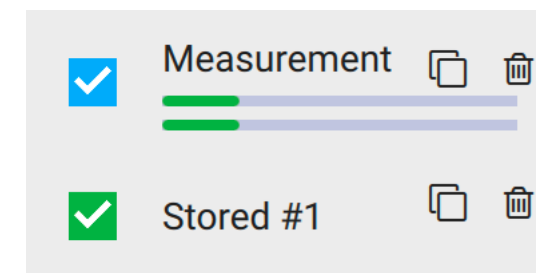
Enable/disable checkbox = view/hide the series

Stored properties

editable automatically

color   title   created notes

0,00dB +	− 0,00ms +	Stored #1	FFT power 14 delay: 0.00ms gain: 0.00 dB
☐ inverse	☐ polarity	Save data as ▾	Built-in Microphone R: 2 M: 1 Window: Hann Average: LPF 0.25 Hz Date: Sun Jul 4 04:44:05 2021

export stored data as:
- osm file
- txt
- calibration file
- frd file type

osm

cal

txt

frd
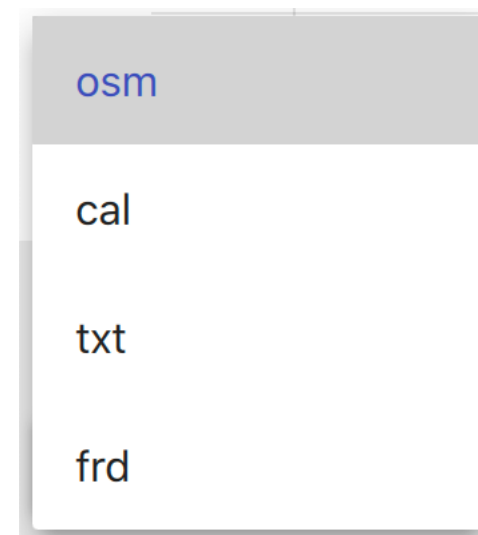
Stored properties

Offline adjustment

gain   delay

inverse
magnitude   inverse
polarity

Math source

store the result

function type

color title

| Sum ▼ | Vector ▼ | Sources must have the same size | ■ Union | STORE |

| HF ▼ | MF ▼ | All ▼ | All ▼ |

select from 2 to 4 sources: active measurement or stored

Impulse chart properties

Horizontal
axis range

Vertical
axis range

save chart
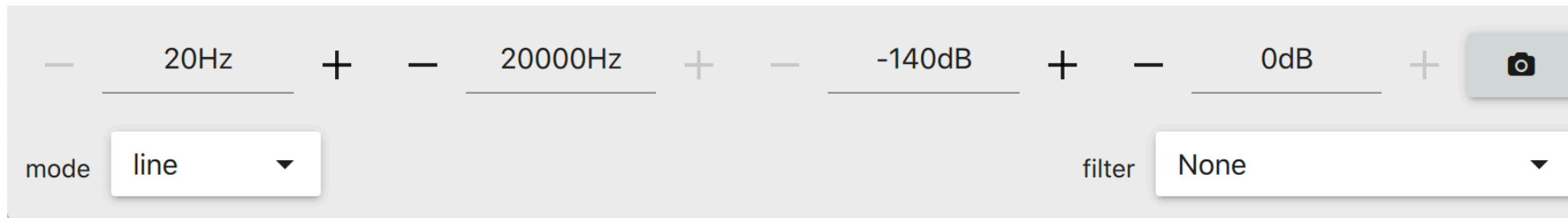as an image

| − | -5,00 | + | − | 5,00 | + | − | -1,00 | + | − | 1,00 | + | 📷 |

filter   None ▾

If source is selected, just that will be shown.

Other charts have the same layout for the properties.
For the rest, I'll show the difference only.

RTA chart properties

− 20Hz +	− 20000Hz +	− -140dB +	− 0dB + 📷

mode [line ▾]   filter [None ▾]
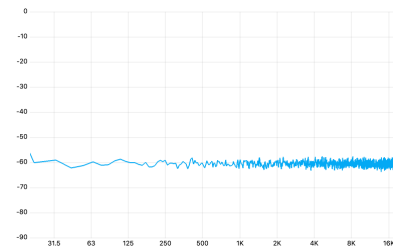
line — one continuous line

bars — [ppo 12 ▾]
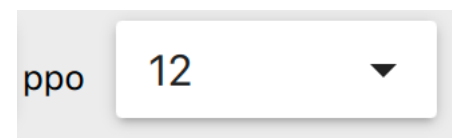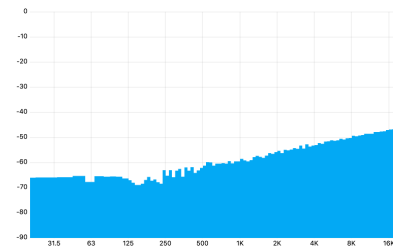
points per octave define the bar width
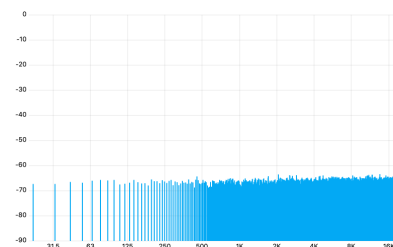
lines — one line per frequency

Magnitude chart properties

| | 20Hz | + | — | 20000Hz | + | — | -18dB | + | — | 18dB | + | ☐ invert | 📷 |

| ppo | 12 ▼ | ☑ use coherence | — | 0,70 | + | filter | None ▼ |
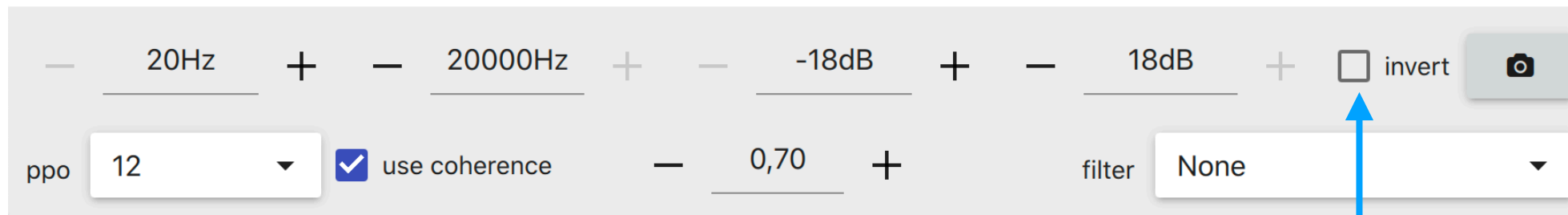
Invert Y axis

Coherence threshold for
the alpha channel

Apply coherence value for the series opacity

Points per octave define an averaging in
the frequency domain

Phase chart properties

	20Hz	+	—	20000Hz	+	—	9°	+	—	360°	+	📷

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

Coherence threshold for
the alpha channel

Apply coherence value
for the series opacity

Points per octave define an averaging in
the frequency domain
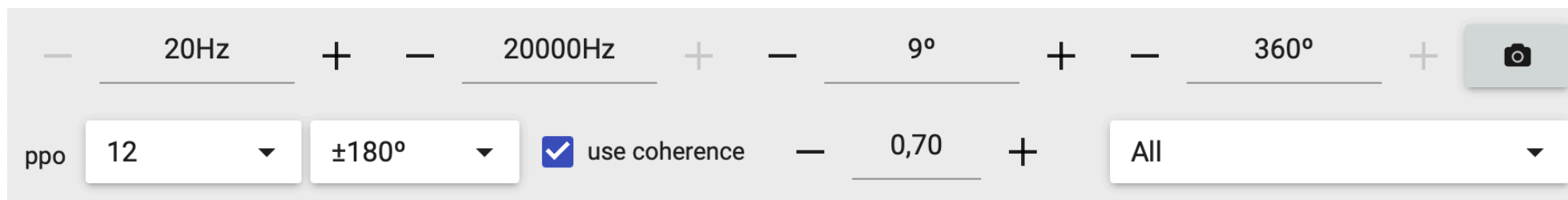
Phase chart range

center angle   range
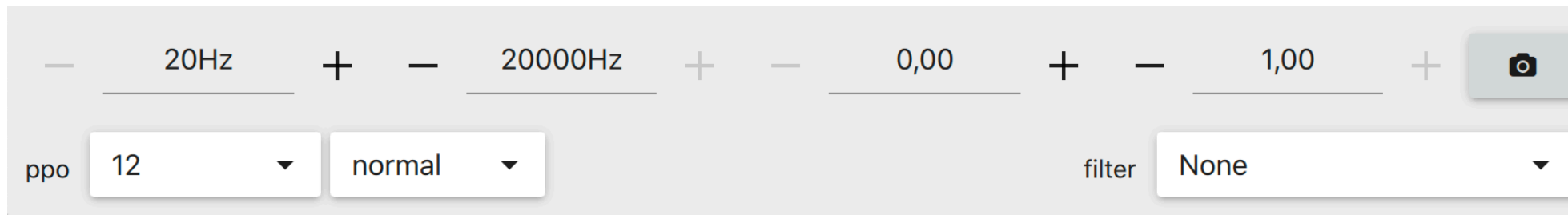
| 20Hz | + | — | 20000Hz | + | — | 9° | + | — | 360° | + | 📷 |

| ppo | 12 ▾ | ±180° ▾ | ☑ use coherence | — | 0,70 | + | All ▾ |

Show values:

- -180° to +180°
- 0° to 360°

Coherence chart properties

| 20Hz | + | − | 20000Hz | + | − | 0,00 | + | − | 1,00 | + | 📷 |

ppo [12 ▾] [normal ▾]   filter [None ▾]

Show normal or squared value

Points per octave define an averaging in
the frequency domain

Spectrogram chart properties

| 20Hz | + | − | 20000Hz | + | − | 0s | + | − | 4s | + | 📷 |

| ppo | 48 ▾ | − -90dB + | − -50dB + | − 10dB + | Measurement ▾ |
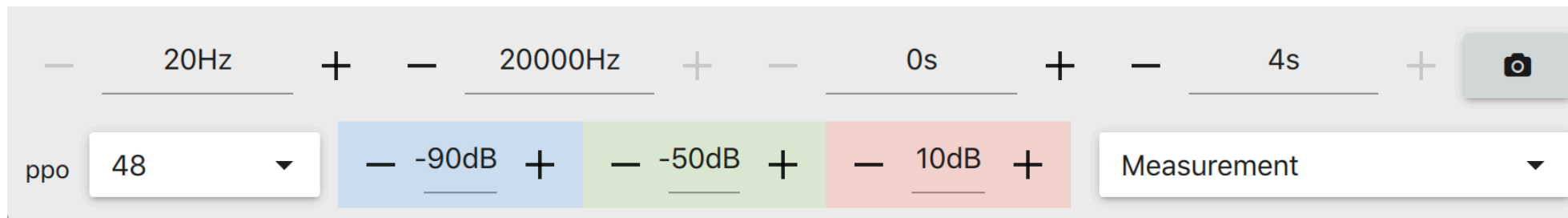
Set colours thresholds   Select a source

Points per octave define an integration in
the frequency domain

Wavelength calculator

— 1000 Hz + — 1,000 ms + — 20°C + 343,3 m/s

— 0,343 m + — 0,171 m + meter ▼

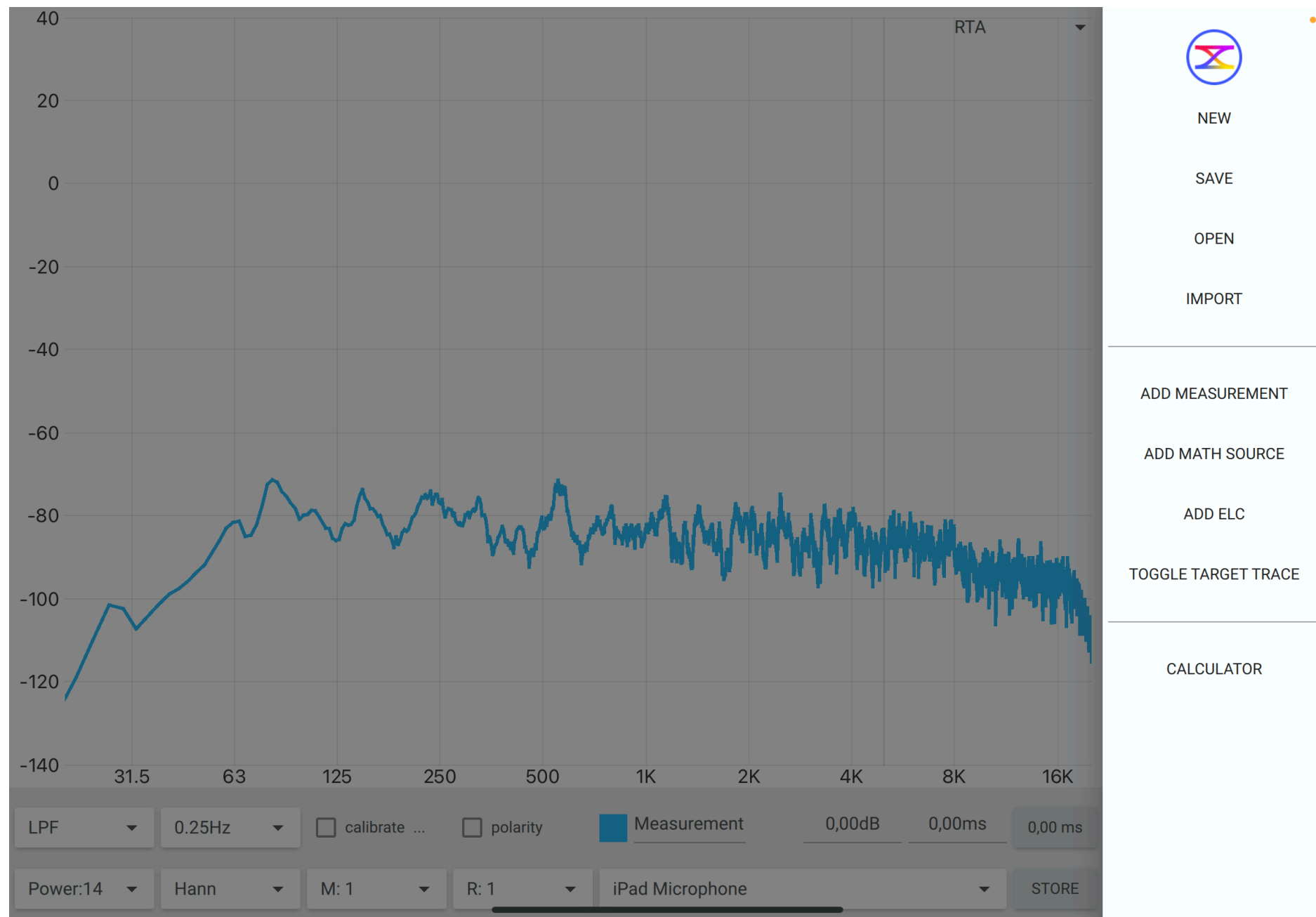Allows you calculate between frequency, period and wavelength.
You can change any value and get others.

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
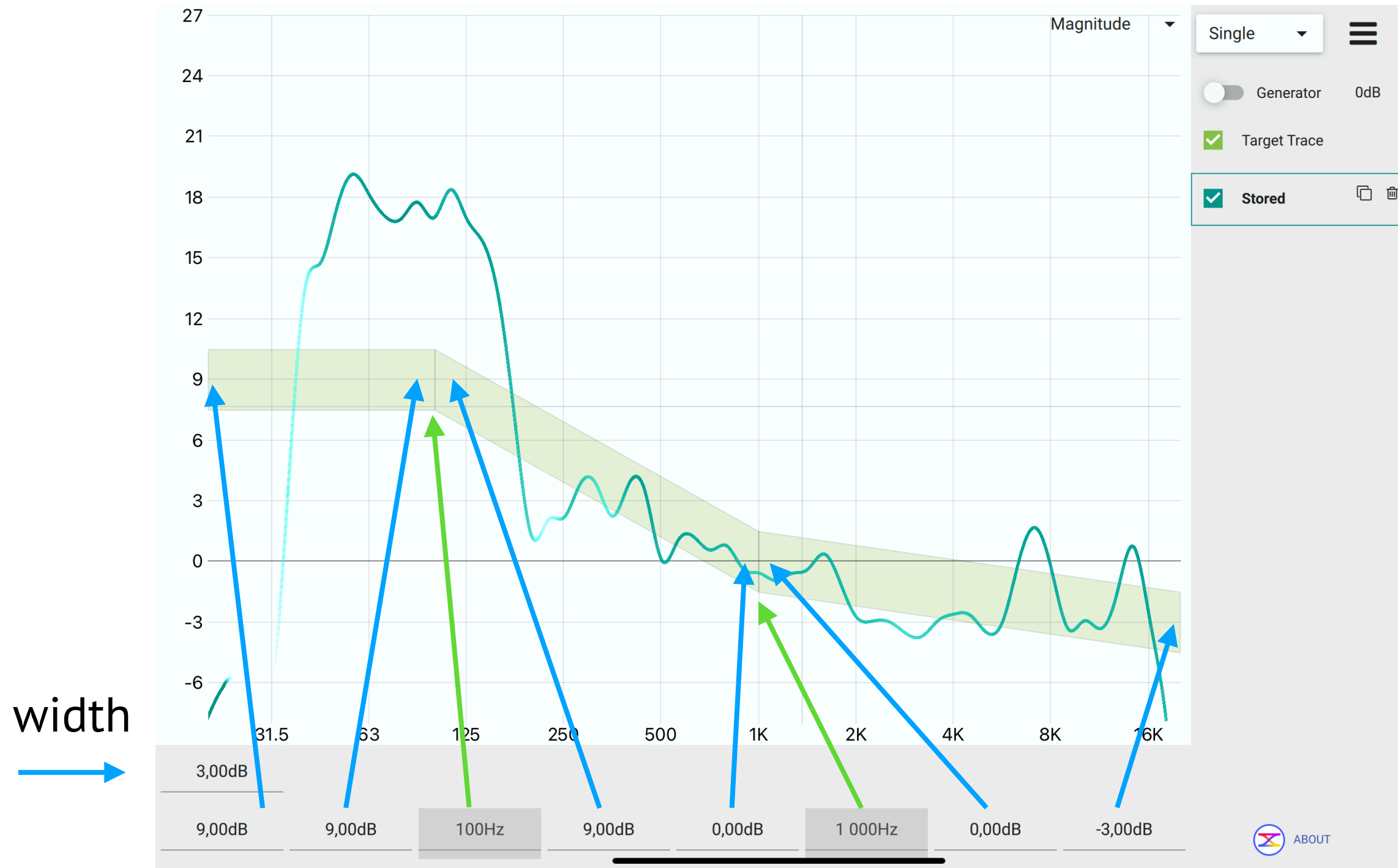touch the chart with second one.

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
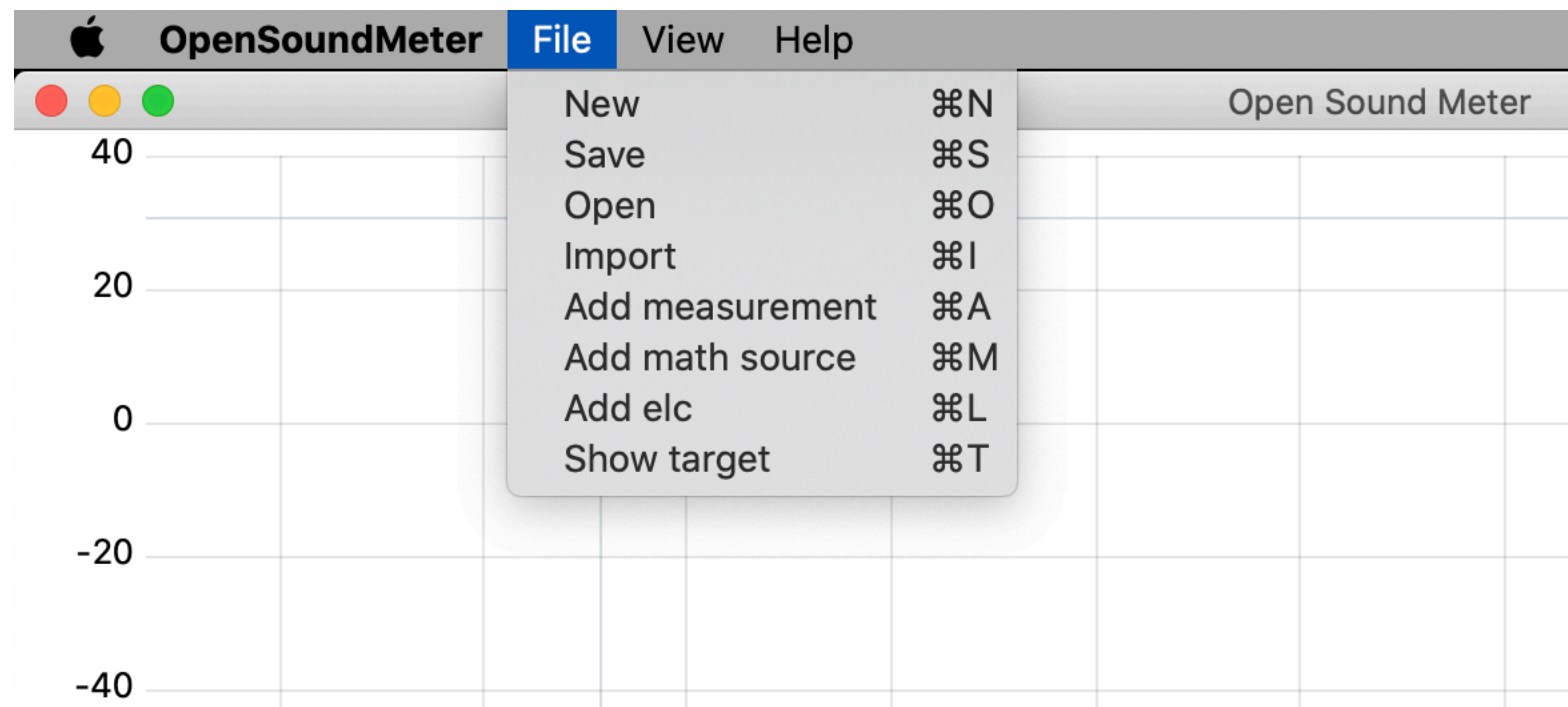
New – create empty measuring project

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

Open – load project file or single stored data

Import – data from txt or csv format

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

Dark mode

Thanks to Josh Barker for contribution

Update application

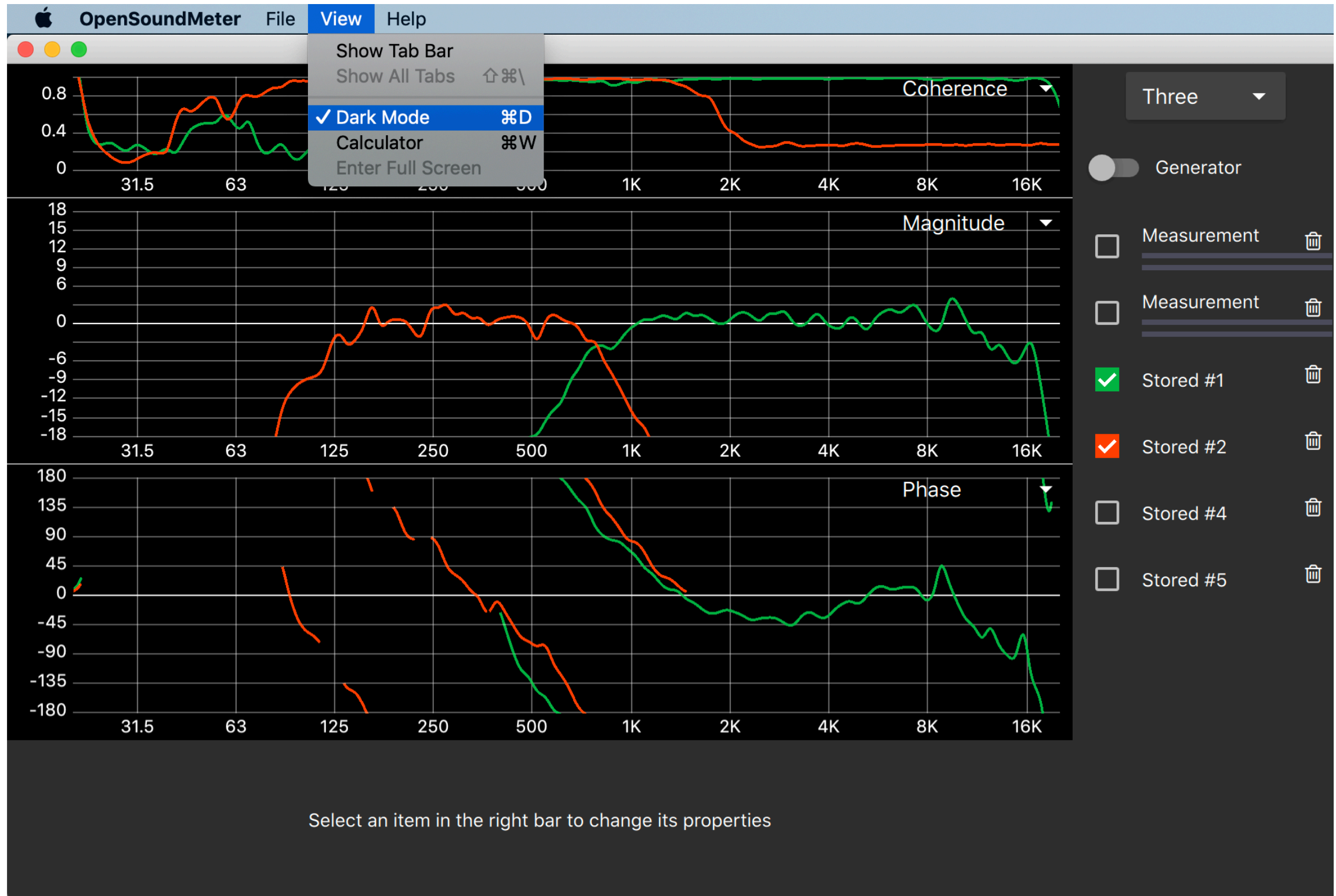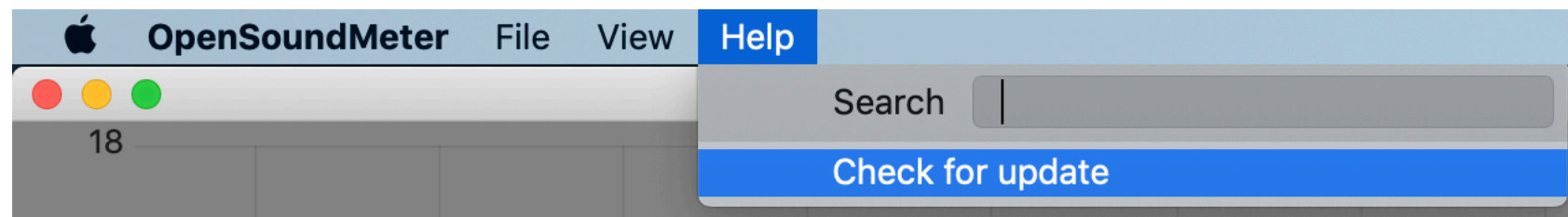Open Sound Meter checks for updates at every start if internet connection is available.
You will see a message about update.

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 crushes

- Create new functions and fix issues if you are a programmer

Thank you for support!

Follow

facebook.com/opensoundmeter