

## Measurement Summary

1 kHz 5 cm/s level and distortion measurements				2nd Harmonic Distortion	
		radius Mil	radius um	Left %	Right %
Conical	Grado EC	0.6	15.2		3.5
Bi-radial	AT 85 EP	0.3	7.6	1.5	1.8
Shibata	AT 85 SHIB	0.26	6.6	1.7	1.2
Vivid Line	AT Series V	0.2	5.1	1.3	0.9
Sim Cart 0.6		0.6	16	1.6	1.6
Sim Cart 0.3		0.3	8	0.8	0.8

### Distortion vs. Stylus Radii

	Left [mv]	Right [mv]	L/R [dB]
Grado EC		0.43	
AT 85 EP	0.51	0.50	0.2
AT 85 SHIB	0.33	0.37	-0.9
AT Series V	0.37	0.42	-1.2

### Output voltages 1 kHz at 5 cm/s, Left vs. Right



15 tracks which have been cut from 1-4 and 5-15

The new 15-track  
fine pressing

1. Frequency Sweep Left Channel 800 Hz – 50 kHz. Log. 28 sec. Linear cut\* (800 – 20000 Hz  $\pm 1,5$  dB)
2. Frequency Sweep Right Channel 800 Hz – 50 kHz. Log. 28 sec. Linear cut\* (800 – 20000 Hz  $\pm 1,5$  dB)
3. Frequency Sweep Left Channel 800 Hz – 50 kHz. Log. 28 sec. Linear cut\* (800 – 20000 Hz  $\pm 1,5$  dB)
4. Frequency Sweep Right Channel 800 Hz – 50 kHz. Log. 28 sec. Linear cut\* (800 – 20000 Hz  $\pm 1,5$  dB)
5. Reference tone 1000 Hz 5 cm/sec rms Left
6. Reference tone 1000 Hz 5 cm/sec rms Right
7. Reference tone 1000 Hz 5 cm/sec rms Left
8. Reference tone 1000 Hz 5 cm/sec rms Right
9. Tracking ability, lateral 50  $\mu$ m peak
10. Tracking ability, lateral 60  $\mu$ m peak
11. Tracking ability, lateral 70  $\mu$ m peak
12. Tracking ability, lateral 80  $\mu$ m peak
13. Tracking ability, lateral 90  $\mu$ m peak
14. Tracking ability, lateral 100  $\mu$ m peak
15. Square Wave Form 2.7 msec duty cycle 3:7

\* The record has a constant amplitude throughout the sweep without any RIAA correction.

How it works

Watch the video where Leif Johannsen, Ortofon's Chief Officer Acoustics and Research, explains how to set up and align your high-end cartridge correctly.

#### 1-4 Frequency sweep - A tool for checking frequency response

There are several factors which can affect frequency response, including cable capacitance, cartridge loading, tracking force and worn parts. Because of this, it can be difficult to achieve perfectly flat frequency response. Sometimes by making small compromises in the cartridge loading, a better overall frequency response can be achieved. Considering the above the signal must be clean throughout the sweep.

#### 5-8 Reference tone for testing channel output

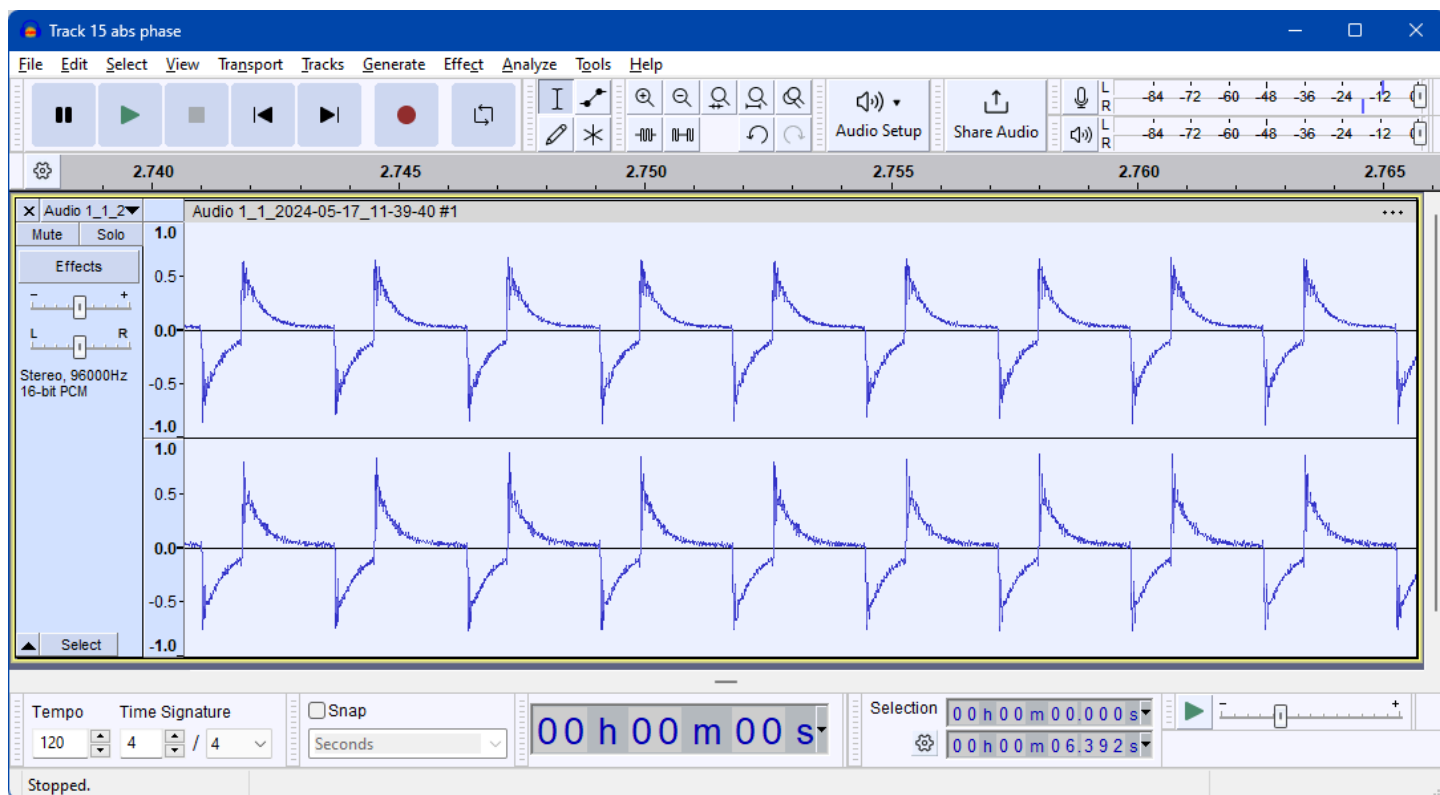
With this standard reference signal is it possible to check the correctness of the connections of the left and right channels, channel balance and speed of the turntable.

#### 9 -14 Tracking ability test, 315 Hz lateral modulation

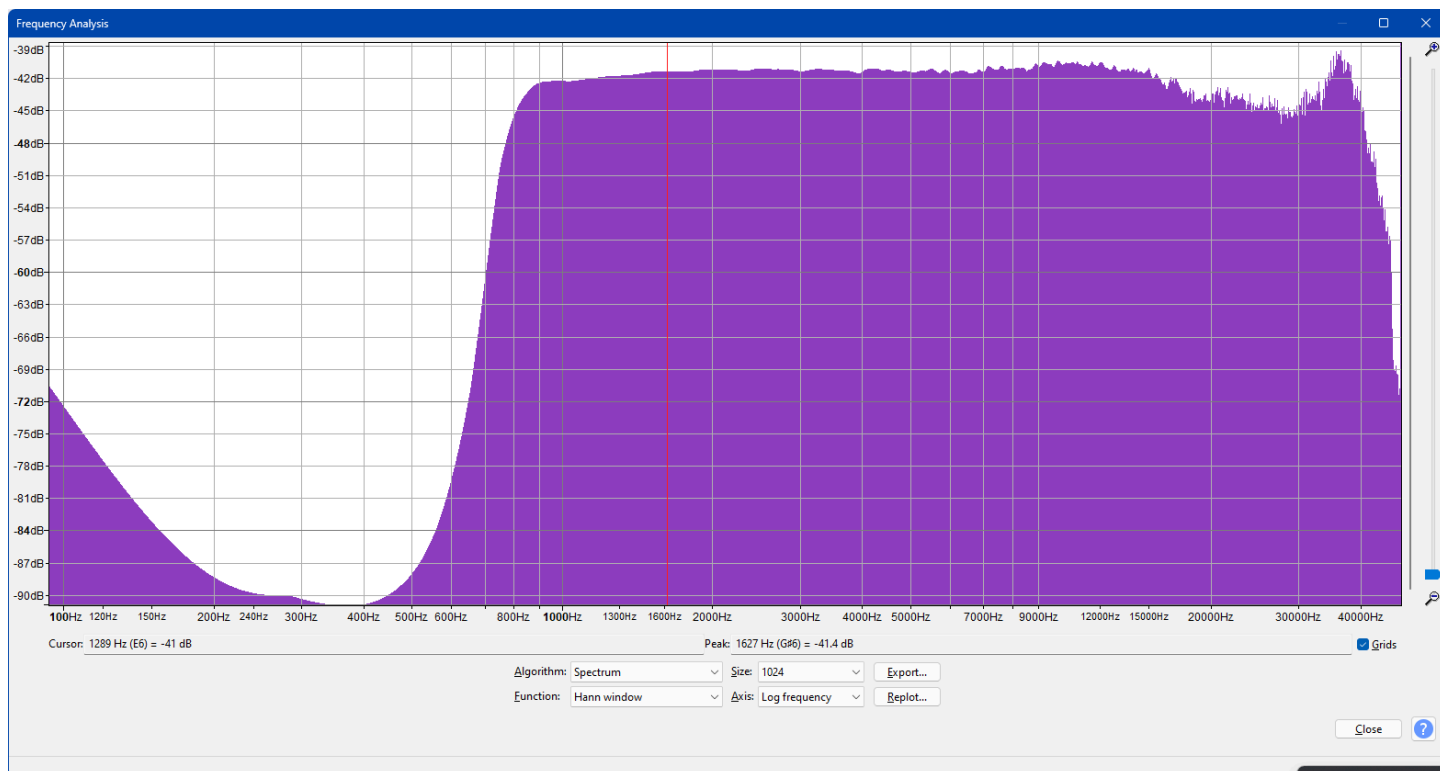
These tracks contain a 315 Hz signal, recorded at increasing pick amplitudes of 50, 60, 70, 80, 90 and 100 micrometers. Please refer to your cartridge's tracking ability value specified in the technical data sheet. Your cartridge should be able to track the actual level without audible distortion. Inability to track can be heard as a departure from a pure tone or a sputtering and intermittent tone. To determine if it is one or both channels, the balance control can be utilized. In case of differing tracking ability in the left and right channels it is probably necessary to readjust the anti-skating correction of the tonearm. If both channels fail to track properly, then vertical tracking force should be increased until no further improvement of tracking force can be obtained.

#### 15. Square Wave Form 2.7 msec duty cycle 3:7

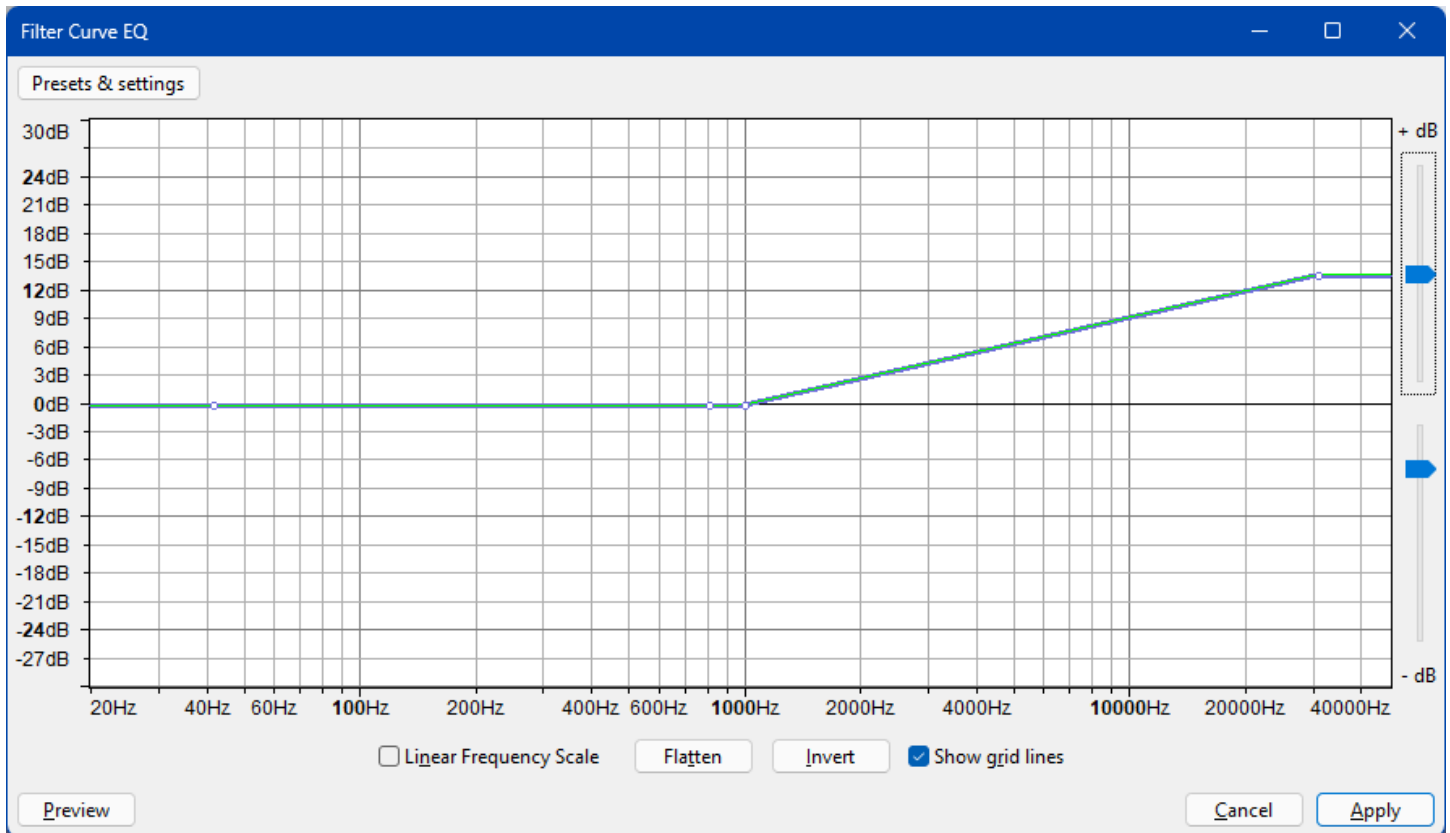
When monitoring the output of your cartridge with an oscilloscope you'll then see a square wave located precisely above each other if the connection from the cartridge is correct.



Absolute Phase, 70% duty cycle square wave.



AT85EP cartridge, flat preamp, EQ as below, capture and graph using Audacity PC Software



9 dB per decade boost beginning at 1kHz

## Posts about the record on DIYAudio

What's below 800Hz isn't RIAA recorded but seemingly also constant velocity but at a ca. -40dB lower level.

Frequency Sweep Left Channel 800 Hz – 50 kHz. Log. 28 sec. Linear cut\* (800 – 20000 Hz  $\pm 1,5$  dB)

"\* The record has a constant velocity amplitude throughout the sweep."

<https://www.diyaudio.com/community/threads/ortofon-test-record.400424/page-2>

And instead of using the time consuming way to construct a FR in Audacity, you could load the recorded .wav file into RightMark Audio Analyzer which is freeware.

Load the .wav file with the most right option at the bottom called "Spectrum Analyzer" and it will process your 28 sec .wav file in one go.

Use the largest FFT size.

Hans

P.s. I forgot to say that within Audacity you will have to construct an upwards going 10dB/dec eq filter from 300Hz to 30Khz or so, to rotate the spectrum from 10dB/dec downwards going into a horizontal one. Once made, it will be a hit of a button in Aadacity to apply the filter.

[https://audio.rightmark.org/index\\_new.shtml](https://audio.rightmark.org/index_new.shtml)

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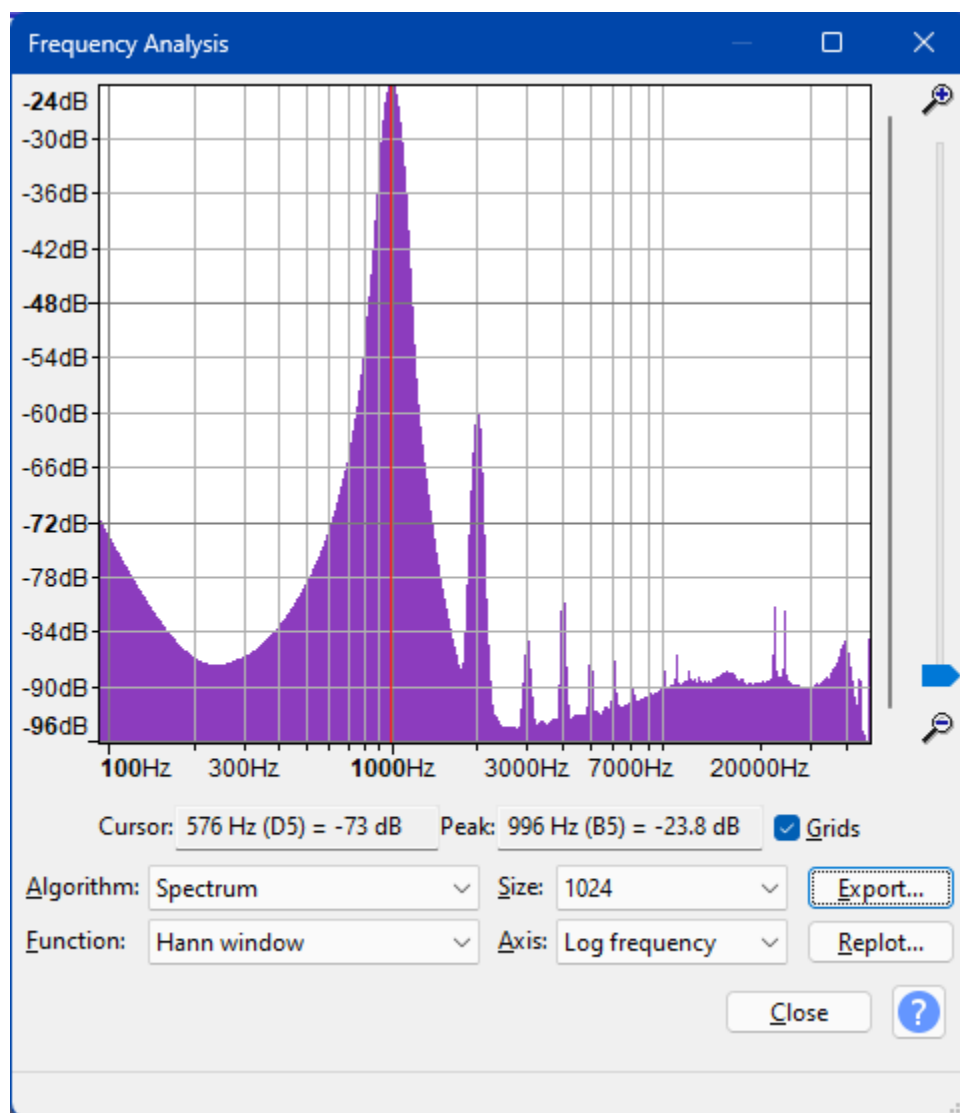
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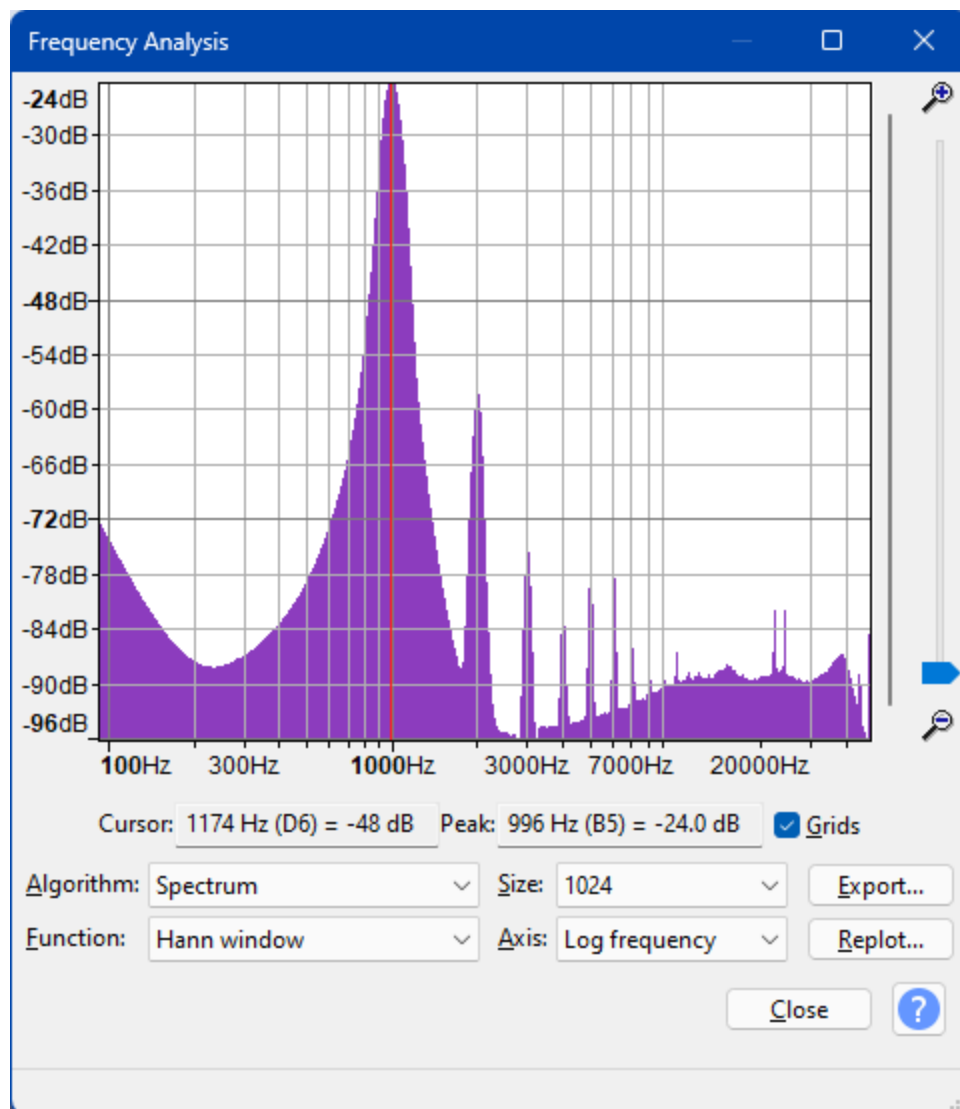
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## Measurements Of Each Cartridge

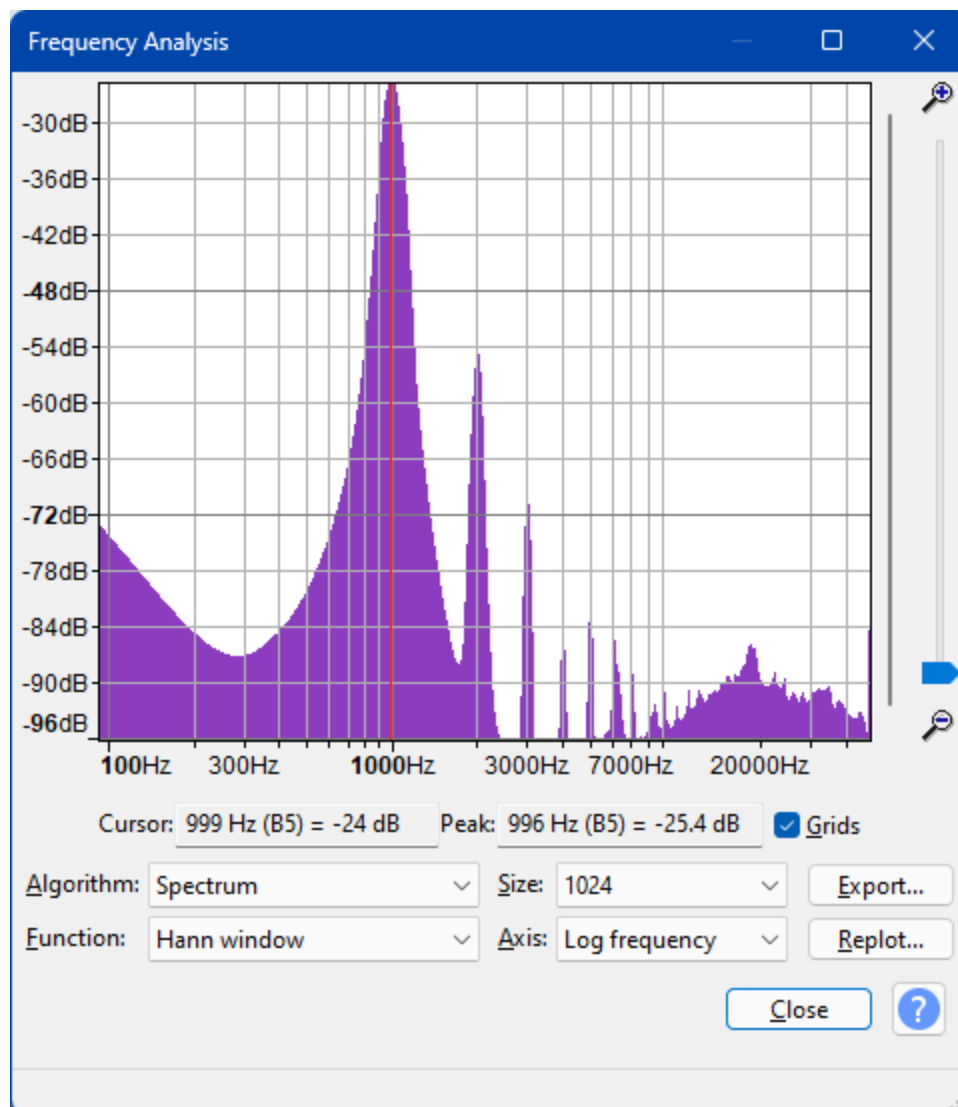
Captures of Tracks 5 & 6 1 kHz at 5 cm/s



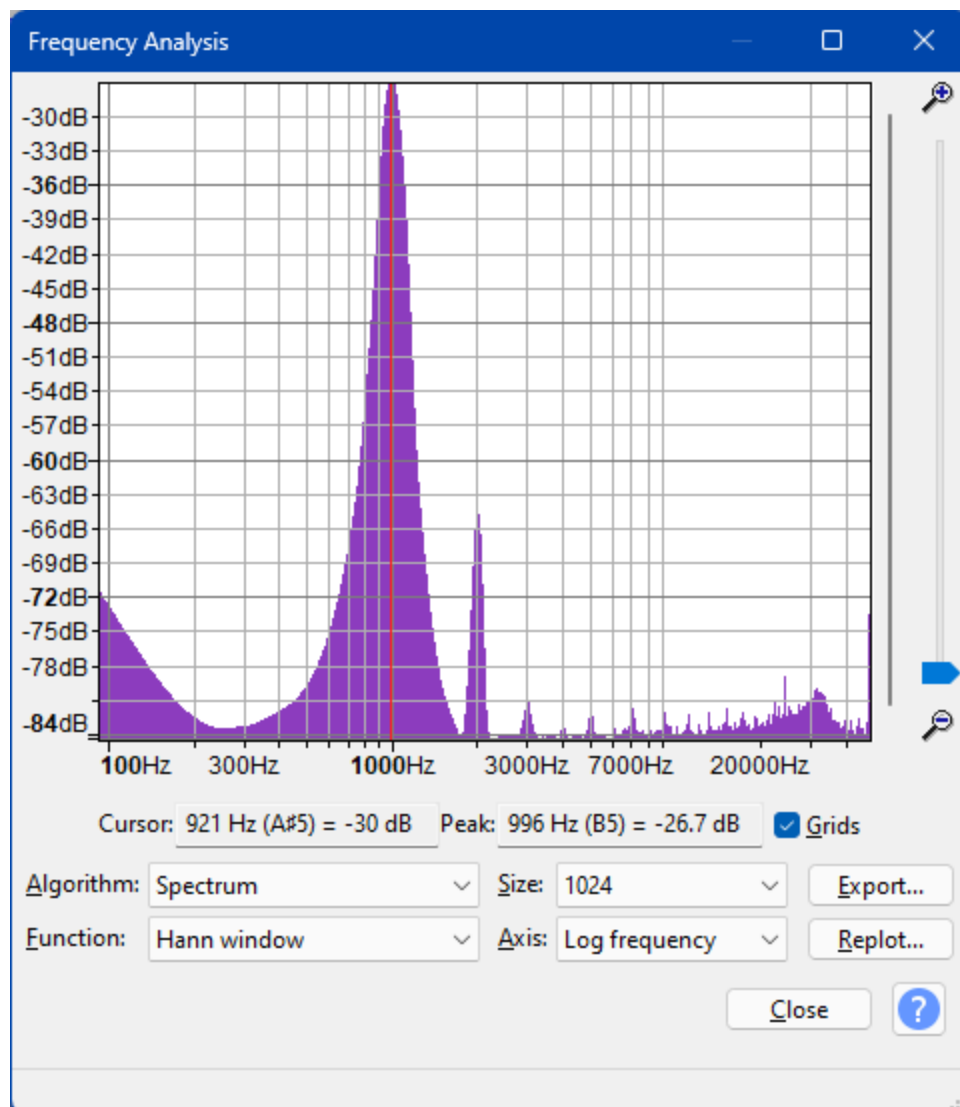
AT85EP cartridge Left Channel



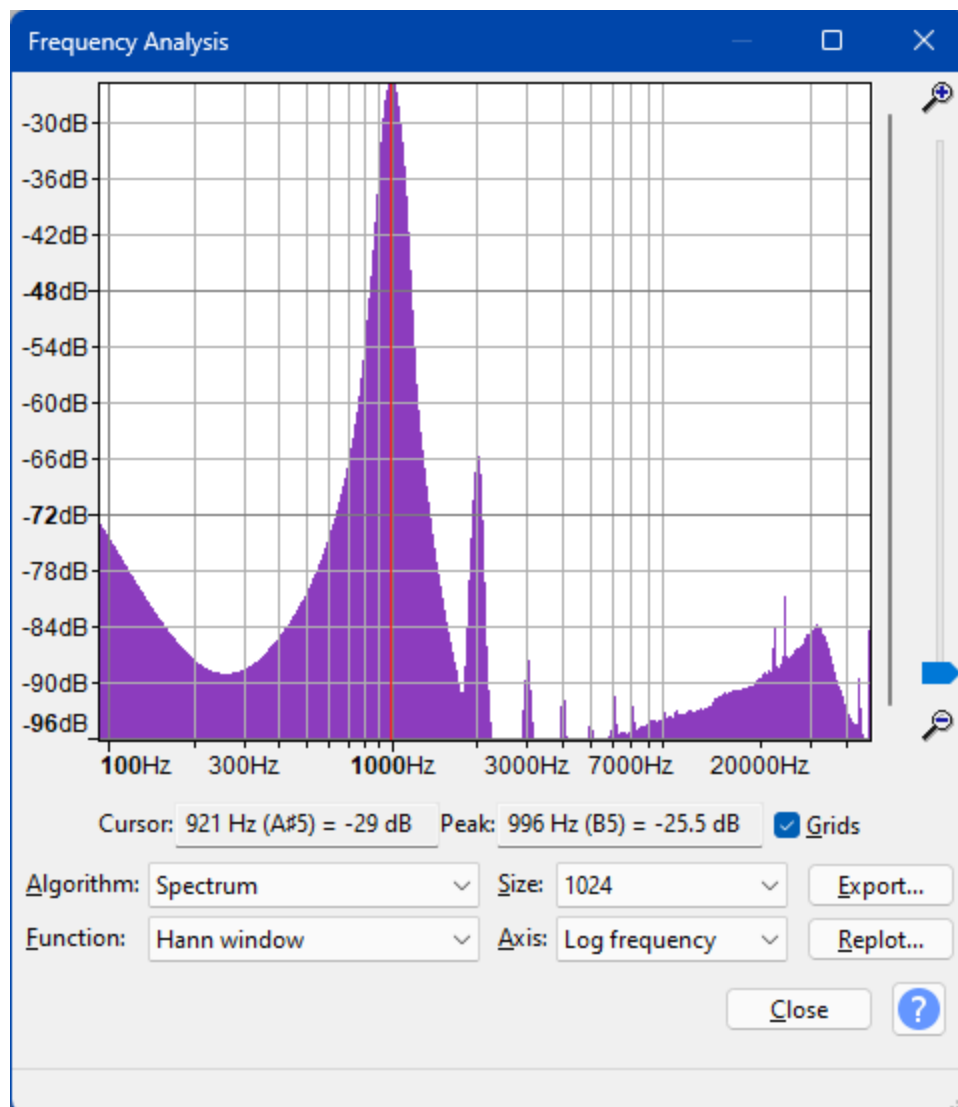
AT85EP cartridge Right Channel



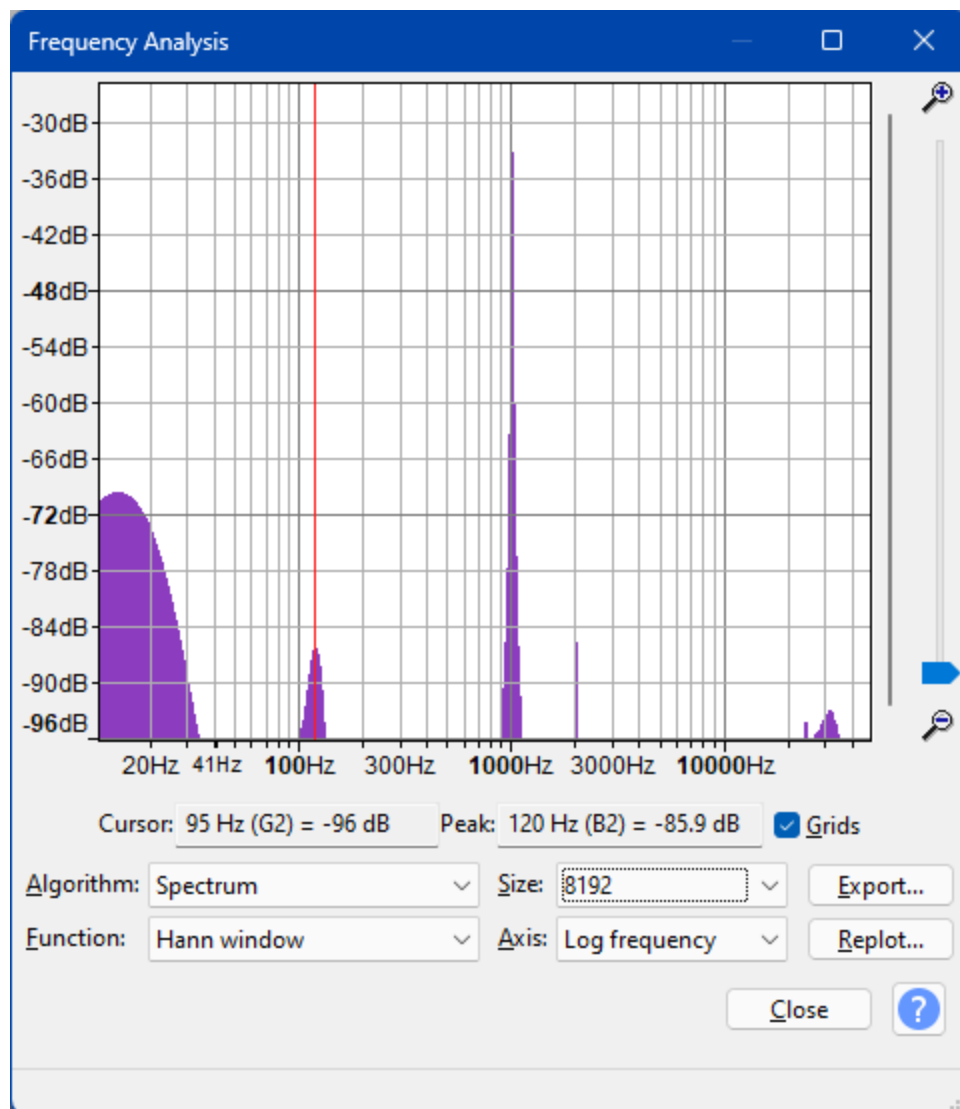
Grado GC Right Channel only



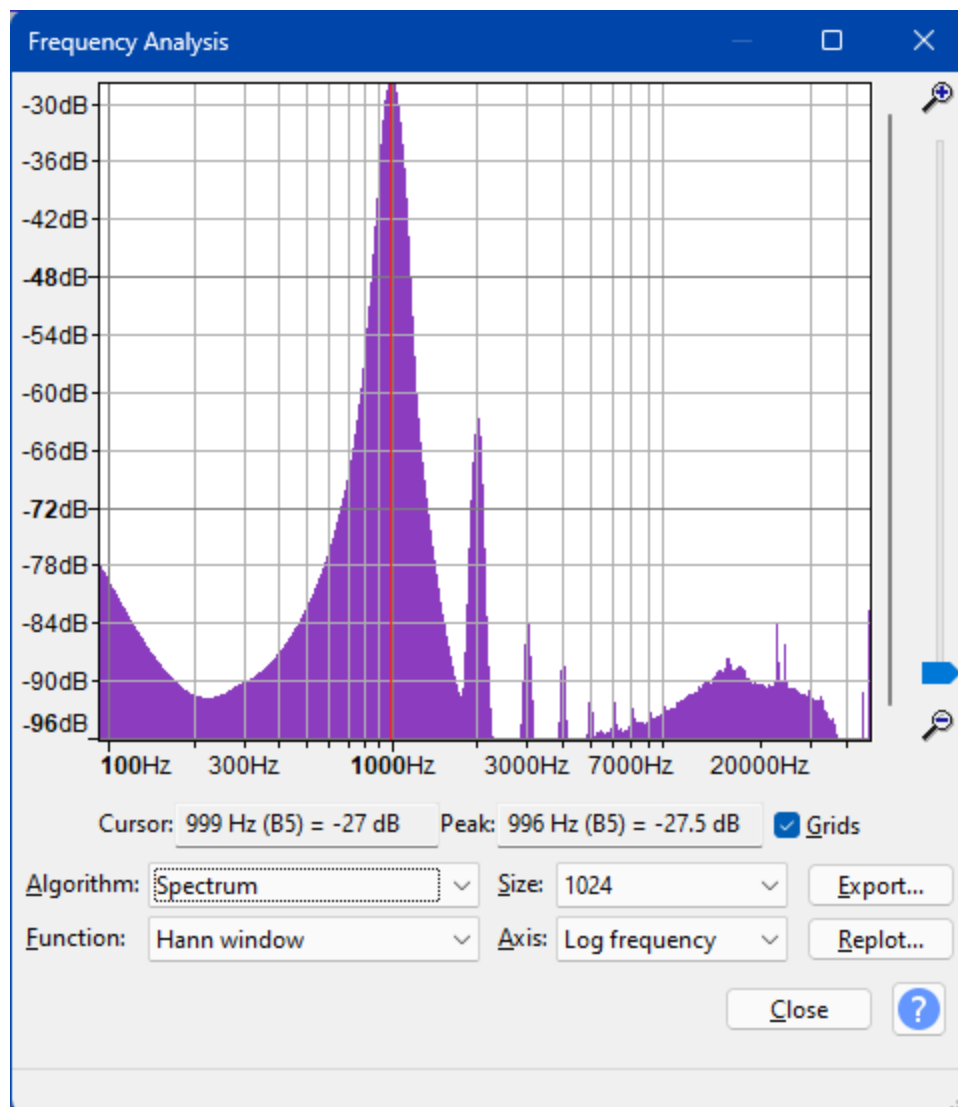
AT Series V Left



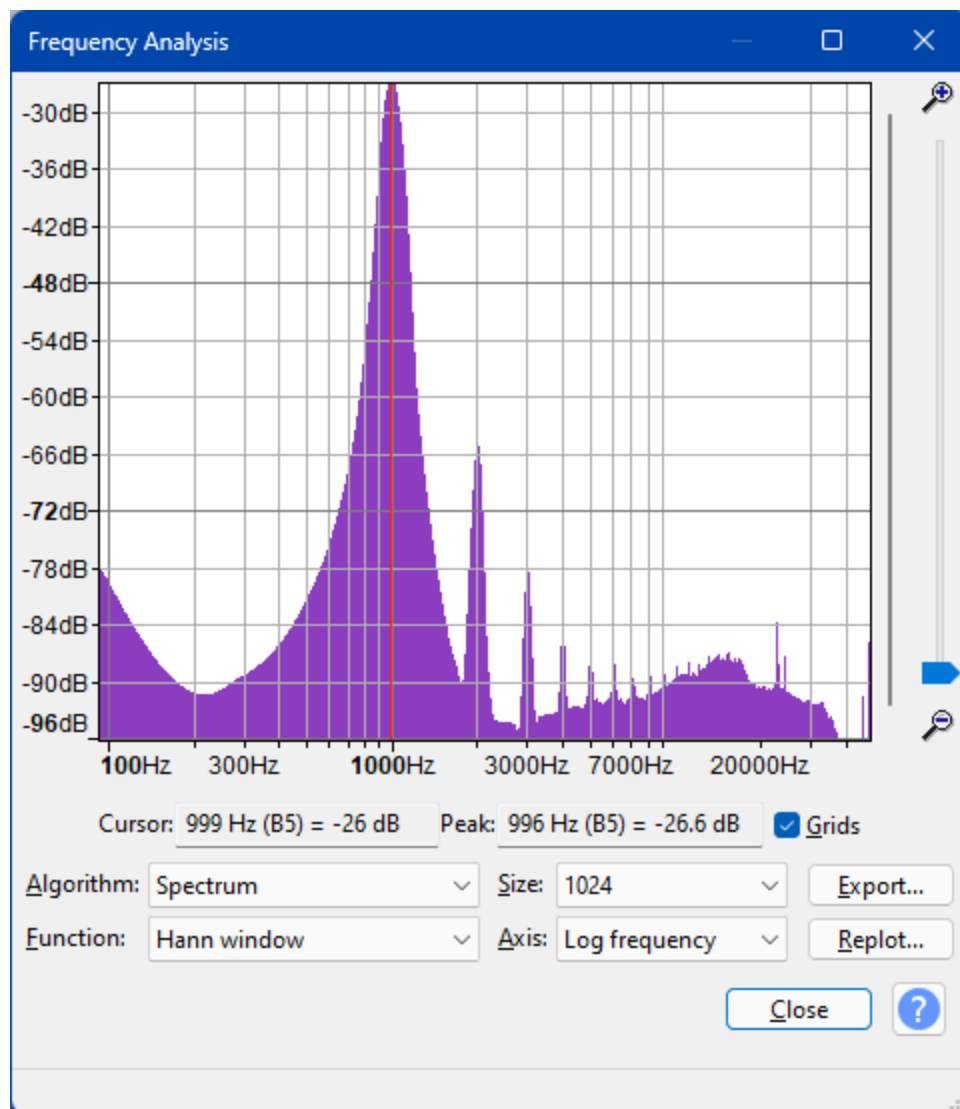
AT Series V Right channel



Series V R channel



AT85 Shibata Left channel



AT85 with Shibata R channel