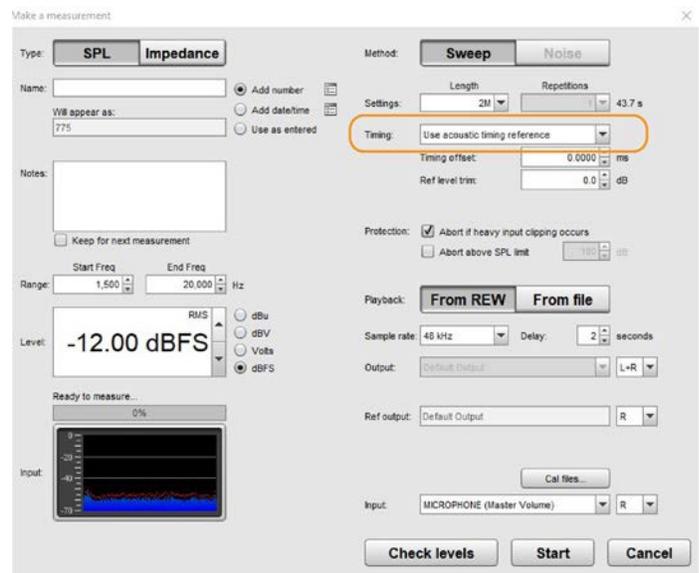
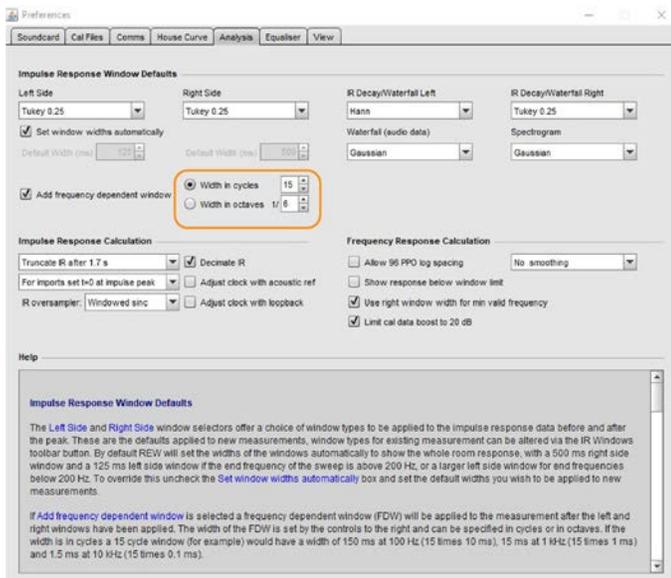


## REW average measurements and impulse correction rePhase

- Tutorial is meant to be use for speakers/ drivers implementation in to your listening area. Integrating impulse corrected filter for your DSP device with or with out "room curve" . "Room curve" bases is Bruel and Kajer work in room acoustics: <https://www.bksv.com/media/doc/17-197.pdf> Goal is to produce the best possibly sounding speakers /drivers for your room.
- Taking a measurements point microfon`s tip vertically ,towards sealing and use 90° calibration file for your mikrofon, resulting much better measuring results for REW.

### 1.REW Preferences



1/6th octave smoothing and 15 cycles FDW to generate the correction filters and avoid 'micro-managing' the amplitude and phase corrections.

Timing reference activated.

### 2. Room curve

Data used to make "room curve" can be imported to REW as a text file or using "target settings" in REW.

"EQ" -> "target settings" -> activate "Add room curve".

It could take to do same tuning to reach desired result and this task is up to you. Settings in a pictures it is just guide line/staring point.

Assuming you following this tutorial and goal is to implement "room curve" with impulse corrected filter for your DSP device.

Then, "Equalizer" choose "rePhase", because we will end up with producing FIR filter in rePhase software for your device.



Importing text file into the REW software.

First you must make text file. Copy digits and paste in to your text editor and save it as txt file with a name ( free choice) :

25.198 0.000  
31.748 -0.001  
40.000 -0.005  
50.397 -0.016  
63.496 -0.039  
80.000 -0.079  
100.794 -0.134  
126.992 -0.203  
160.000 -0.290  
201.587 -0.397  
253.984 -0.528  
320.000 -0.683  
403.175 -0.866  
507.968 -1.087  
640.000 -1.351  
806.349 -1.651  
1015.937 -1.972  
1280.000 -2.302  
1612.699 -2.634  
2031.873 -2.967  
2560.000 -3.300  
3225.398 -3.634  
4063.747 -3.967  
5120.000 -4.300  
6450.796 -4.634  
8127.493 -4.967  
10240.000 -5.301  
12901.592 -5.634  
16254.986 -5.967  
20480.000 -6.301  
22050.000 -6.301

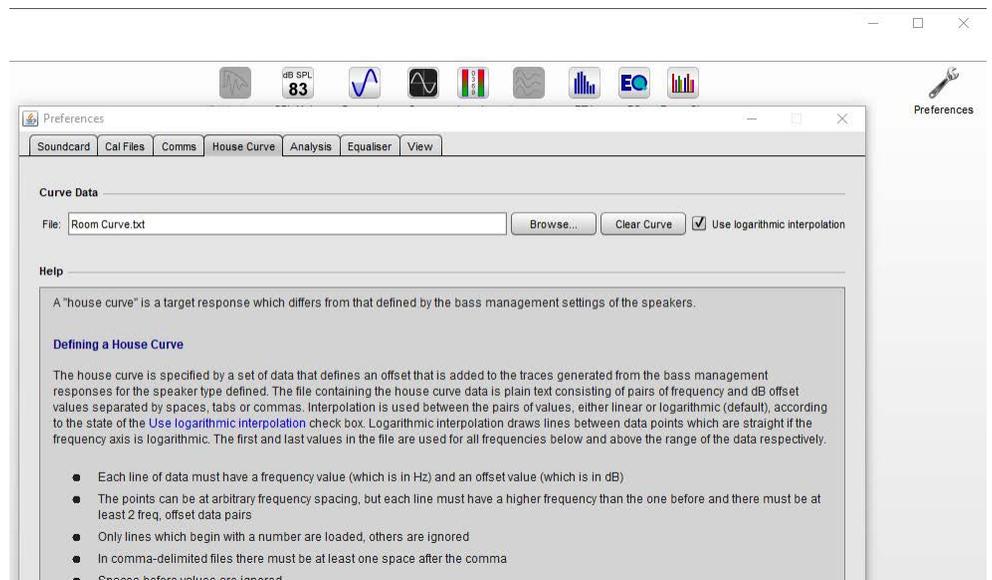
This room curve based on Bob Katz' recommendations, diyAudio forum.

0 -90.0  
5 -6  
6 -3  
7.5 -1  
10 -0.1  
20 0.0  
50 0.0  
100 -1  
200 -2  
400 -3.0  
800 -4.0  
1000 -4.2  
2000 -4.7  
3200 -5.3  
6400 -6.5  
12800 -7.5  
19200 -8  
22050 -10

This room curve based on "fluid" recommendations, diyAudio forum.

Then saved file import to REW.

"Preferences" ->"House Curve"->"Browser" find your saved file and import it.



How to Integrate impulse corrected filter and "room curve" for your DSP device ,will be explained in detail in a step **7. Combined filter**

Each and everyone person on this earth have singular hearing organ belonging only to him and no one else has it the same sound interception experience. "Room curve" is an how most of people would love sound to be in they listening room for music. It is up to you to use " room curve" or don't.

*If you are using it:*

"room curve" should be activated for all times in REW software. From step one of this tutorial up to the end.

*If you are not using it:*

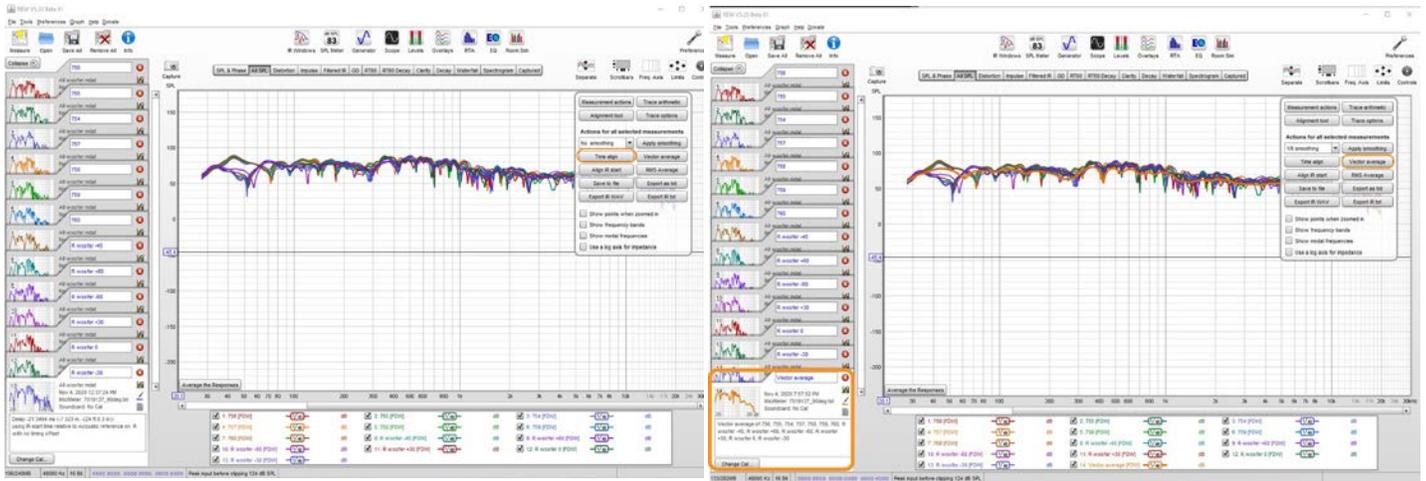
Just don't activate .

How you will use tutorial depends on your DSP hardware/software set up. Following up to the end of tutorial step **7. Combined filter**,we will end up with having needed information for rePhase software to produce file for FIR filter for your hardware/software. Theoretically it would be only one filter what you need,minimizing used of PEQ filters.

If your set up don't have FIR in it,tutorial for you it is usefully up to step **4.PEQ generated filter**.

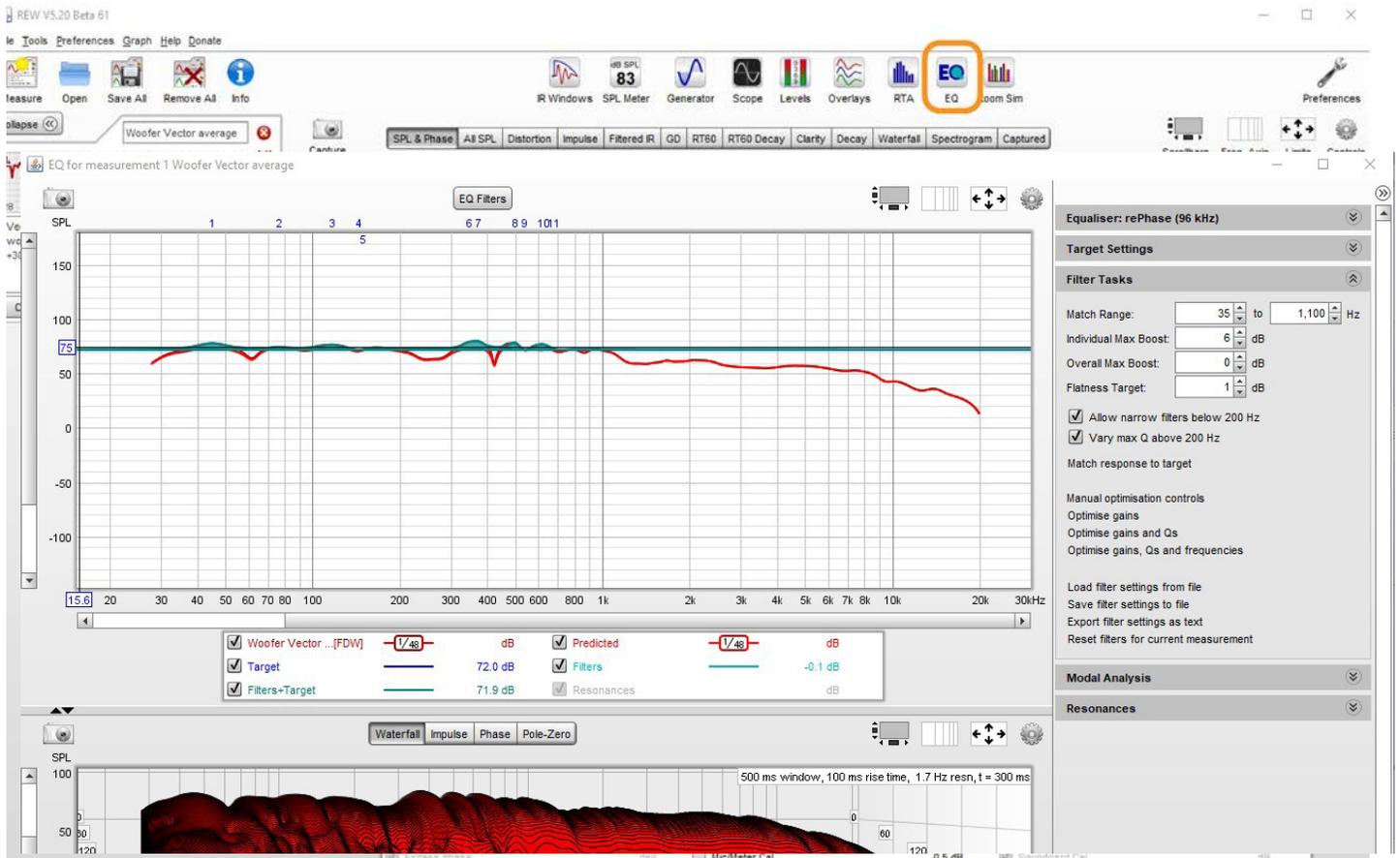
### 3. Averaged measurements.

Take several meaningful measurements representing your listening area . Import all of them in to the REW .  
"All SPL" -> "Control" -> "Time Align"->"Vector average".

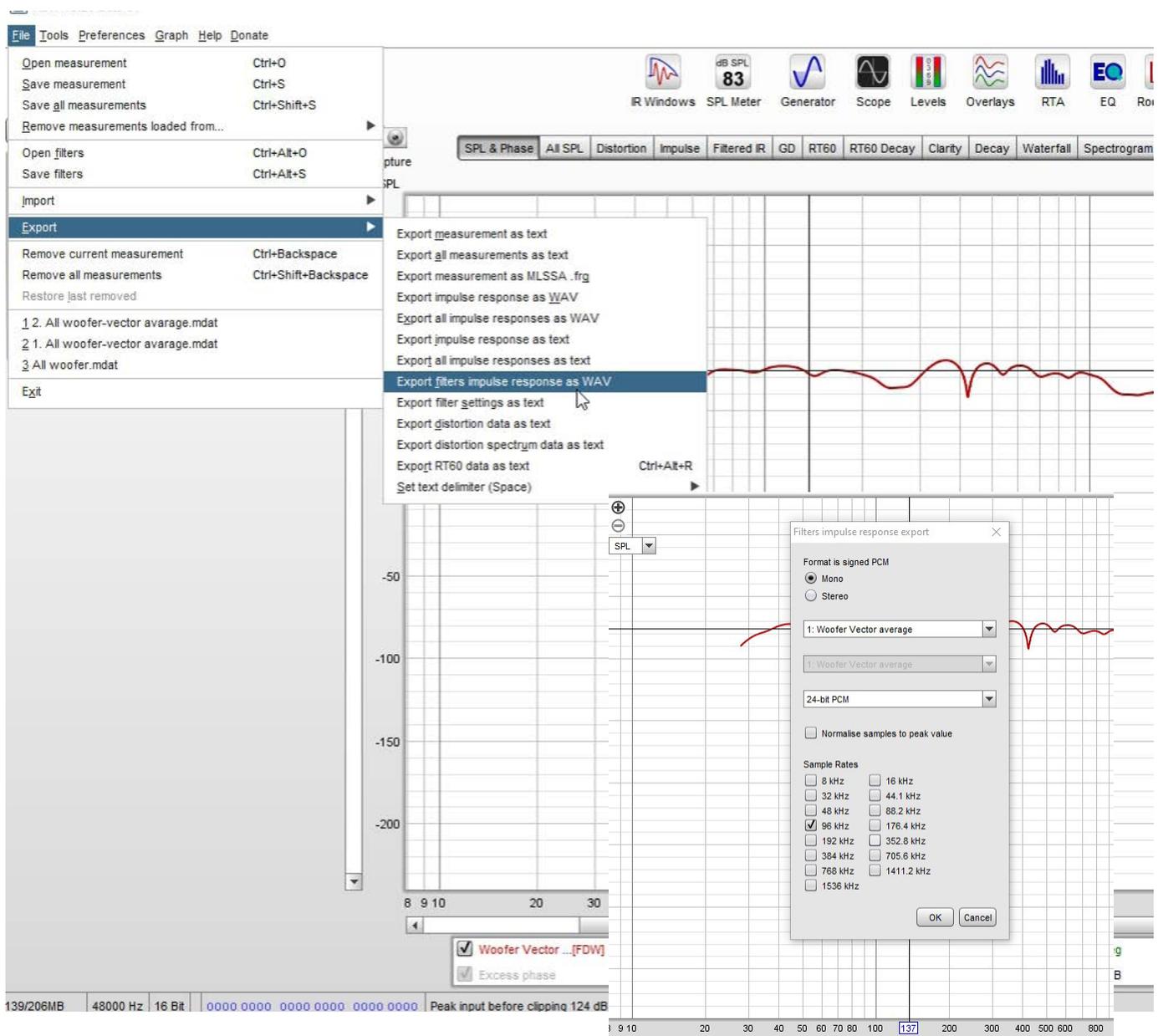


### 4. PEQ generated filter

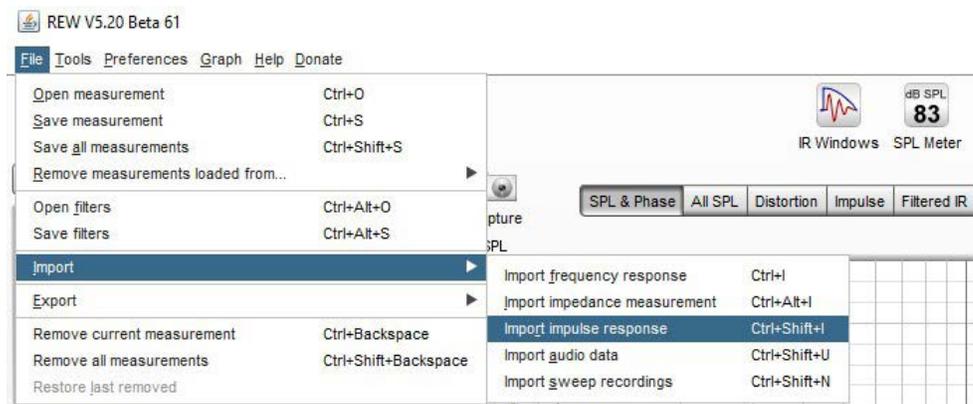
We have ended up with REW generated "Vector average" measurement. Next is to make PEQ filter for "Vector average" measurement. At this point you would like to save PEQ filter to be used in your DSP.  
Or exported PEQ filter before as an xml for RePhase to create a combined filter -step **6. Combined filter**



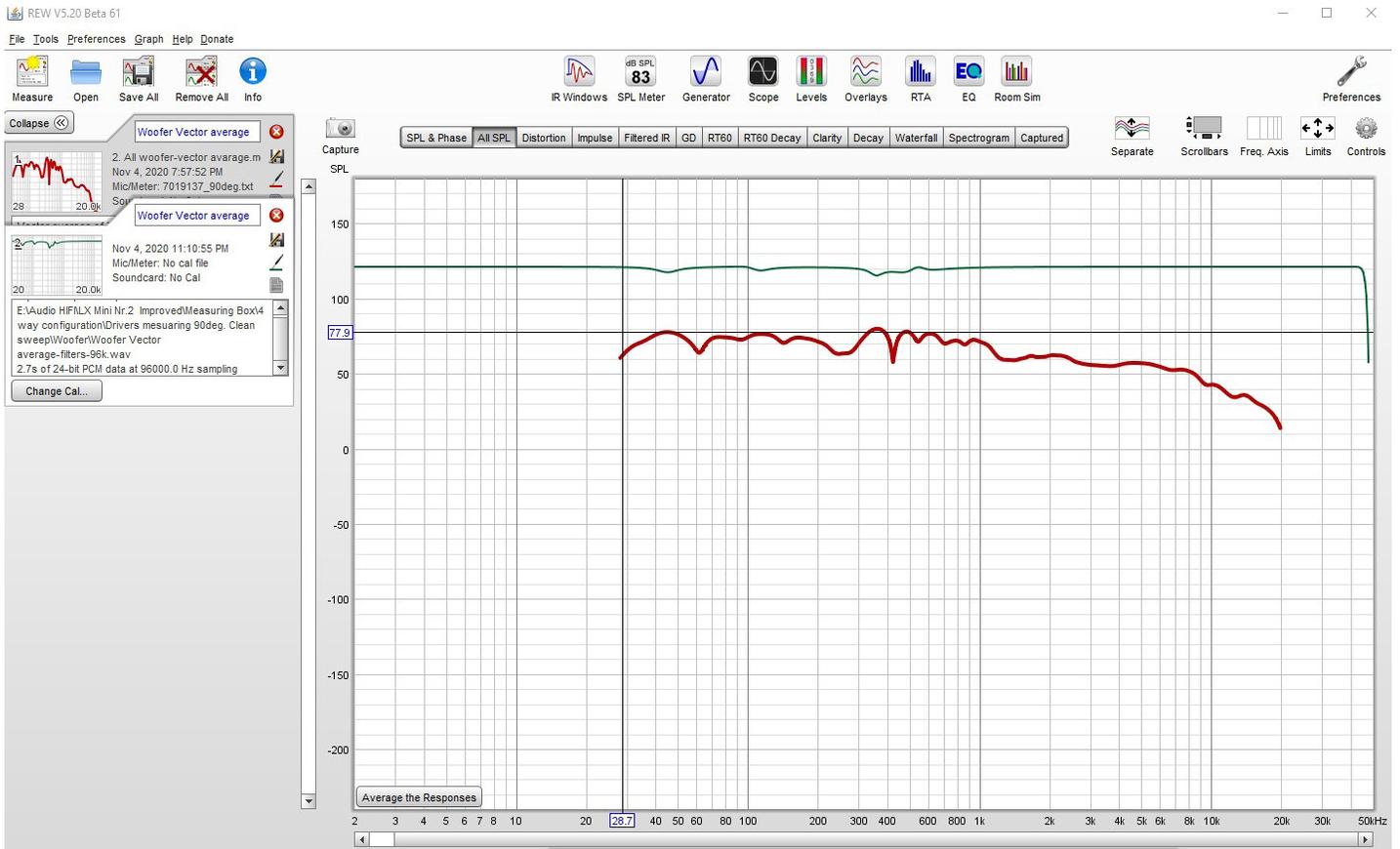
Go back to main REW window and File-> Export -> Export filters impulse response as a wav file and save it .



Import wav file. Main REW window " All SPL". Controls--> File--> Import --> Import impulse response.



Result should be “ Vector average ” and “ Vector average .wav ” measurements with in a main REW window “All SPS” tab activated.



### 5.Trace Arithmetic.

Controls -> Trace arithmetic -> Choose both measurements in windows A and B -> Choose A\*B -> Generate

Decay Clarity Decay Waterfall Spectrogram Captured

Separate Scrollbars Freq. Axis Limits **Controls**

**Trace arithmetic**

A: 1: Woofer Vector average

B: 2: W. Vector average wav

**A \* B** Generate

**Measurement actions** **Trace arithmetic**

Alignment tool Trace options

**Actions for all selected measurements**

No smoothing Apply smoothing

Time align Vector average

Align IR start RMS Average

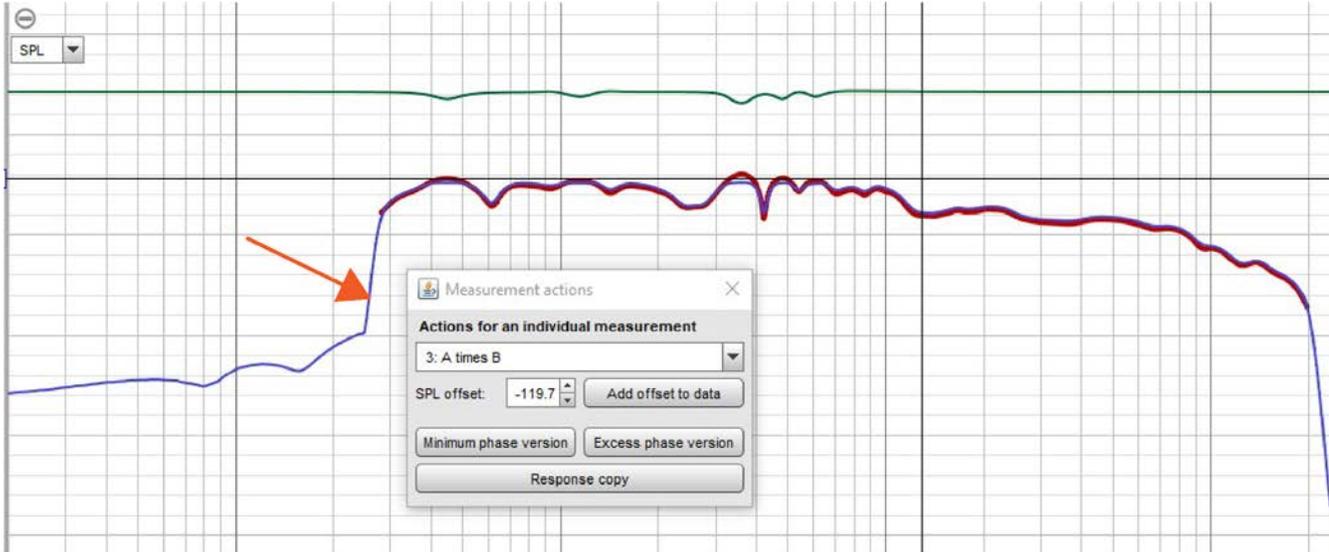
Save to file Export as txt

Export IR WAV Export IR txt

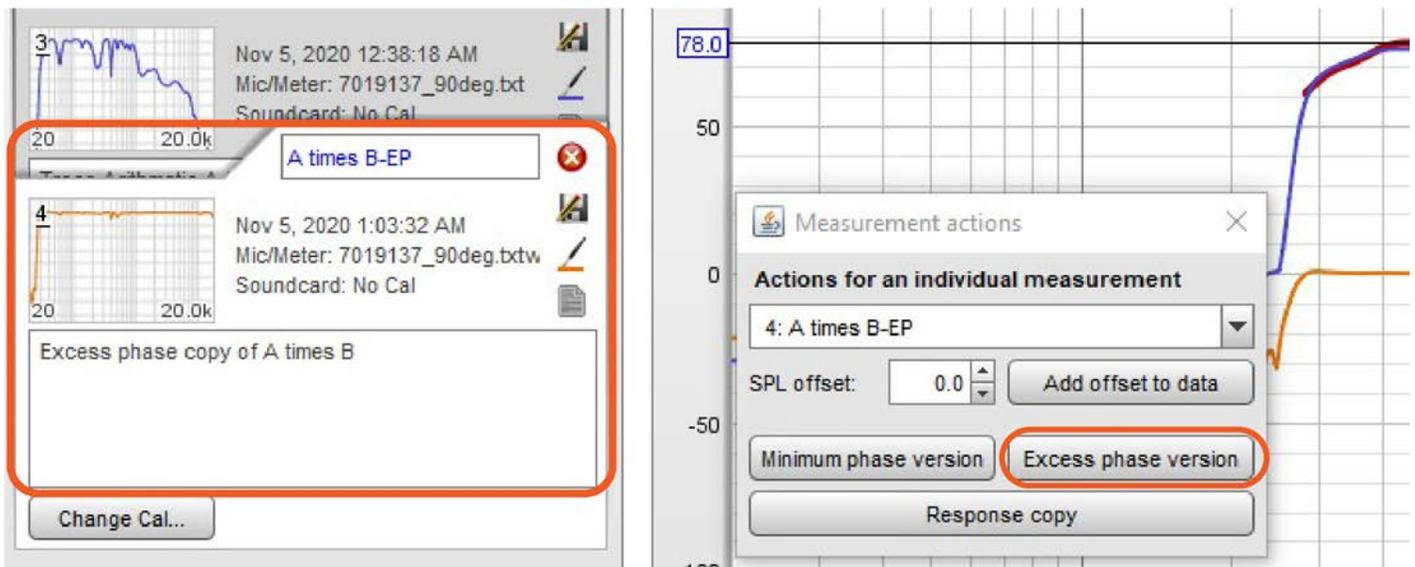
Show points when zoomed in

Controls -> Measurement actions -> A times B -> then enter a negative "SPL offset" to match "Vector average" value -> when you are happy press "Add offset to data".

The ultimate level does not matter for this only relative level so use the same amount for each channel. If the level not be reduced the measurement will end up at 150dB or more.



When press " Excess phase version". That will result to "A times B-EP" measurement .



## 6. Finalization

Main REW window " All SPL"File>Export>Export measurement as text.

Import saved txt file to rePhase. Then from rePhase generate \*.bin file be used in MiniDsp FIR filter.

## 7. Combined filter

Everything the same as in the first part of step **“3.PEQ generated filter”**.

“Vector average ” measurement. Next is to make PEQ filter for “Vector average “. Choose “Equalizer Rephase” -Filter Tasks-Save filter settings to file. Filtar will be saved as \*.xml file

The screenshot shows the rePhase software interface. On the left is a frequency response graph with a red curve and a green horizontal line. In the foreground, a 'Select speaker' dialog box is open, showing 'Left Subwoofer' selected in a dropdown menu, with 'OK' and 'Cancel' buttons. On the right, the 'Target Settings' panel is visible, with the 'Filter Tasks' section highlighted. The 'Filter Tasks' section includes settings for Match Range (30 to 800 Hz), Individual Max Boost (6 dB), Overall Max Boost (0 dB), and Flatness Target (1 dB). There are also checkboxes for 'Allow narrow filters below 200 Hz' and 'Vary max Q above 200 Hz'. The 'Save filter settings to file' option is highlighted with an orange circle.

Open Rephase import \*.txt file made in step **6.Finalization**. Then : Paragraphic Gain EQ -> Tools-> Import REW filter settings and import saved \*.xml file

The screenshot shows the rePhase software interface. On the left, the 'File' menu is open, showing options like 'Load Settings...', 'Save Settings', and 'Import Measurement...'. On the right, the 'Paragraphic Gain EQ' settings panel is visible, with the 'Tools' dropdown menu open. The 'Import REW filter settings...' option is highlighted in blue. The settings panel also shows a 'Range' of  $\pm 12\text{dB}$  and several frequency sliders.

Finally "Generated" file in RePhase for your device.

The screenshot shows the rePhase 1.4.3 software interface. At the top, there is a phase plot with a logarithmic frequency axis from 10Hz to 20kHz and a phase axis from -180° to 180°. Below the plot is a control panel with several tabs: General, Filters Linearization, Linear-Phase Filters, Minimum-Phase Filters, Paragraphic Phase EQ, and Paragraphic Gain EQ. The Paragraphic Phase EQ tab is active, showing a series of sliders for different frequency bands. To the right of the sliders is the 'Impulse Settings' panel, which is highlighted with a green box. This panel contains various parameters for generating the filter, such as taps, FFT length, centering, windowing, optimization, rate, format, and filename. Below the impulse settings is a 'generate' button and a small text box showing the resulting impulse delay and max response. To the right of the impulse settings is a 'Ranges' and 'Measurement' panel with buttons for 'import from file', 'import from clipboard', 'bypass', 'clear', 'gain offset', 'time offset', 'hide magnitude', 'hide phase', 'invert response', and 'invert polarity'. A text box below these buttons shows the name of the filter: 'woofercombinedfilter'.

Start Woofler - rePhase 1.4.3

File View Help

General Filters Linearization Linear-Phase Filters Minimum-Phase Filters Paragraphic Phase EQ Paragraphic Gain EQ

Bank 01 EQ type constant Q minimum-phase Range ± 12dB Tools Presets

dB -5.80 -1.70 -4.10 +5.80 -4.40 -4.80 -5.20 -7.40 +6.00 -9.30 +5.80 0.00 0.00 0.00 0.00 0.00 0.00

Q 4.54 9.17 4.76 6.22 3.22 9.55 11.77 12.71 10.54 8.55 5.99 10 10 10 10 10 10

Hz 44.9 75.9 116 143.5 148.5 344 372 498 534 624 674 100 100 100 100 100 100

bypass bypass

Impulse Settings

taps 1024 samples

FFT length 16384 samples

centering 0% use closest perfect impulse

windowing blackman

optimization none to -100 dB

rate 96000 Hz

format 32 bits IEEE-754 (.bin)

filename woofercombinedfilter

directory E:\Audio HIFILX Mini Nr.2 Improv

generate

impulse delay: 0.001 samples, 0 ms  
max response: 0.21 dB, max impulse: -0.05 dB

My settings for MiniDsp FIR filter

Special thanks "fluid" from diyAudio with out this involvement this tutorial not to born in existence.  
Thank you "fluid"