Filter Sheet
VORTIS 2

PROFESSIONAL

VORTIS (2) filters for speaker equalization

In addition to downloadable speaker preset files (currently for Lab.gruppen IPD, LAKE and Powersoft Armonía+) we also provide our filters in an **open text format.**

Please note that these filters don't necessarily provide the same result as our speaker preset files when being used on a **different (3rd party) DSP.**

This is because there's **no international standardization** of Q/bandwith, slope and/or centre frequency. In other words: Using the provided filters on a different DSP might lead to unwanted results and different sounding speakers.

To minimize such problems, we also provide the total equalization for each speaker/horn variant through **impulse response files in .wav format.** These impulse responses can be imported into your measurement system and its frequency responses can be compared to the output of the DSP you're working with. You'll find pictures of the **total filter curves** on the last pages of this document, as well.

Adjusting your DSP settings carefully will then lead to a result that's close(r) to the original HK Audio speaker preset.

Please also take into consideration that the HK Audio speaker presets have been designed to achieve a flat frequency response **under anechoic conditions.**

When installing VORTIS (2) speakers in **rooms**, multiple acoustic effects will affect the overall sound. For example, mounting a speaker **close to a concrete wall** will increase the low frequencies by roughly **+6 dB (SPL).** This will increase to +12 dB (SPL) for low frequencies when the speaker is mounted **close to the ceiling** with a side wall in its back.

However, the HK Audio speaker presets do **not equalize for such mounting conditions.** We recommend that acoustic measurements are performed by a professional acoustician in order to equalize the in-room frequency response according to the project specifications.

HK AUDIO VORTIS (2) VR(2)-10810, LAB.GRUPPEN IPD1200/2400

	VR(2)-10810 60x40 LC	VR(2)-10810 60x40 FR	VR(2)-10810 90x55 LC	VR(2)-10810 90x55 FR	VR(2)-10810 ASY LC	VR(2)-10810 ASY FR
Phase	NORM	NORM	NORM	NORM	NORM	NORM
Delay [ms]	0	0	0	0	0	0
High Pass						
Frequ. [Hz]	120	85	120	85	120	85
Shape	But24	But24	But24	But24	But24	But24
Low Pass						
Frequ. [Hz]						
Shape						
EQ1						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]		85		85		85
Q		2.5		2.5		2.5
Gain [dB]		4.5		4.5		4.5
EQ2						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	240	240	240	240	240	240
Q	2.9	2.9	2.9	2.9	2.9	2.9
Gain [dB]	1.7	1.7	1.7	1.7	1.7	1.7
EQ3						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	565	565	565	565	565	565
Q	2.4	2.4	2.4	2.4	2.4	2.4
Gain [dB]	2	2	2	2	2	2
EQ4						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	820	820	820	820	820	820
Q	1	1	1	1	1	1
Gain [dB]	-5	-5	-5	-5	-5	-5
EQ5						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]			1200	1200		
Q			3.5	3.5		
Gain [dB]			2.8	2.8		
EQ6						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1600	1600	1600	1600	1600	1600
Q	2	2	2	2	2	2
Gain [dB]	3	3	2.5	2.5	3	3
EQ7						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	3500	3500	2700	2700		
Q/BW (Oct.)	4	4	5	5		
Gain [dB]	-2	-2	2	2		
EQ8						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	4900	4900	4900	4900	4900	4900
Q/BW (Oct.)	4	4	4	4	4	4
Gain [dB]	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5
EQ9						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]						
Q/BW (Oct.)						
Gain [dB]						
EQ10						
Type	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf
Frequ. [Hz]	3000	3000	3000	3000		
Q	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.		
Gain [dB]	-2.5	-2.5	1	1		
Peak Limiter						
Vpk [dB]	98	98	98	98	98	98
Release [ms]	15	15	15	15	15	15
RMS Limiter						
Tresh. [dBu]	29	29	29	29	29	29
Attack [ms]	15	15	15	15	15	15
Hold [ms]	10	10	10	10	10	10
Release [ms]	80	80	80	80	80	80
Ratio	1.6:1	1.6:1	1.6:1	1.6:1	1.6:1	1.6:1
Gain [dB]	0	0	0	0	0	0

HK AUDIO VORTIS (2) VR(2)-11210, LAB.GRUPPEN IPD1200/2400

	VR(2)-11210 60x40 LC	VR(2)-11210 60x40 FR	VR(2)-11210 90x55 LC	VR(2)-11210 90x55 FR	VR(2)-11210 ASY LC	VR(2)-11210 ASY FR
Phase	NORM	NORM	NORM	NORM	NORM	NORM
Delay [ms]	0	0	0	0	0	0
High Pass						
Frequ. [Hz]	120	60	120	60	120	60
Shape	But24	But24	But24	But24	But24	But24
Low Pass						
Frequ. [Hz]						
Shape						
EQ1						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]		65		65		65
Q		2.5		2.5		2.5
Gain [dB]		6		6		6
EQ2						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	900	900	1280	1280	1280	1280
Q	4	4	10	10	10	10
Gain [dB]	1	1	-2	-2	-2	-2
EQ3						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1220	1220	2040	2040	2000	2000
Q	8	8	4	4	2	2
Gain [dB]	-2	-2	-5	-5	-4	-4
EQ4						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	3220	3220	3560	3560	3350	3350
Q	2	2	7	7	10	10
Gain [dB]	-3	-3	-6	-6	-1	-1
EQ5						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	5100	5100	4880	4880	4100	4100
Q	3	3	10	10	3	3
Gain [dB]	-1	-1	-4.5	-4.5	-5	-5
EQ6						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]			7500	7500	7500	7500
Q			2	2	2	2
Gain [dB]			-2	-2	-2	-2
EQ7						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]						
Q						
Gain [dB]						
EQ8						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]						
Q						
Gain [dB]						
EQ9						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]						
Q						
Gain [dB]						
EQ10						
Type	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf
Frequ. [Hz]	2000	2000				
Q	12 dB/Oct.	12 dB/Oct.				
Gain [dB]	-5	-5				
Peak Limiter						
Vpk [dB]	98	98	98	98	98	98
Release [ms]	15	15	15	15	15	15
RMS Limiter						
Tresh. [dBu]	36	36	36	36	36	36
Attack [ms]	15	15	15	15	15	15
Hold [ms]	10	10	10	10	10	10
Release [ms]	80	80	80	80	80	80
Ratio	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1
Gain [dB]	0	0	0	0	0	0

HK AUDIO VORTIS (2) VR(2)-11214, LAB.GRUPPEN IPD1200/2400

	VR(2)-11214 60x40 LC	VR(2)-11214 60x40 FR	VR(2)-11214 90x55 LC	VR(2)-11214 90x55 FR	VR(2)-11214 ASY LC	VR(2)-11214 ASY FR
Phase	NORM	NORM	NORM	NORM	NORM	NORM
Delay [ms]	0	0	0	0	0	0
High Pass						
Frequ. [Hz]	120	60	120	60	120	60
Shape	But24	But24	But24	But24	But24	But24
Low Pass						
Frequ. [Hz]						
Shape						
EQ1						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]		65		65		65
Q		2.5		2.5		2.5
Gain [dB]		6		6		6
EQ2						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	215	215	215	215	215	215
Q	4	4	4	4	4	4
Gain [dB]	-2	-2	-2	-2	-2	-2
EQ3						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	350	350	350	350	350	350
Q	2	2	2	2	2	2
Gain [dB]	1.5	1.5	1.5	1.5	1.5	1.5
EQ4						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	730	730	730	730	730	730
Q	2	2	2	2	2	2
Gain [dB]	-4	-4	-3	-3	-6	-6
EQ5						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1000	1000	880	880	900	900
Q	5	5	3	3	5	5
Gain [dB]	2	2	-1.5	-1.5	-1.5	-1.5
EQ6						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1380	1380	1200	1200	1600	1600
Q	6	6	6	6	3	3
Gain [dB]	-2	-2	2	2	-5	-5
EQ7						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	2000	2000	1660	1660	2700	2700
Q	6	6	6	6	5	5
Gain [dB]	2	2	-4	-4	-4	-4
EQ8						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	3200	3200	2560	2560	4000	4000
Q	4	4	6	6	4	4
Gain [dB]	-2	-2	-3	-3	-3	-3
EQ9						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	4900	4900	4050	4050	8500	8500
Q	3	3	3.5	3.5	4	4
Gain [dB]	1.5	1.5	-4	-4	-3	-3
EQ10						
Type	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf
Frequ. [Hz]	1000	1000	1000	1000	4000	4000
Q	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.
Gain [dB]	-6.5	-6.5	-3.5	-3.5	-6	-6
Peak Limiter						
Vpk [dB]	98	98	98	98	98	98
Release [ms]	15	15	15	15	15	15
RMS Limiter						
Tresh. [dBu]	36	36	36	36	36	36
Attack [ms]	15	15	15	15	15	15
Hold [ms]	10	10	10	10	10	10
Release [ms]	80	80	80	80	80	80
Ratio	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1
Gain [dB]	0	0	0	0	0	0

HK AUDIO VORTIS (2) VR(2)-11510, LAB.GRUPPEN IPD1200/2400

	VR(2)-11510 60x40 LC	VR(2)-11510 60x40 FR	VR(2)-11510 90x55 LC	VR(2)-11510 90x55 FR	VR(2)-11510 ASY LC	VR(2)-11510 ASY FR
Phase	NORM	NORM	NORM	NORM	NORM	NORM
Delay [ms]	0	0	0	0	0	0
High Pass						
Frequ. [Hz]	120	50	120	50	120	50
Shape	But24	But24	But24	But24	But24	But24
Low Pass						
Frequ. [Hz]						
Shape						
EQ1						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]		55		55		55
Q		2.5		2.5		2.5
Gain [dB]		6		6		6
EQ2						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	580	580	580	580	580	580
Q	3	3	3	3	3	3
Gain [dB]	-3	-3	-3	-3	-3	-3
EQ3						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	890	890	890	890	890	890
Q	11	11	11	11	11	11
Gain [dB]	-2	-2	-2	-2	-2	-2
EQ4						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1000	1000	1000	1000	1000	1000
Q	3	3	3	3	3	3
Gain [dB]	-3	-3	-3	-3	-3	-3
EQ5						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1250	1250	1250	1250	1250	1250
Q	6	6	6	6	6	6
Gain [dB]	-2	-2	-2	-2	-2	-2
EQ6						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	2800	2800	2000	2000		
Q	3	3	4.5	4.5		
Gain [dB]	-3	-3	-2	-2		
EQ7						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	3700	3700	3400	3400	3700	3700
Q	2	2	10	10	2	2
Gain [dB]	-2	-2	-3.5	-3.5	-2	-2
EQ8						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	4600	4600	4700	4700	4600	4600
Q	3	3	12	12	3	3
Gain [dB]	-2	-2	-2	-2	-2	-2
EQ9						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	7500	7500	8300	8300	7500	7500
Q	4	4	10	10	4	4
Gain [dB]	-3.5	-3.5	-2.5	-2.5	-3.5	-3.5
EQ10						
Type	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf
Frequ. [Hz]			9500	9500	4500	4500
Q			24 dB/Oct.	24 dB/Oct.	24 dB/Oct.	24 dB/Oct.
Gain [dB]			3	3	2	2
Peak Limiter						
Vpk [dB]	98	98	98	98	98	98
Release [ms]	15	15	15	15	15	15
RMS Limiter						
Tresh. [dBu]	36	36	36	36	36	36
Attack [ms]	15	15	15	15	15	15
Hold [ms]	10	10	10	10	10	10
Release [ms]	80	80	80	80	80	80
Ratio	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1
Gain [dB]	0	0	0	0	0	0

HK AUDIO VORTIS (2) VR(2)-11514, LAB.GRUPPEN IPD1200/2400

	VR(2)-11514 60x40 LC	VR(2)-11514 60x40 FR	VR(2)-11514 90x55 LC	VR(2)-11514 90x55 FR	VR(2)-11514 ASY LC	VR(2)-11514 ASY FR
Phase	NORM	NORM	NORM	NORM	NORM	NORM
Delay [ms]	0	0	0	0	0	0
High Pass						
Frequ. [Hz]	120	50	120	50	120	50
Shape	But24	But24	But24	But24	But24	But24
Low Pass						
Frequ. [Hz]						
Shape						
EQ1						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]		55		55		55
Q		2.5		2.5		2.5
Gain [dB]		6		6		6
EQ2						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	350	350	350	350	350	350
Q	6	6	6	6	6	6
Gain [dB]	1.5	1.5	1.5	1.5	1.5	1.5
EQ3						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	530	530	530	530	530	530
Q	4	4	4	4	4	4
Gain [dB]	-1	-1	-1	-1	-1	-1
EQ4						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1220	1220	850	850	850	850
Q	3	3	10	10	10	10
Gain [dB]	-1	-1	-3	-3	-2	-2
EQ5						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	2100	2100	1630	1630		
Q	3	3	8	8		
Gain [dB]	3.5	3.5	-3	-3		
EQ6						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	3270	3270	2150	2150	2150	2150
Q	3	3	3	3	3	3
Gain [dB]	-1	-1	3	3	3	3
EQ7						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	5200	5200	2660	2660	5800	5800
Q	4	4	10	10	4	4
Gain [dB]	2	2	-3	-3	3	3
EQ8						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]			4200	4200	9200	9200
Q			3	3	4	4
Gain [dB]			-2	-2	3	3
EQ9						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]			5800	5800		
Q			4	4		
Gain [dB]			3	3		
EQ10						
Type	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf
Frequ. [Hz]	400	400	400	400	400	400
Q	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.	12 dB/Oct.
Gain [dB]	-5	-5	-3	-3	-5	-5
Peak Limiter						
Vpk [dB]	98	98	98	98	98	98
Release [ms]	15	15	15	15	15	15
RMS Limiter						
Tresh. [dBu]	36	36	36	36	36	36
Attack [ms]	15	15	15	15	15	15
Hold [ms]	10	10	10	10	10	10
Release [ms]	80	80	80	80	80	80
Ratio	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1
Gain [dB]	0	0	0	0	0	0

HK AUDIO VORTIS (2) VR(2)-21214, LAB.GRUPPEN IPD1200/2400

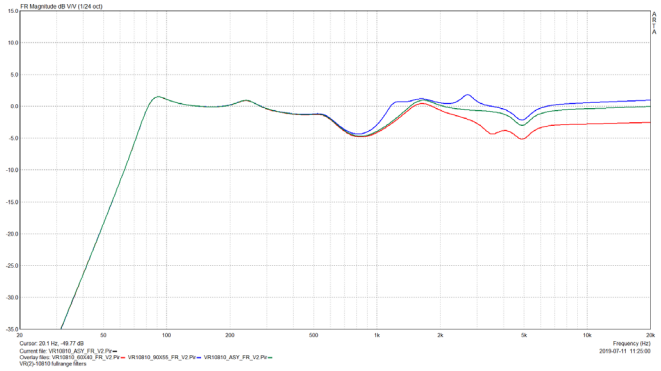
	VR(2)-21214 60x40 LC	VR(2)-21214 60x40 FR	VR(2)-21214 90x55 LC	VR(2)-21214 90x55 FR	VR(2)-21214 ASY LC	VR(2)-21214 ASY FR
Phase	NORM	NORM	NORM	NORM	NORM	NORM
Delay [ms]	0	0	0	0	0	0
High Pass						
Frequ. [Hz]	120	60	120	60	120	60
Shape	But24	But24	But24	But24	But24	But24
Low Pass						
Frequ. [Hz]						
Shape						
EQ1						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]		65		65		65
Q		2.5		2.5		2.5
Gain [dB]		6		6		6
EQ2						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	210	210	210	210	210	210
Q	3.5	3.5	3.5	3.5	3.5	3.5
Gain [dB]	-1	-1	-1	-1	-1	-1
EQ3						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	650	650	650	650	650	650
Q	1	1	1	1	1	1
Gain [dB]	-3	-3	-3	-3	-3	-3
EQ4						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	1350	1350	1550	1550	1500	1500
Q	5	5	5	5	3.5	3.5
Gain [dB]	-4	-4	-4	-4	-2.5	-2.5
EQ5						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]			2550	2550		
Q			10	10		
Gain [dB]			-3	-3		
EQ6						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	2750	2750				
Q	1.5	1.5				
Gain [dB]	-2.5	-2.5				
EQ7						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	4000	4000	4000	4000	4000	4000
Q	5	5	4	4	5	5
Gain [dB]	-3	-3	-3	-3	-3	-3
EQ8						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	7000	7000			7000	7000
Q	4	4			4	4
Gain [dB]	-3	-3			-3	-3
EQ9						
Type	Bell	Bell	Bell	Bell	Bell	Bell
Frequ. [Hz]	8500	8500	8000	8000		
Q	1	1	2	2		
Gain [dB]	-2	-2	-1.5	-1.5		
EQ10						
Type	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf	High Shelf
Frequ. [Hz]						
Q						
Gain [dB]						
Peak Limiter						
Vpk [dB]	98	98	98	98	98	98
Release [ms]	15	15	15	15	15	15
RMS Limiter						
Tresh. [dBu]	41	41	41	41	41	41
Attack [ms]	15	15	15	15	15	15
Hold [ms]	10	10	10	10	10	10
Release [ms]	80	80	80	80	80	80
Ratio	1.4:1	1.4:1	1.4:1	1.4:1	1.4:1	1.4:1
Gain [dB]	0	0	0	0	0	0

Filter Sheet

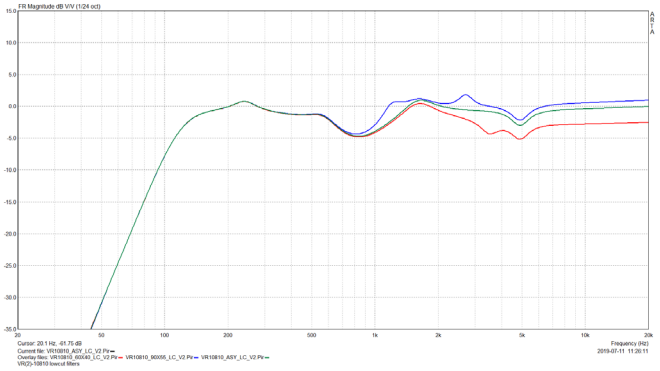
VORTIS 2

HK AUDIO PROFESSIONAL

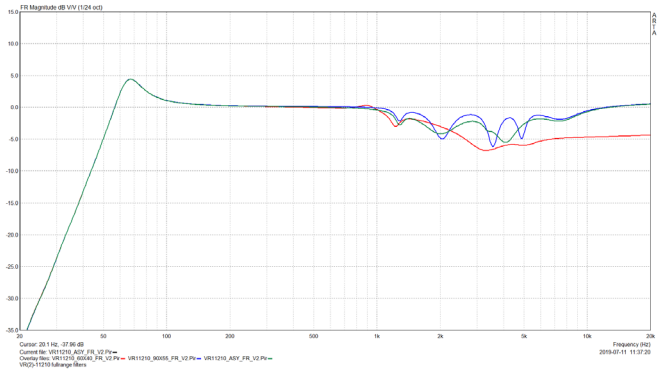
VR(2)-10810 fullrange filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



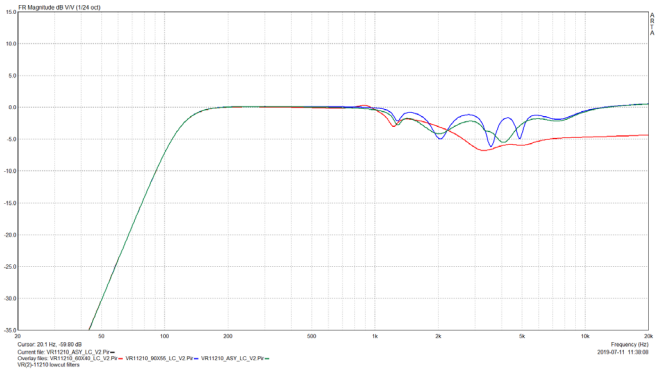
VR(2)-10810 lowcut filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



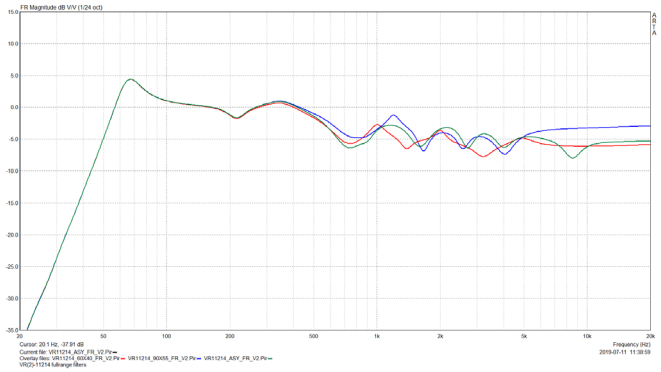
VR(2)-11210 fullrange filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



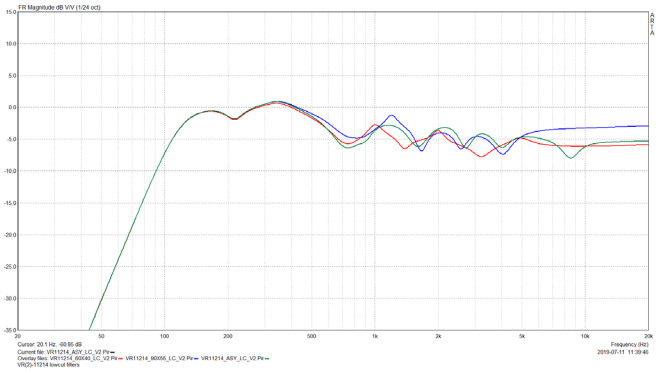
VR(2)-11210 lowcut filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



VR(2)-11214 fullrange filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



VR(2)-11214 lowcut filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)

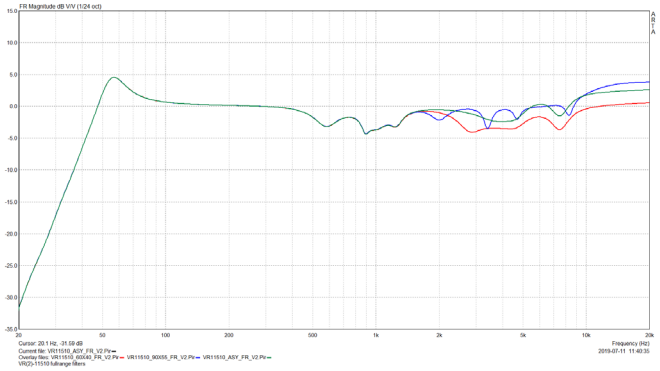


Filter Sheet

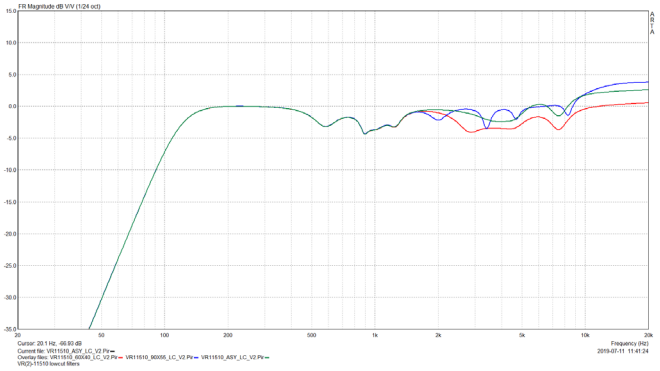
VORTIS 2

HK AUDIO PROFESSIONAL

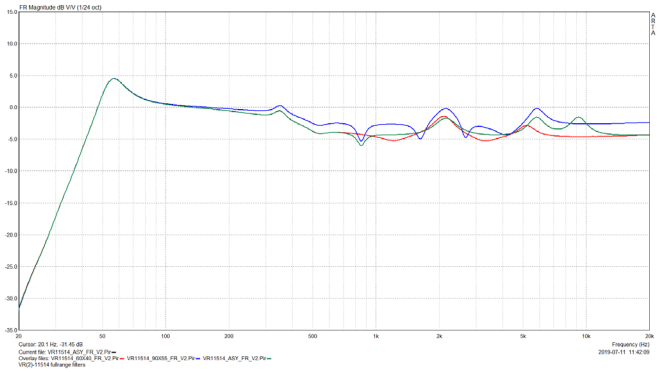
VR(2)-11510 fullrange filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



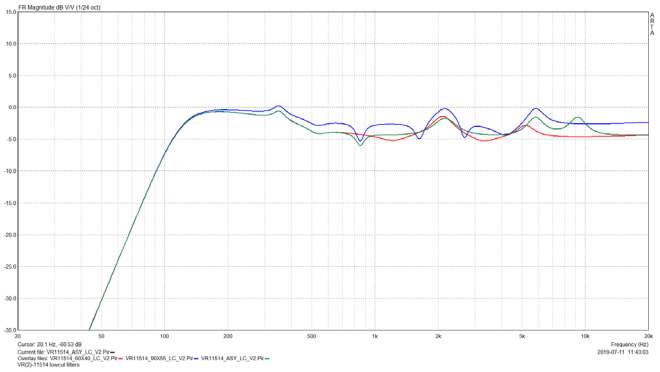
VR(2)-11510 lowcut filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



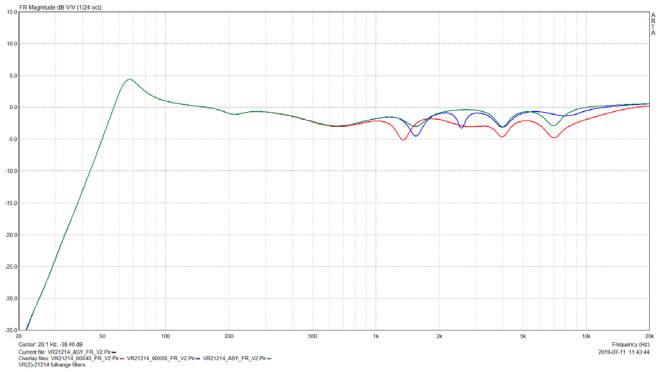
VR(2)-11514 fullrange filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



VR(2)-11514 lowcut filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



VR(2)-21214 fullrange filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)



VR(2)-21214 lowcut filter:
60x40 (red), 90x55 (blue), 60-90x55 asymmetrical (green)