

KRIEG

THEMIS

Audio Headphone Amplifier
and Preamplifier

Datasheet and measurements

See www.krieg.tech for the product page

Test and equipment

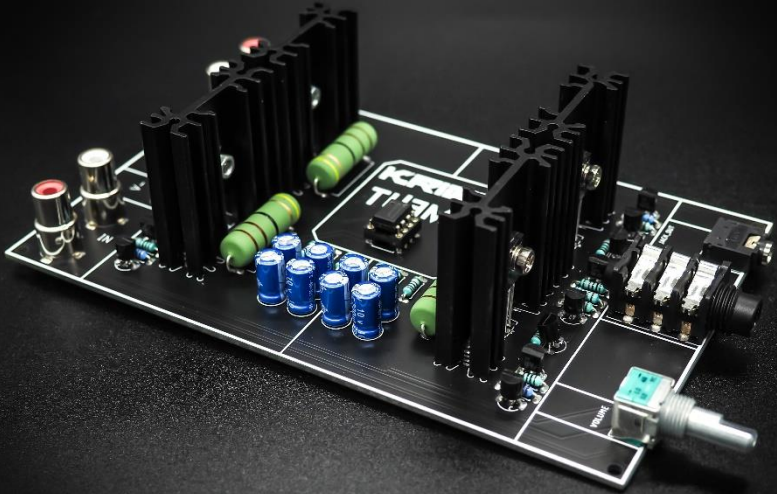
EQUIPMENT:

- QuantAsylum QA401
- Hantek DS05102P (Software: 3.40.0)
- TACKlife DM01M
- Signal generator: DDS 200MSa/s 12bit 20Mhz
- Power supply: 2 x PS-305D
- 20W non-inductive 32 Ohm load
- Test conducted at supply voltage: +- 15V

TEST APPLIED:

- Large frequency response
- Audio spectrum frequency response (20Hz - 20kHz)
- THD and Intermodulation THD (IMD with 11 tones) at max output
- Noise Floor and SNR
- Output DC offset
- Damping factor
- Slew rate test
- Square wave response

***NOTE:** All test have been done in a normal environment and at an average temperature of 27°C, with the pre-mounted core NE5532 operational amplifier.



Datasheet – THEMIS | NE5532 op-amp core

MEASURED DATA AND SPECIFICATIONS	
Rated Power (AES) – 32 Ohm	10 W
Amplifier gain	+ 23.5 dB
Operation Class	AB
Min supply voltage	+– 2.5 V (dual power supply)
Max supply voltage	+– 22 V (dual power supply) (core-limited)
Regular supply voltage	+– 15 V (dual power supply)
Standby power consumption	1.2 W
Nominal output current (Safe Operating Area)	0.95 A
Minimum load nominal impedance <small>*Minimum load is referred to amplifier stability, be careful with output current</small>	8 Ohm
Frequency Response (-3dB)	3 Hz – 570 kHz (core-limited)
20Hz – 20kHz max deviation	+– 0.01 dB
THD - 32 Ohm load:	
THD + N @ 1kHz – before clipping	0.002 % (-93dB)
THD + N @ 20kHz – before clipping	0.002 % (-93dB)
Intermodulation THD (11 signals)	0.001 % (-97dB)

SNR (non A-weighted)	98 dB
Noise floor	- 110 dB
CrossTalk	- 112 dB
Output DC Offset typical	~ 3 uV
Output DC Offset worst	~ 10 uV
Slew rate	7.5 V / uS (core-limited)
Damping Factor:	
32 Ohm Damping Factor	9100
32 Ohm Output impedance	0.0035 Ohm
Board size	156 x 99 mm

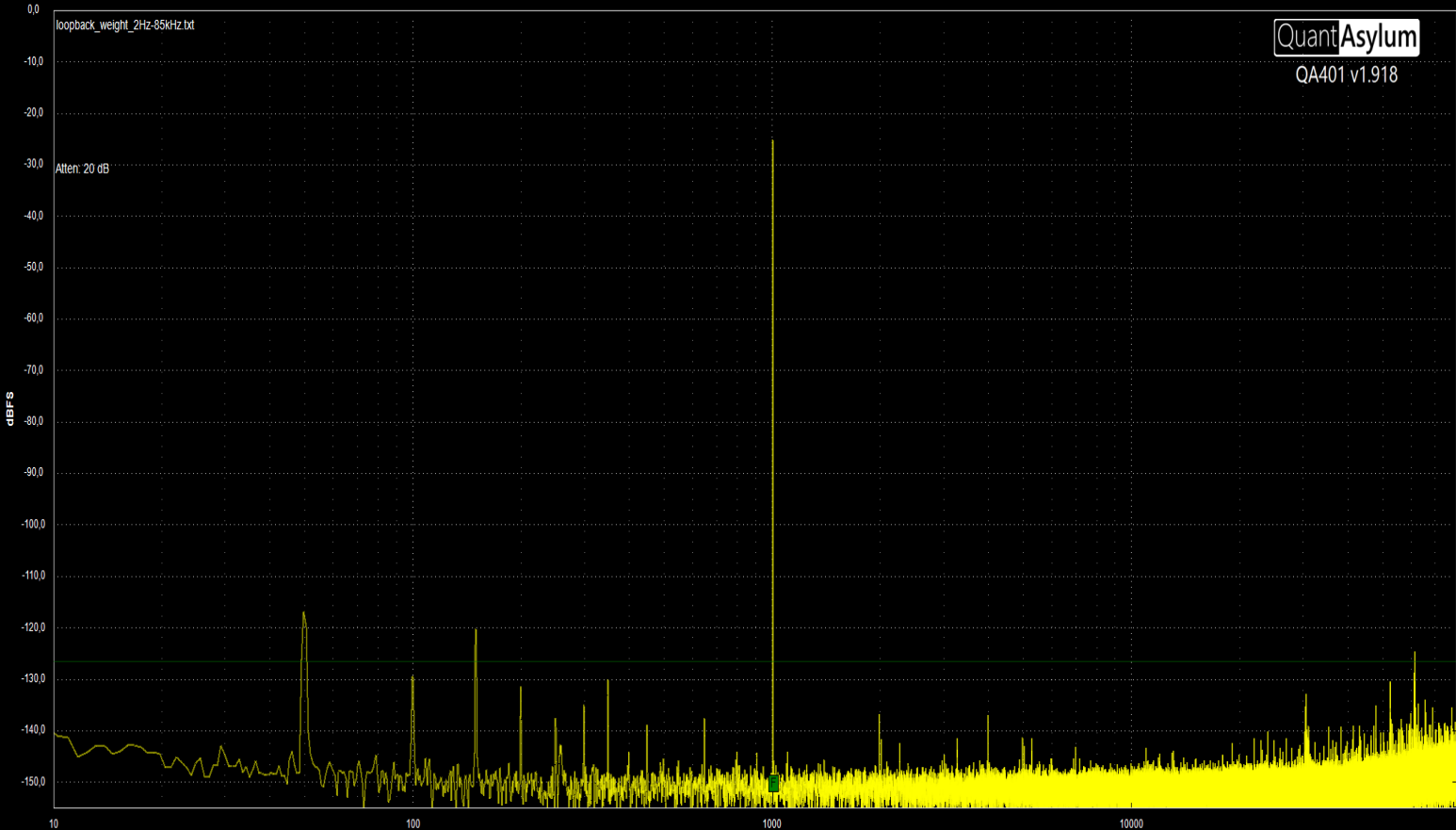
Measurement – 1 Vrms @ 1kHz (+- 15V supply)

FFT: 256k Meas Start: 20.0 Hz Peak L: -25,19 dBFS Gen 1: 1,007812 KHz @ -22,9 dBFS Phase L: -0,01 deg
Avg: 5 of 50 Meas Stop: 20,0 KHz Gen 2: 20,00024 KHz @ -23,0 dBFS Delay L: 10,1 uSec
Res: 732 mHz RMS L: -25,2 dBFS Peak L: 1,081 Vrms
Fs: 192 KHz THD L: -107,9 dB/ 0,00040% Gain L: 17,69 dB
Win: Hann N+D L: -107,5 dBFS
Weight: User

QuantAsylum
QA401 v1.918

loopback_weight_2Hz-85KHz.txt

Atten: 20 dB



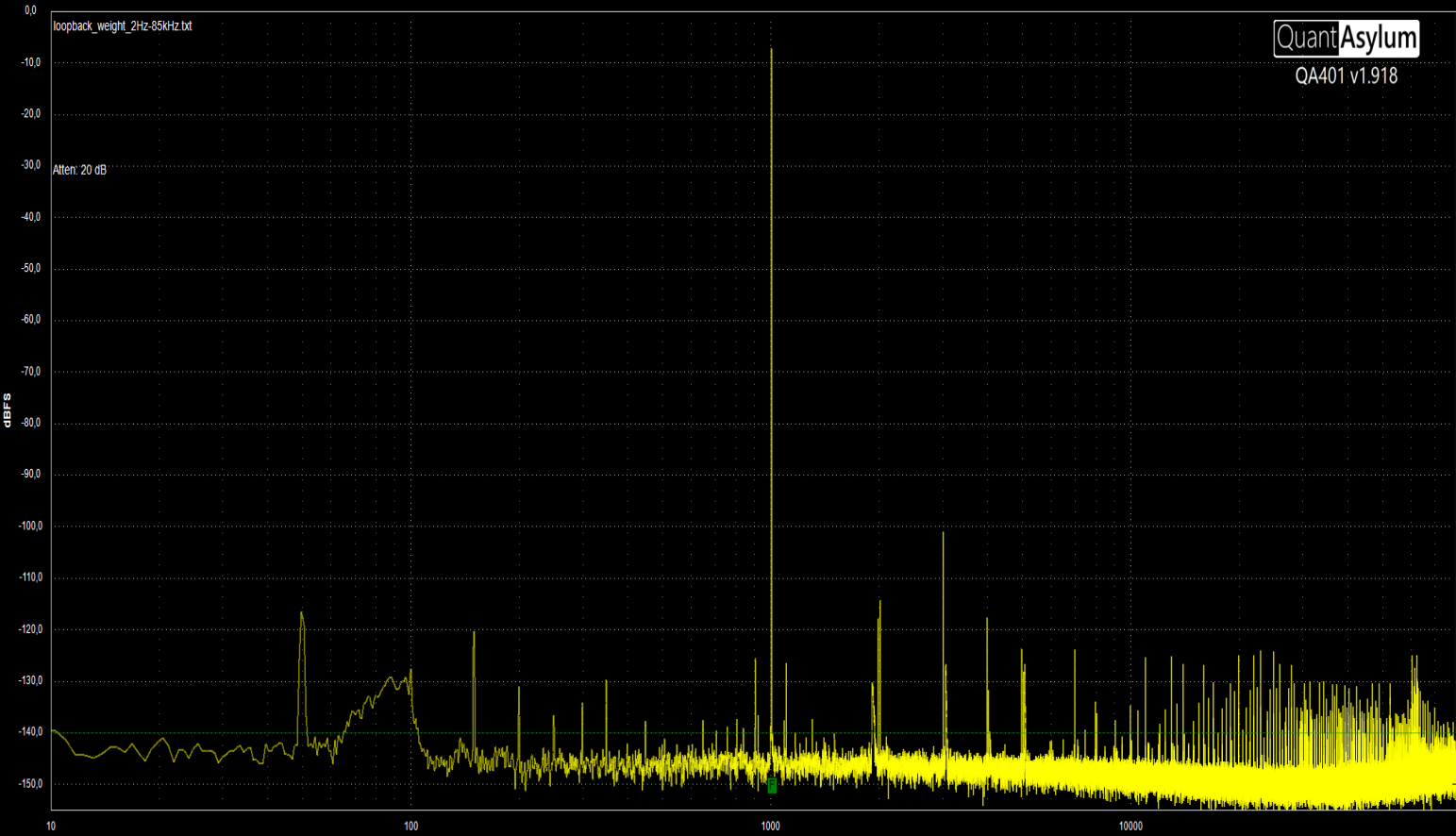
Measurement – max out @ 1kHz (+- 15V supply)

FFT: 256k Meas Start: 20.0 Hz Peak L: -7.19 dBFS Gen 1: 1.007812 KHz @ -4.9 dBFS Phase L: -0.01 deg
Avg: 10 of 10 Meas Stop: 20.0 KHz Gen 2: 20.00024 KHz @ -23.0 dBFS Delay L: 10.1 uSec
Res: 732 mHz RMS L: -7.2 dBFS Peak L: 8.587 Vrms SNR L: 97.9 dB
Fs: 192 KHz
Win: Hann N+D L: -98.9 dBFS THD L: -93.8 dB/ 0.00205% THD+N L: -91.8 dB/ 0.00258% Gain L: 17.69 dB
Weight: User

QuantAsylum
QA401 v1.918

loopback_weight_2Hz-85KHz.txt

Atten: 20 dB



Measurement – 1 Vrms @ 20kHz (+- 15V supply)

FFT: 256k
Avg: 23 of 23
Res: 732 mHz
Fs: 192 KHz
Win: Hann
Weight: User

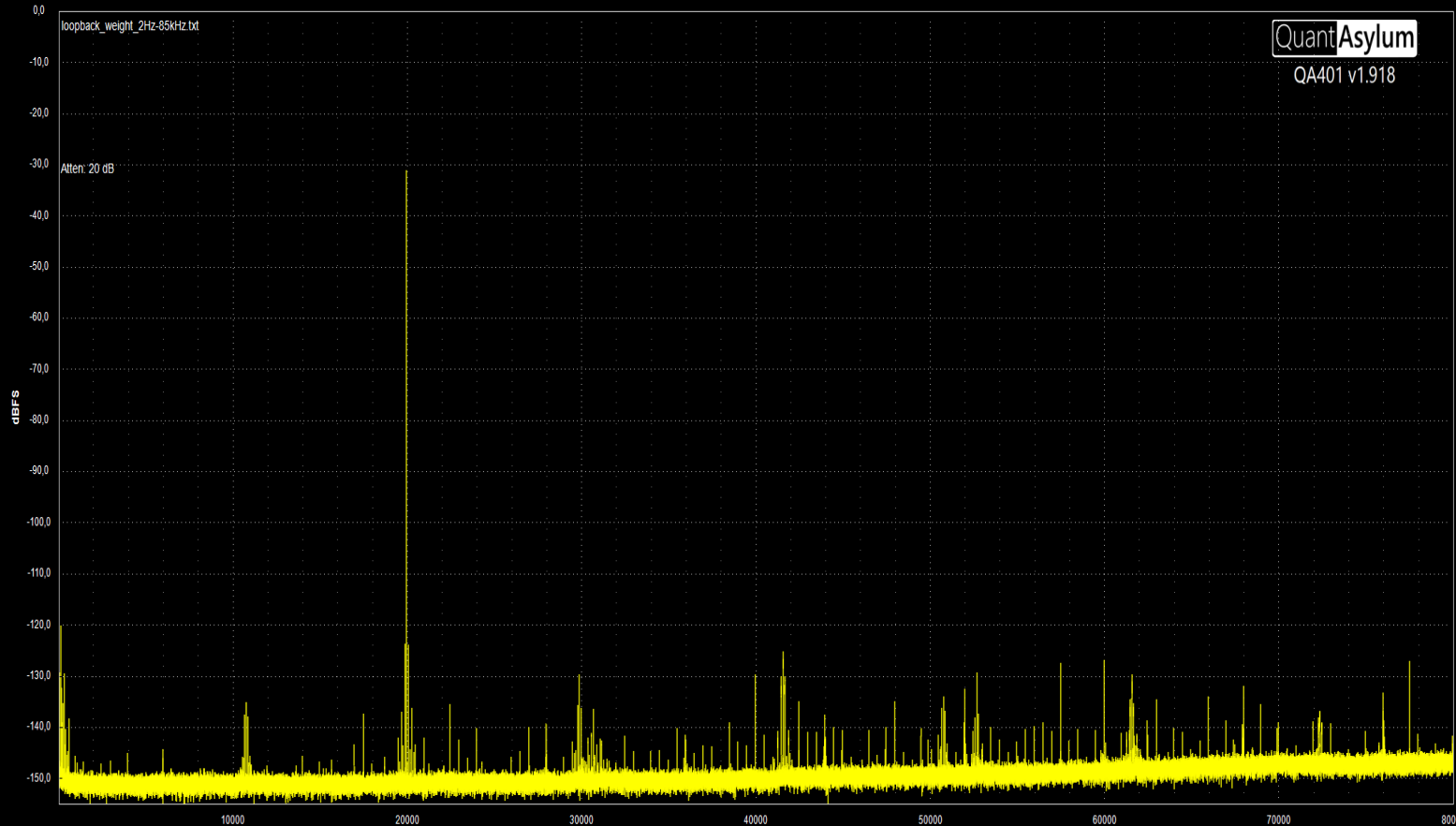
Meas Start: 20.0 Hz
Meas Stop: 20.0 KHz
RMS L: -107.3 dBFS
N+D L: -107.9 dBFS

Peak L: -31.19 dBFS
Peak L: 1,081 Vrms

Gen 1: 20,00024 KHz @ -28.9 dBFS
Gen 2: 20,00024 KHz @ -23.0 dBFS

Phase L: -4.66 deg
Delay L: 10.7 uSec
Gain L: 23.69 dB

QuantAsylum
QA401 v1.918



Measurement – max out @ 20kHz (+- 15V supply)

FFT: 256k
Avg: —
Res: 732 mHz
Fs: 192 KHz
Win: Hann
Weight: User

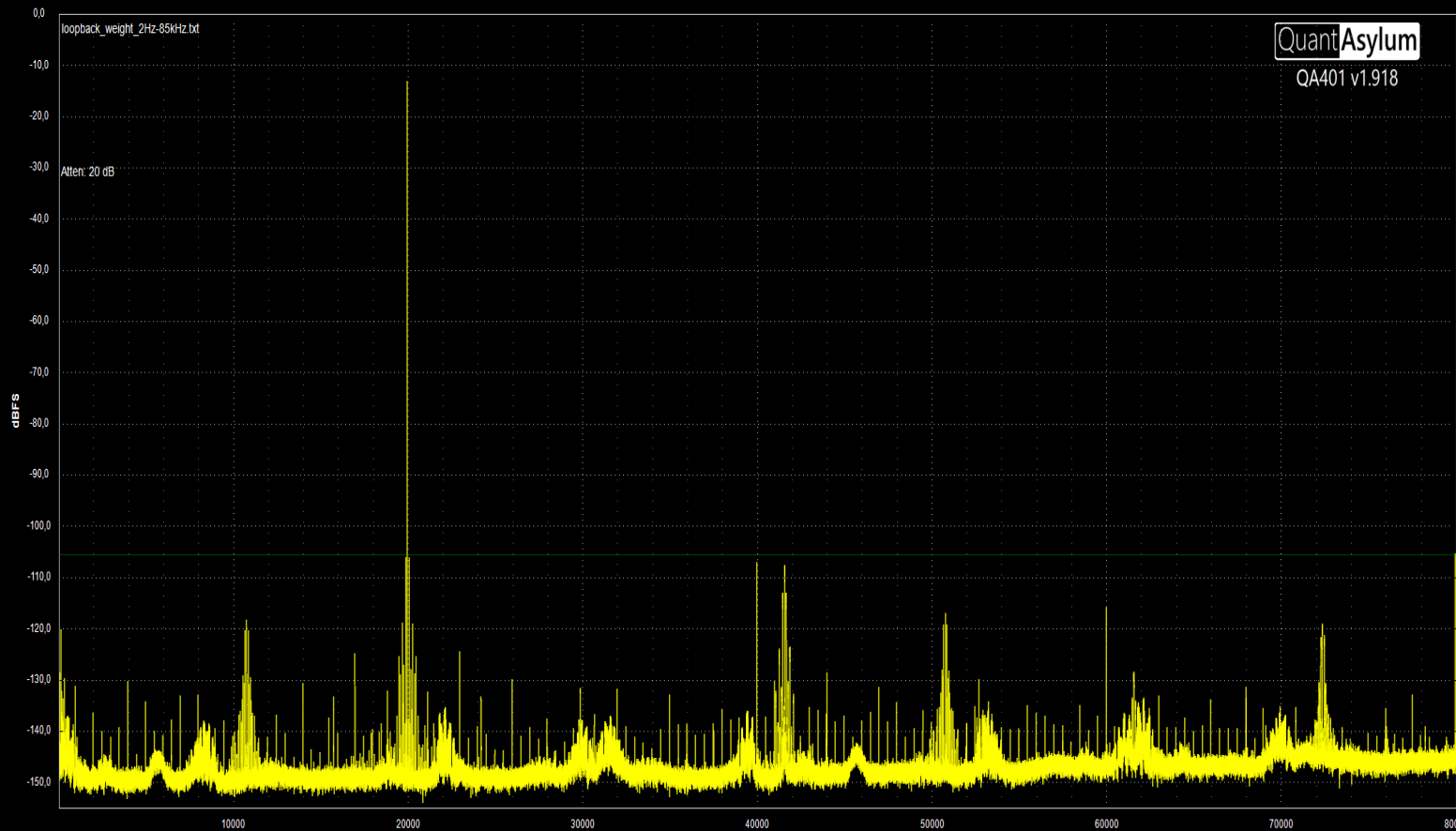
Meas Start: 20.0 Hz
Meas Stop: 20.0 KHz
RMS L: -101.0 dBFS
N+D L: -103.5 dBFS

Peak L: -13.19 dBFS
Peak L: 8.593 Vrms

Gen 1: 20.00024 KHz @ -10.9 dBFS
Gen 2: 20.00024 KHz @ -23.0 dBFS

Phase L: -4.67 deg
Delay L: 10.7 uSec
Gain L: 23.69 dB

QuantAsylum
QA401 v1.918



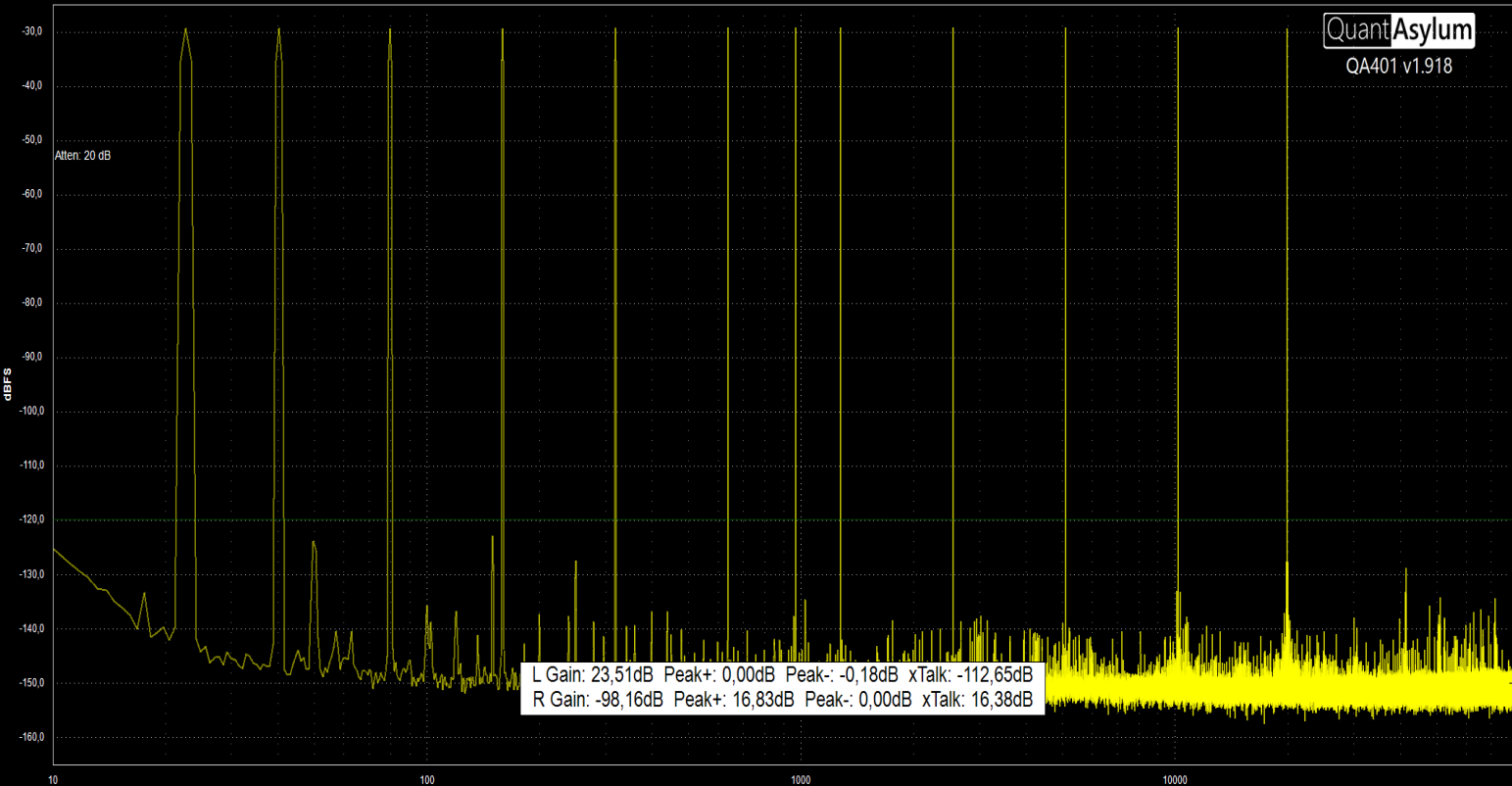
Measurement – max out IMD THD (+- 15V supply)

[Note: analyzer 50Hz supply ripple present]

FFT: 256k Meas Start: 20.0 Hz Peak L: -29,28 dBFS Multitone: -16,0 dBFS
Avg: 14 of 15 Meas Step: 20.0 KHz
Res: 732 mHz RMS L: -18,5 dBFS Peak L: 1,347 Vrms
Fs: 192 KHz
Win: Hann N+D L: -18,9 dBFS
Weight: None

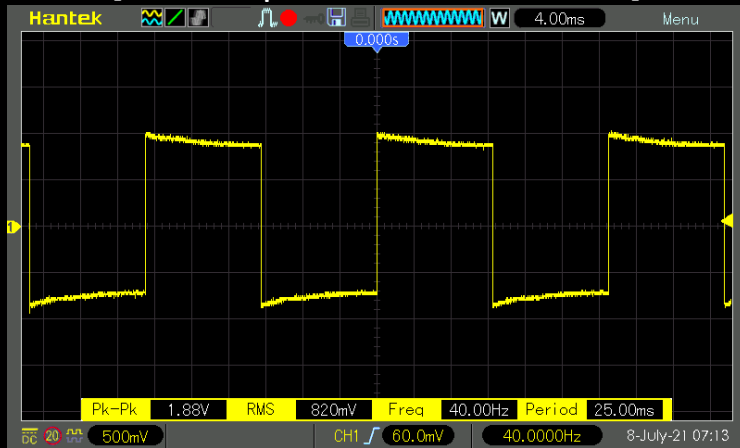
QuantAsylum
QA401 v1.918

Atten: 20 dB

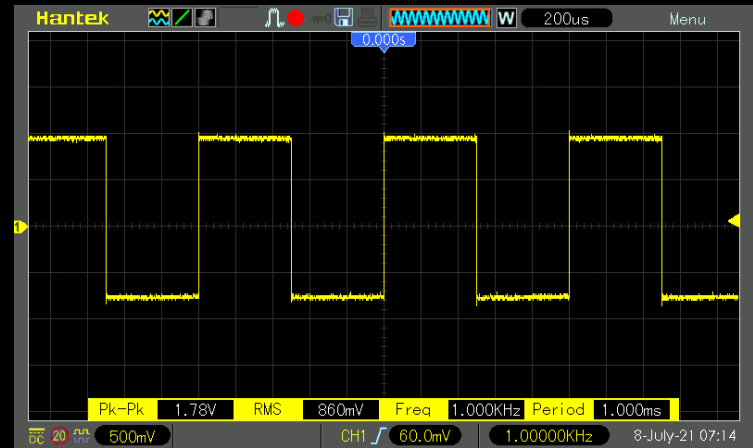


40 Hz – Square wave 32 Ohm

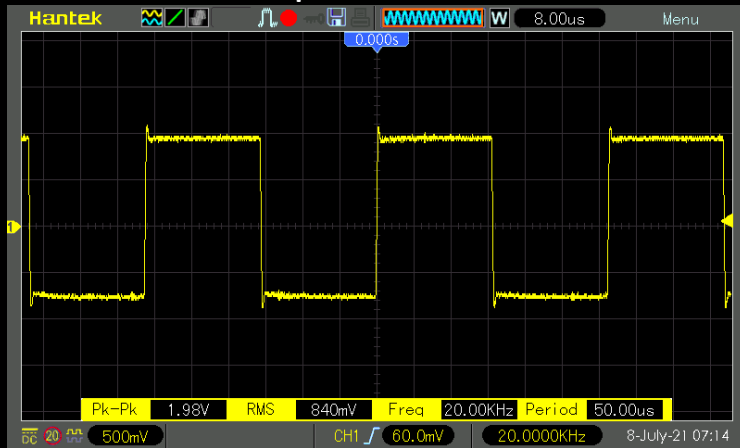
[Note: input DC filter included]



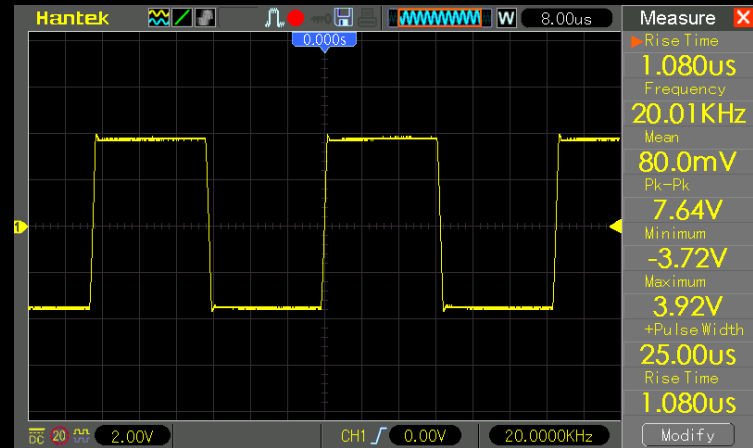
1 kHz – Square wave 32 Ohm



20 kHz – Square wave 32 Ohm

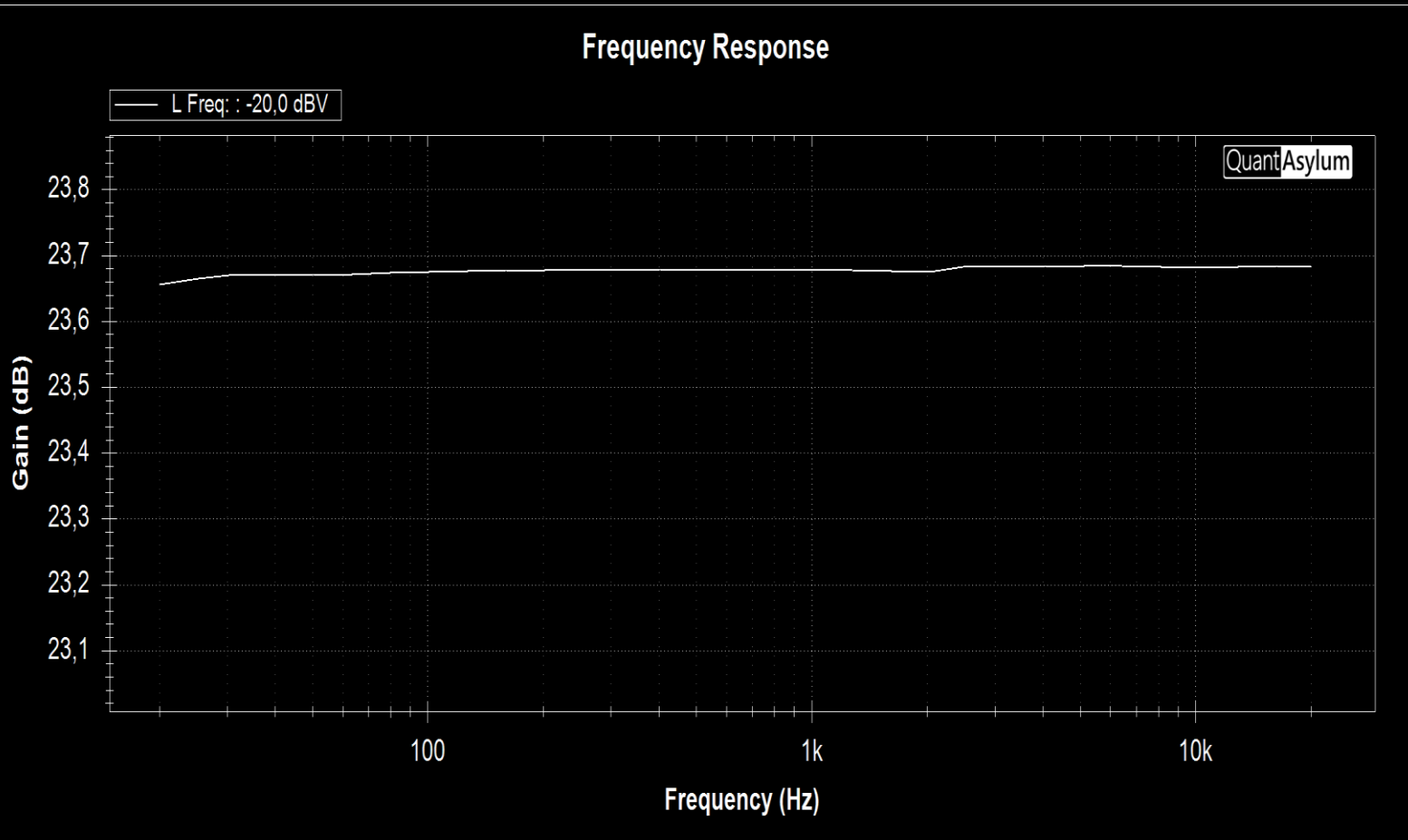


20 kHz – Slew rate



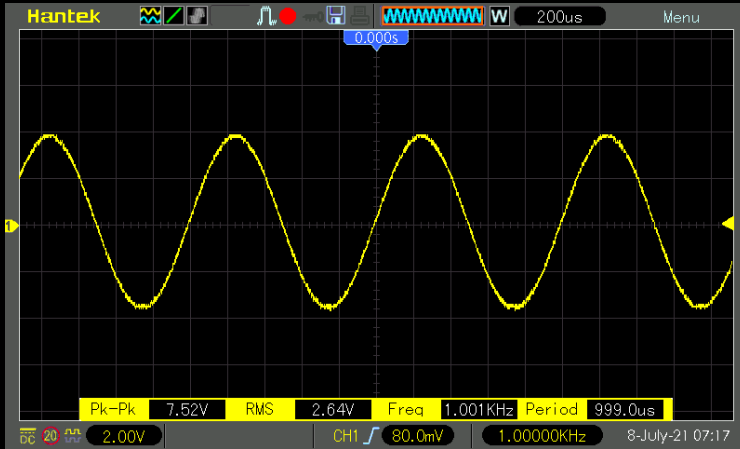
Measured 20 Hz – 20 kHz Frequency Response

[Note: amplifier input DC filter included]



Measured Bandwidth: 1 Vpk input

1 kHz – output voltage



570 kHz – output voltage

