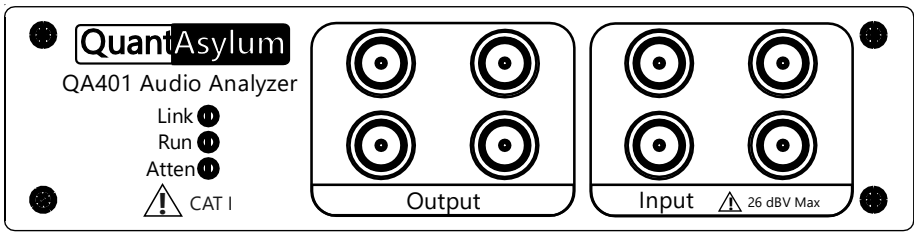
QA401

192 KSPS AUDIO ANALYZER



- ✓ 48 & 192 KSPS
- ✓ Fully isolated from PC
- ✓ USB Powered
- ✓ 20 dB Attenuator
- ✓ Differential I/O
- ✓ + 26 dBV Max Input

Introduction

The QA401 is our second-generation audio analyzer. The goal with the QA401 was to put a sophisticated analyzer on the desk of every engineer in the development lab while delivering performance that has ample margin to readily measure most every type of consumer audio equipment imaginable—from pre-amps and headphone amps to class D amplifiers.

No-Cal Design

Complex and finnicky calibration routines common with soundcard-based approaches are a thing of the past. The QA401 delivers stellar accuracy via a no-tune design thanks to 0.1% component specs in all critical gain stages.

Measurements

The included software makes measurements quickly: THD, SNR, THD+N, RMS and noise measurements are just a click away.

Complex measurements can be automated via free Microsoft DotNet development tools.

The differential input and output stages make driving and measuring modern amp topologies easy. For example, the QA401 can directly measure the output of Class D amplifiers up to several hundred watts.

The QA401 comes with a 15-day, no-questions-asked money back guarantee.

Driven by TRACTOR

Tractor is our open-source application for controlling our hardware. With it, you can quickly assemble a sequence of tests for your product. The data can be logged automatically to a database, and as you'd expect, there is lots of flexibility for setting product-specific options. It's fast, too: Knock out 10 tests in 30 seconds. From barcode scanning to THD, IM, efficiency, output impedance, amplitude, noise and more. It's almost turnkey.

Are You Ready?

Are you testing your products thoroughly before they leave your factory? If not, you should be. Contact: sales@QuantAsylum.com

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REVD

Specifications

Mechanical

Dimensions	177w 44h 97d mm, 116mm deep with BNC
Weight	420 grams
Case Material	Powder coated aluminum

Electrical

Inputs	Differential, BNC x 2 for left and BNC x 2 for right
Input Z	100 K Ohm
Input Coupling	AC, F_C = 1.6 Hz
Input Full Scale (Atten OFF)	Single Ended: 6 dBV = 5.6 V_{PP} = 2 V_{RMS}
Input Full Scale (Atten ON)	Single Ended: 26 dBV = 56 V_{PP} = 20 V_{RMS}
Input Overload Protection	Yes, automatic up to 56.4 V_{PP}
Input Noise Floor	-113 dBV (inputs shorted, atten off, 20 to 20 KHz, 32K FFT, avg 5, Hann, 48 Ksps)
THD	-108.5 dB (loopback, single ended, L- shorted to ground, atten off, 32K FFT, avg 5, Hann, 48 Ksps, -10 dBV input)
CMRR	82 dB typical at 1 KHz, 0 dBV input split into both input channels
Input Crosstalk	< -130 dB (DAC output connected to ADC input +, input – shorted to ground)
DAC to ADC Crosstalk	< -130 dB (DAC outputs open and set to 0 dBV, ADC inputs shorted to ground)
IMD	-125 dB typ (19 KHz @ -6 dBV, 20 KHz @ -6 dBV, resulting 1 KHz product at -125 dBV)
ADC	AKM AK5397EQ
Outputs	Differential, BNC x 2 for left and BNC x 2 for right
Output Z	47 ohms. Output stage is OPA1612 with series 47 ohm for protection against capacitive loading and momentary accidental shorts
Output Coupling	DC coupled, with user adjustable offsets to reduce offset imbalance to ~300 uV
Output Full Scale	Single Ended: 5.5 dBV = 5.3 V_{PP} = 1.88 V_{RMS}
DAC	AKM AK4490
Audio Interface	Custom USB
Max FFT Size	256Kpts
Included Accessories	None. You will need a USB A to B cable to connect the QA401 to the PC and BNC cables to connect the QA401 to the DUT. Some BNC terminators (0, 50 or 75 ohm) will be helpful for some types of measurements.

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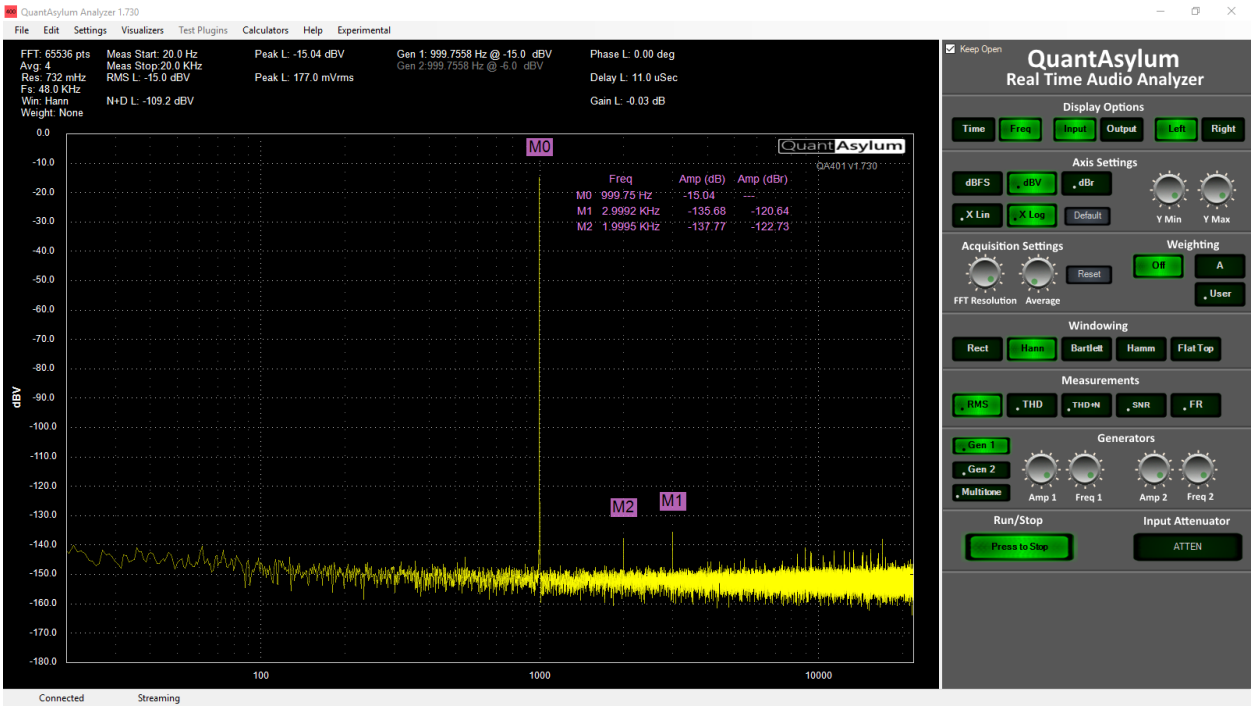
Application

Below is the typical application screen.



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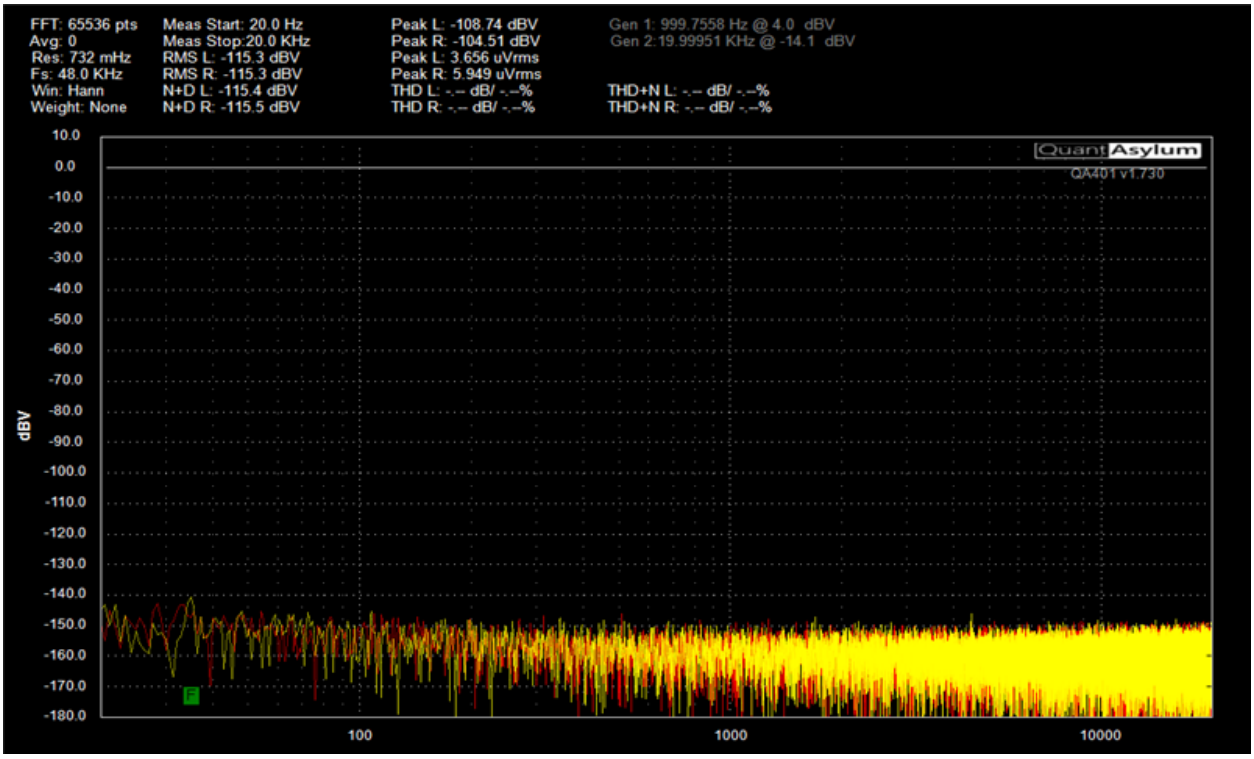
Measurements

Measurements below are made in loopback mode such that the output of the analyzer is routed back to the input. There are two types of plots shown. The first is the application screen. In this mode, the measurements can be read directly from the application display. The second measurement type presented in a graph. These graphs are created inside the QA401 application by specifying various sweep parameters. The graphs will complete automatically based on your specified parameters.

The graphs shown below are representative of performance: other units may perform slightly better or worse in some areas.

Noise Floor

The noise floor is measured by shorting both input channels. The RMS noise from 20 to 20 kHz is reported at -115.3 dBV (left) and -115.3 dBV (right).



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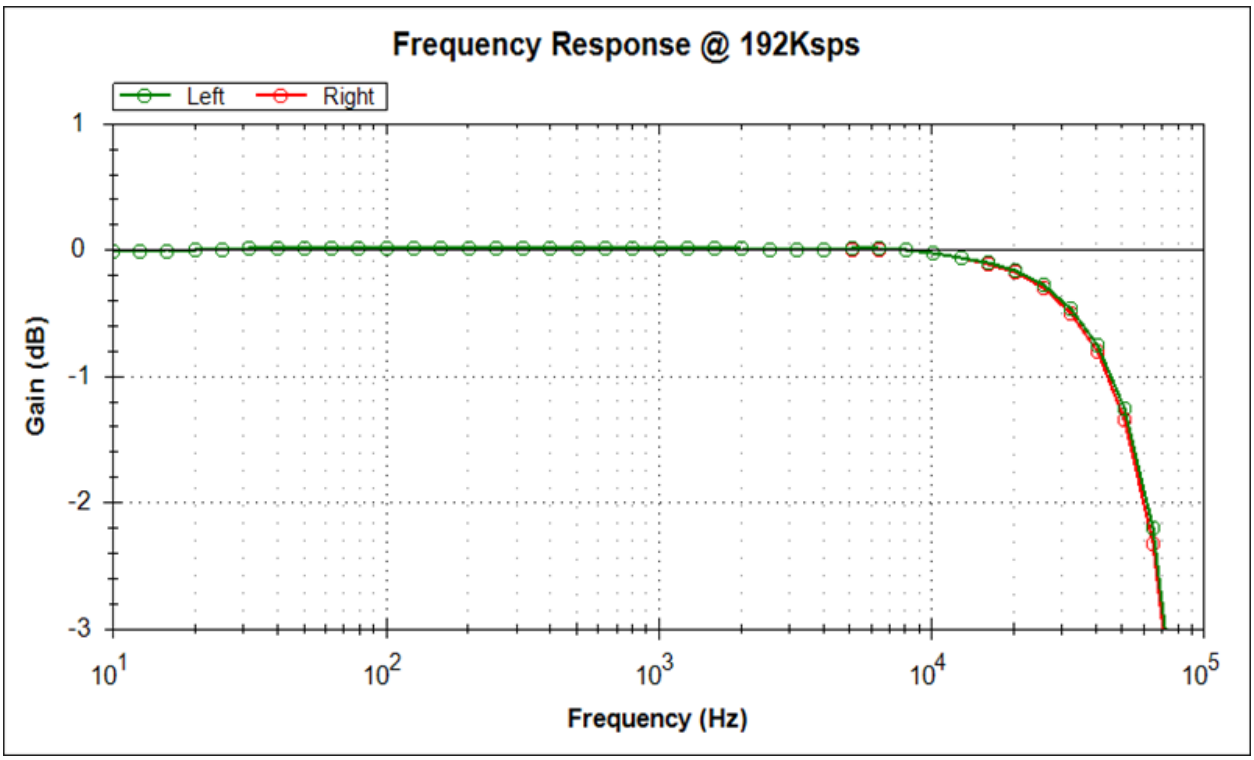
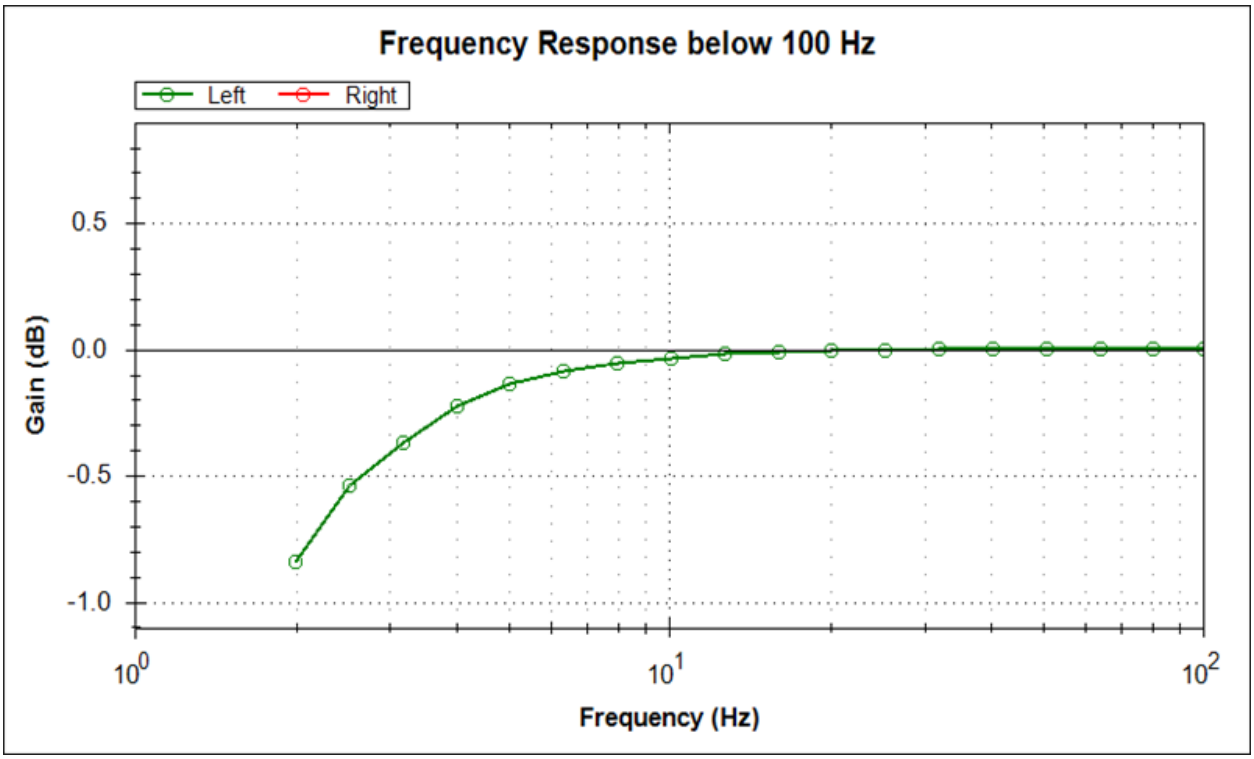
Frequency Response

(192 ksps, 0 dBV, Flat Top Windowing, 64K FFT). The -3 dB point is around 70 kHz.



The zoom below focuses on low-frequency response (2 Hz to 100 Hz) in 48Ksps mode of operation. You need very large FFT sizes to make these measurements at low frequencies.



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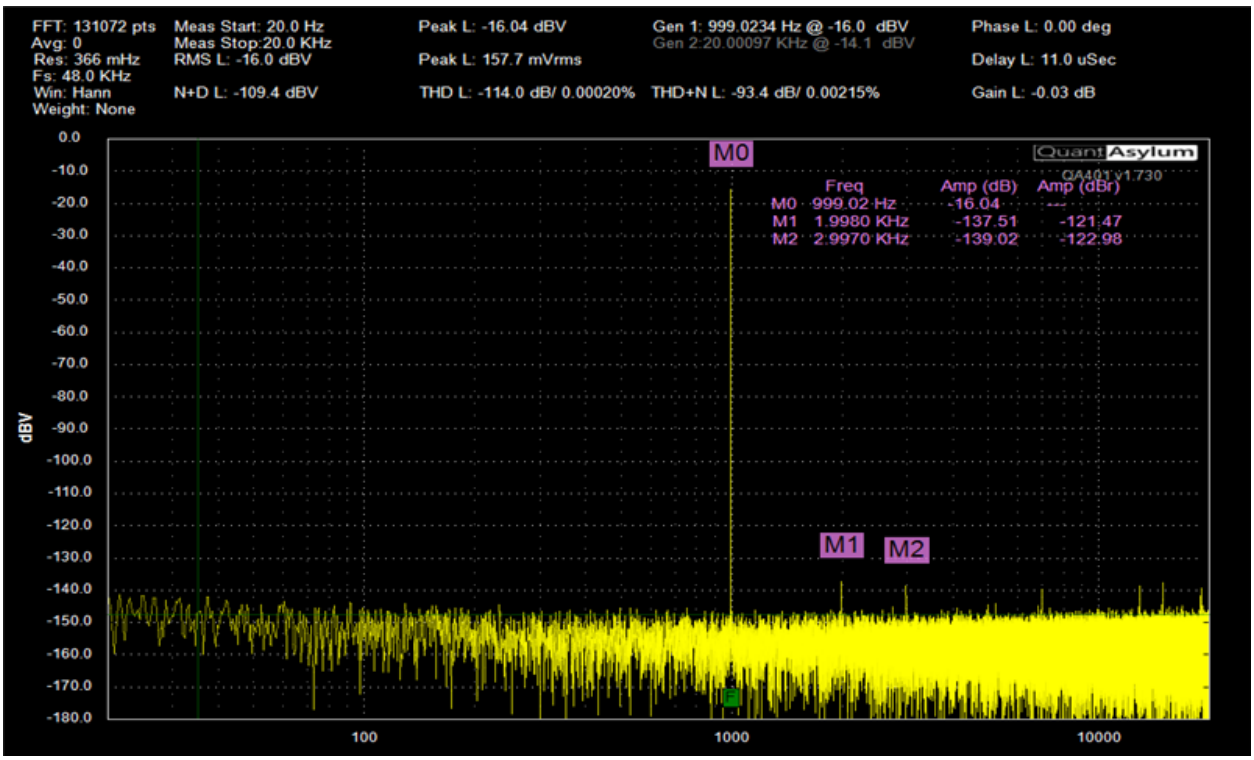
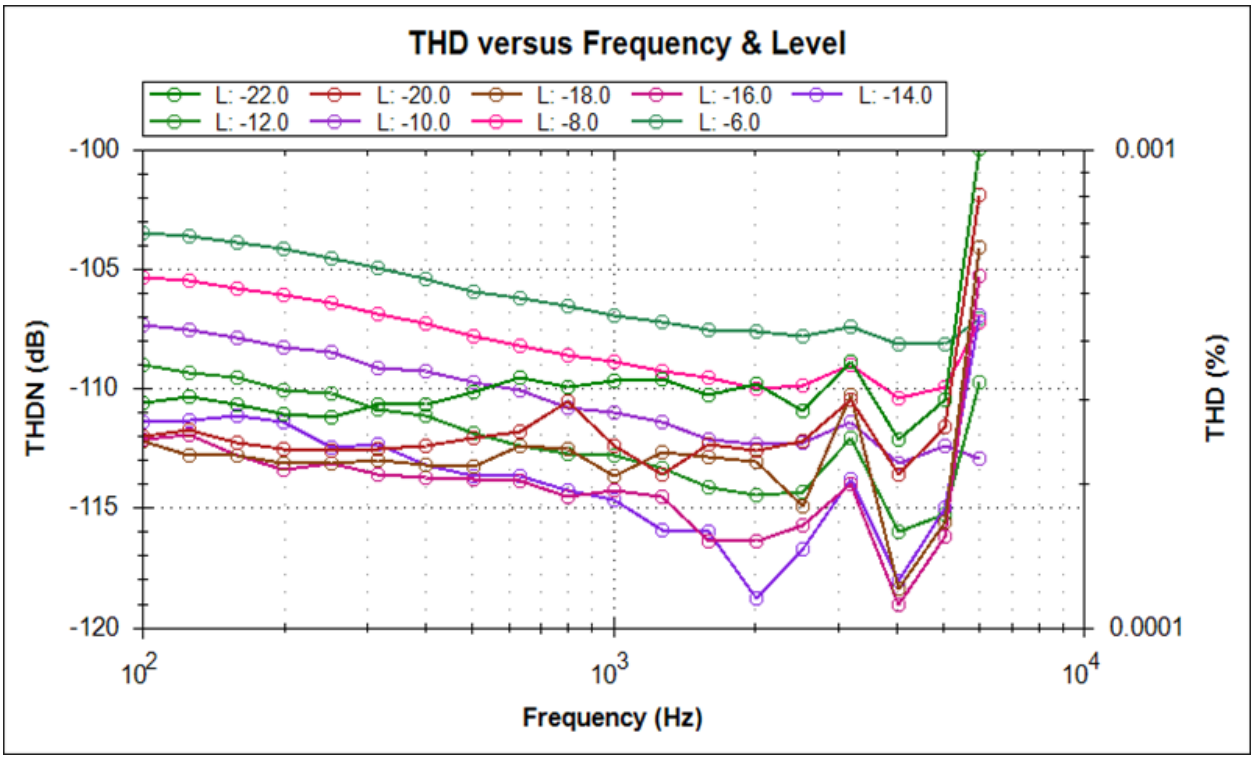
THD

The plot below is representative of performance at -16 dBV DAC output level.



The plot below shows the achieved THD at level swept from 100 to 6 KHz and from -22 dBV to -6 dBV. The harmonic measurement limit was 20 kHz.



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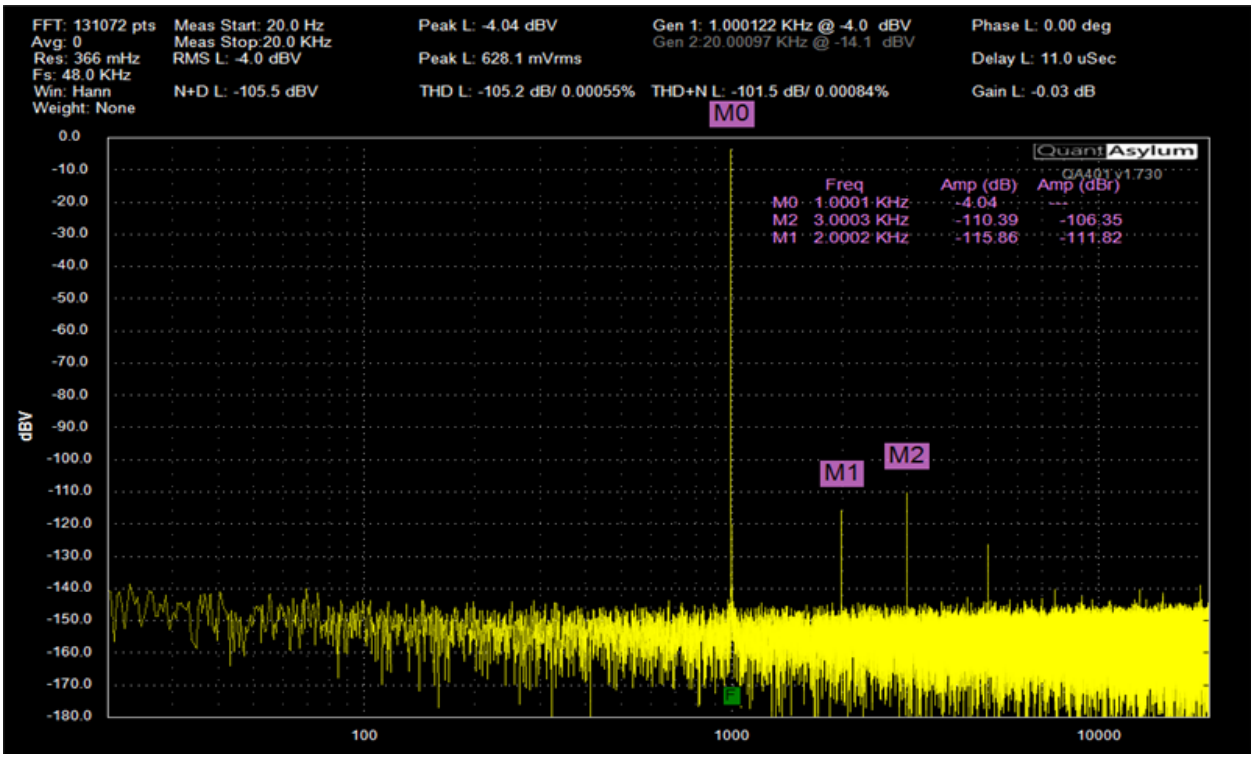
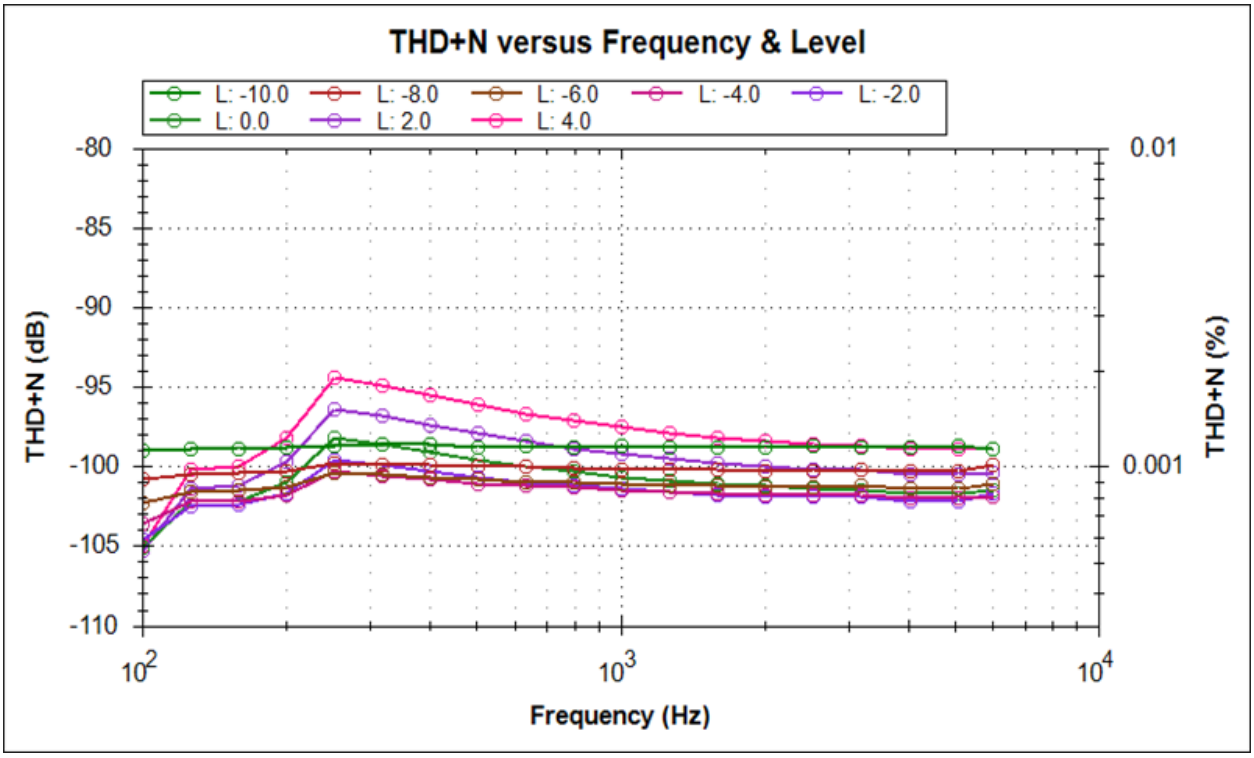
THD+N

The plot below is representative THD+N performance at -4 dBV DAC output level. The measured THD+N value is -101.5 dB.



The plot below shows the achieved THD+N at level swept from 100 to 6 kHz and from -22 dBV to -6 dBV. The harmonic measurement limit was 20 kHz.



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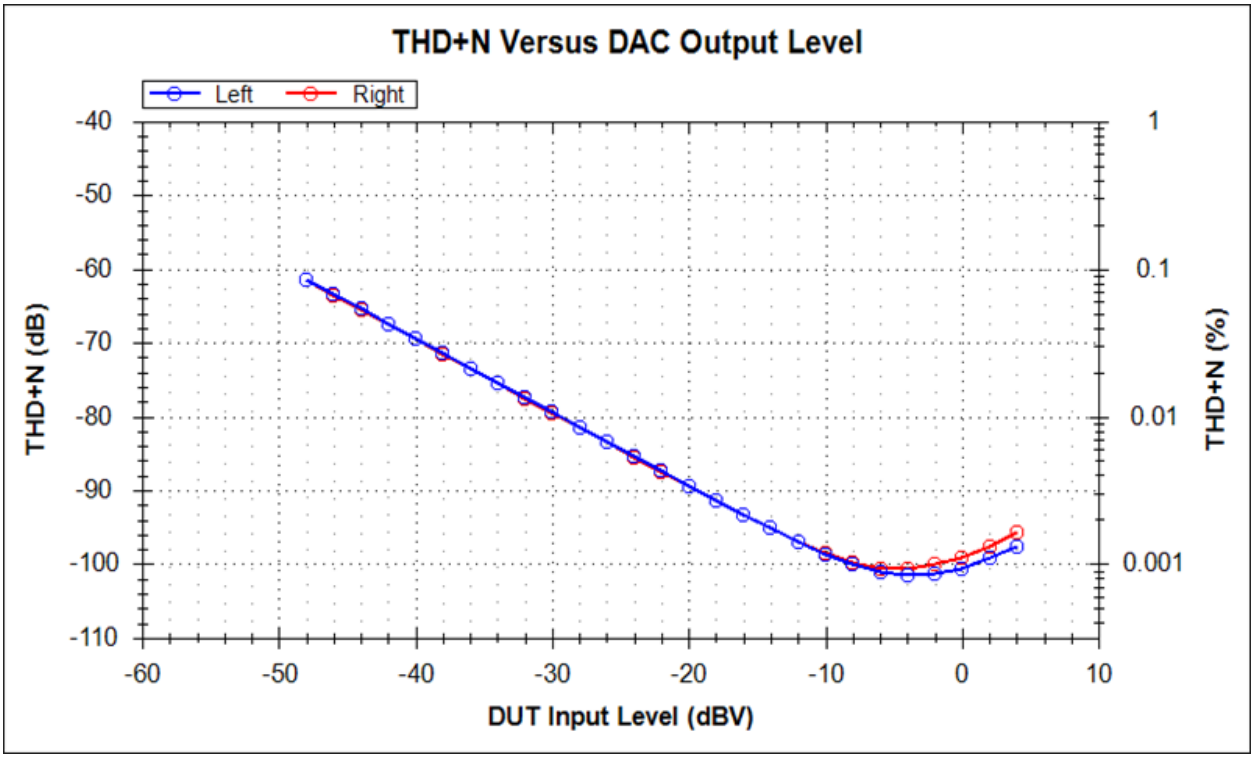
The plot below shows the THD+N ratio with the output swept from -48 to 4 dBV.



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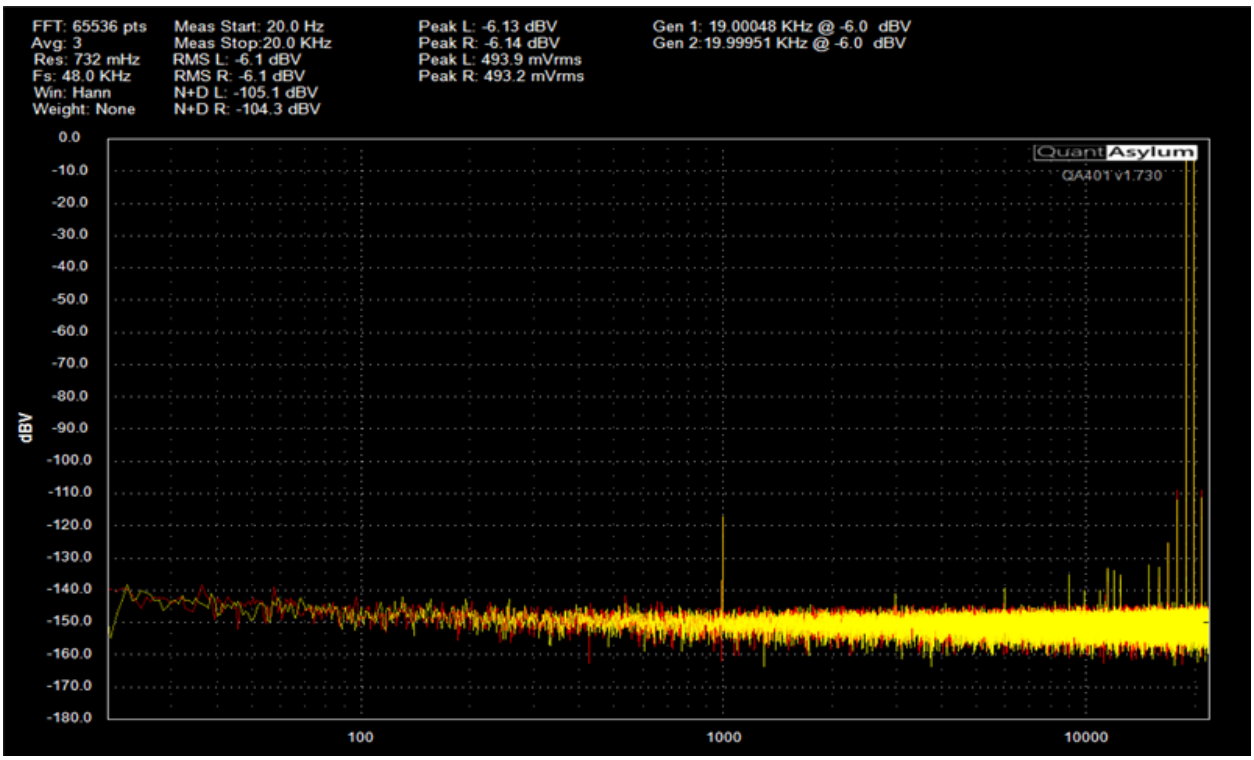
IMD

For a 19 and 20 KHz input tones at -6 dBV level, the resulting 1 kHz product emerges at about -115 dBV.



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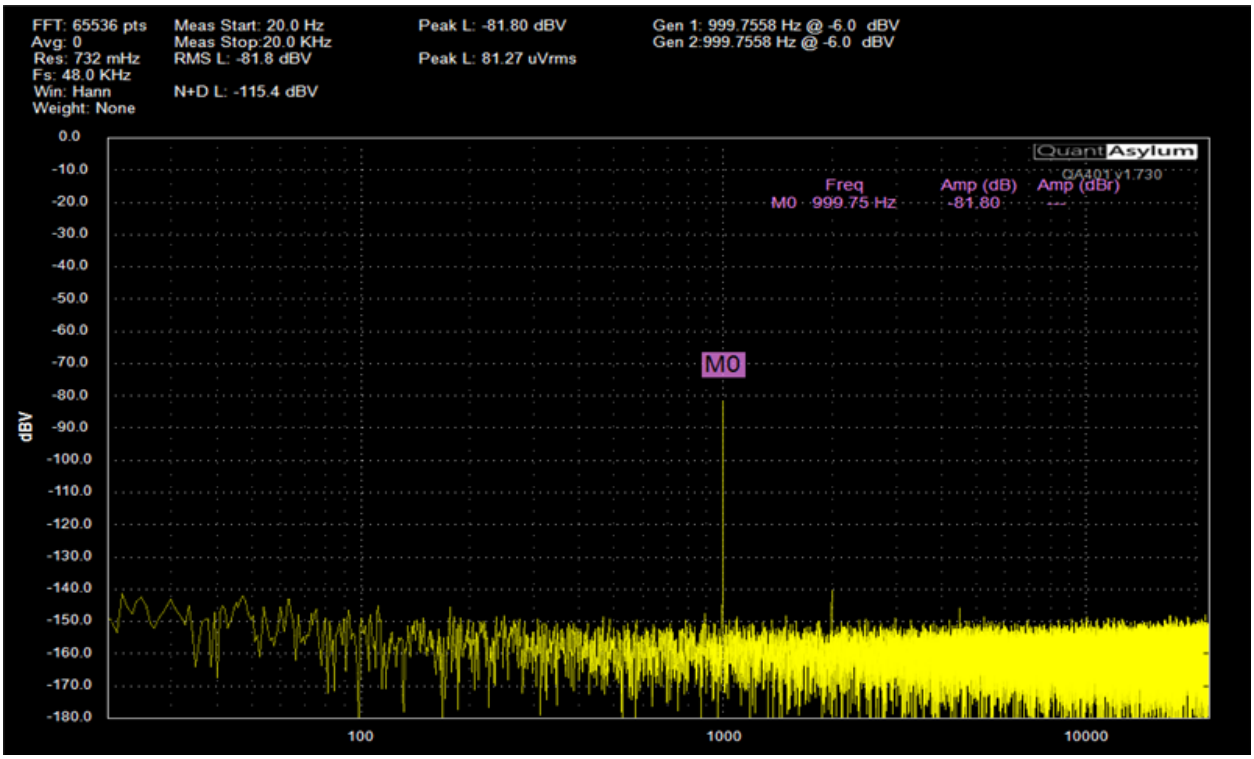
CMRR

CMRR is measured by applying a -6 dBV signal from L+OUT to both L+IN and L-IN. Because both signals are equal, they should cancel. As the plot below shows, the resulting level is roughly 80 dB below the input level.



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