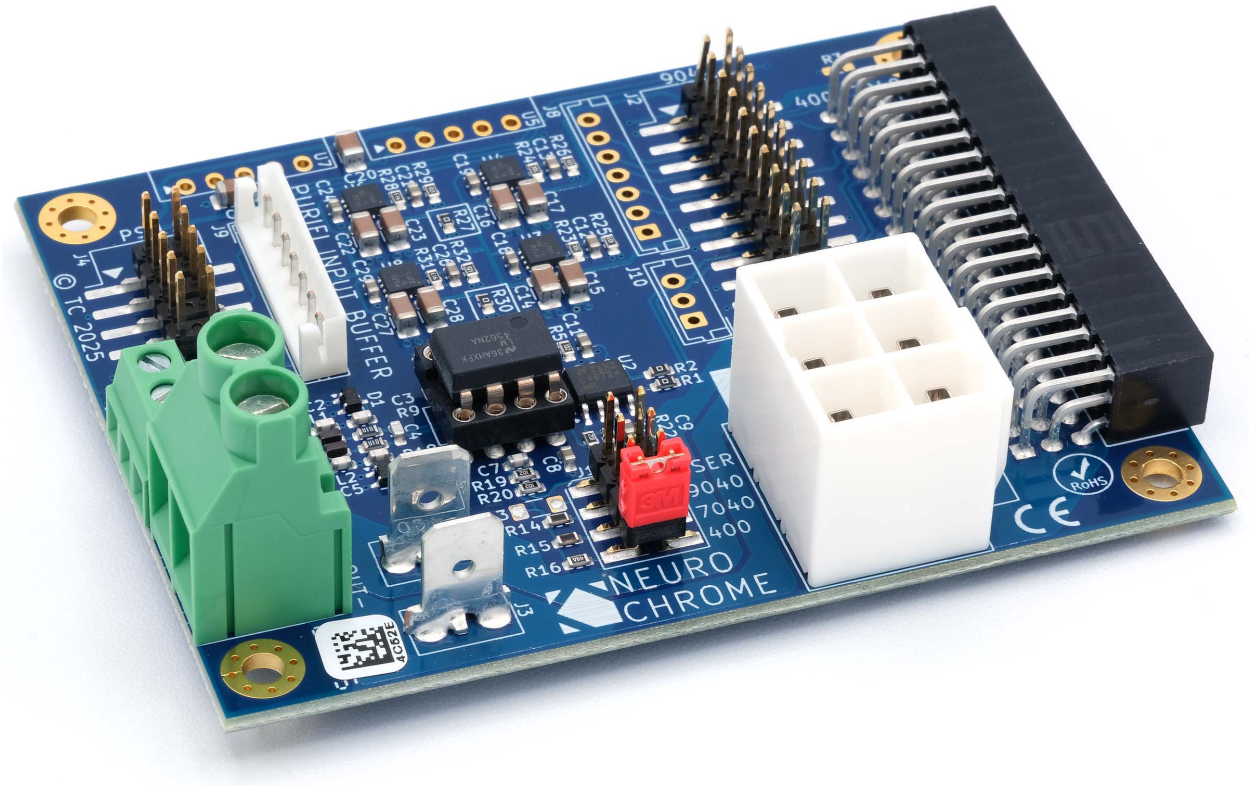
Universal Purifi Input Buffer Rev. 1.0 Data Sheet



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Revision History

Universal Purifi Input Buffer Rev. 1.0 Data Sheet

Revision	Date	Notes
1.0	01 APR 2025	Document created.

Typical Performance Measurements

The measurements below were performed on a randomly selected sample of the Universal Purifi Input Buffer Rev. 1.0. Except where noted, they represent the typical performance that can be expected from the Universal Purifi Input Buffer.

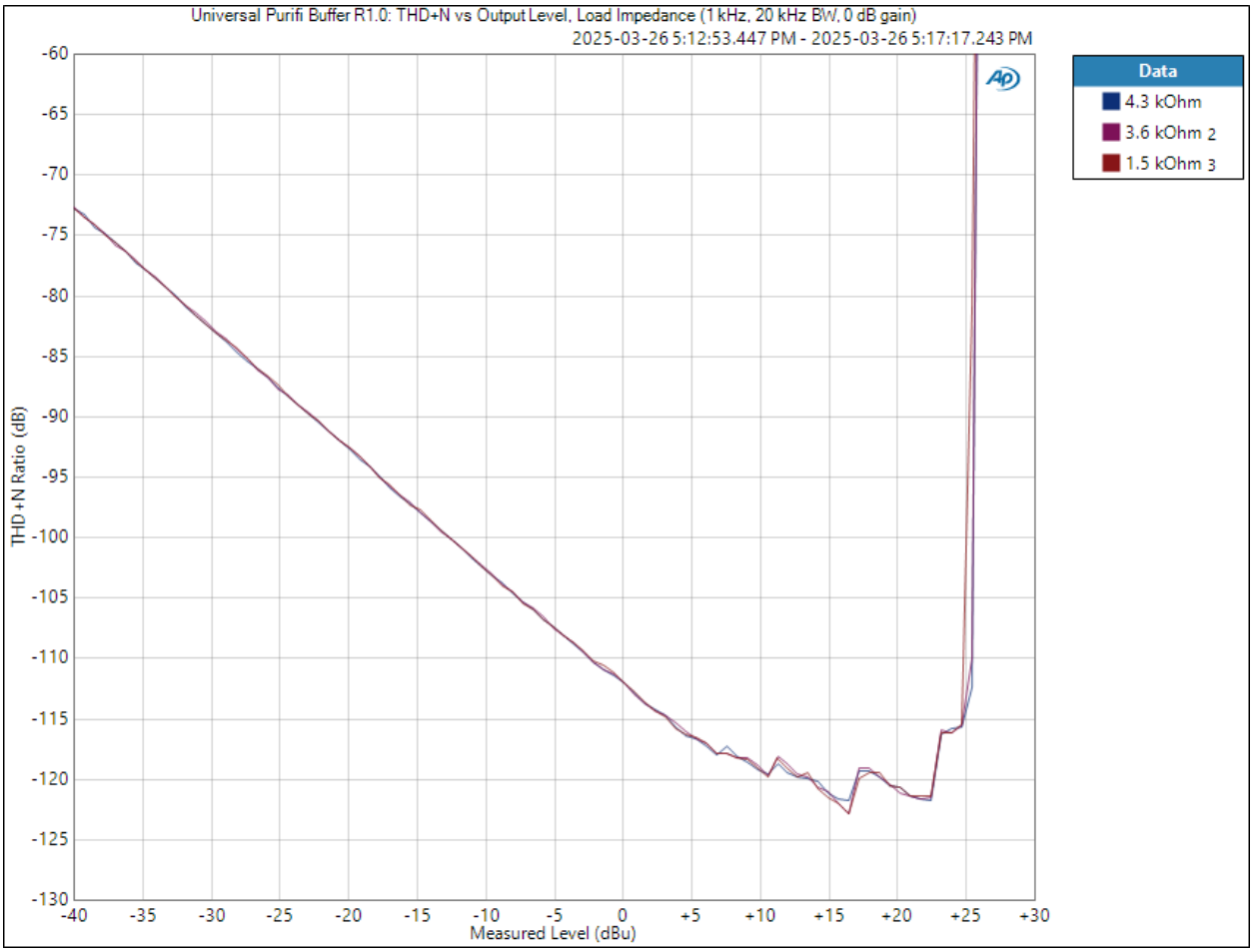
Parameter	Value	Notes
Quiescent Current Draw	20 mA 27 mA	Typical Max. (Guaranteed by design)
Maximum Current Draw	47 mA	Z_{load} = 1.5 kΩ, +25 dBu
Total Harmonic Distortion	-140 dBc (0.00001 %)	1 kHz, V_{in} = 2.0 V RMS
Total Harmonic Distortion	-130 dBc (0.00003 %)	20 kHz, V_{in} = 2.0 V RMS
Total Harmonic Distortion + Noise	≤-120 dB (≤0.0001 %)	1 kHz, V_{in} = 2.0 V RMS, 20 kHz BW
Total Harmonic Distortion + Noise	≤-120 dB (≤0.0001 %)	1 kHz, V_{out} = 9.6 V RMS, 20 kHz BW
IMD (SMPTE: 60 Hz + 7 kHz, 4:1)	-112 dB	V_{in} = 2.0 V RMS
IMD (DFD: 18 kHz + 19 kHz, 1:1)	-122 dB	V_{in} = 2.0 V RMS
Multi-Tone IMD Residual	≤-148 dB Ref. 7.6 V RMS	AP 32-tone, V_{in} = 2.0 V RMS
Gain	0 dB 11.6 dB 13.0 dB 13.2 dB	Can be further customized by resistor option.
Gain Flatness	±0.007 dB	20 Hz – 20 kHz
Bandwidth	DC – 900 kHz	100 mV RMS, -3 dB
Slew Rate	21 V/µs	8 Ω || 1 nF load

Parameter	Value	Notes
Common-Mode Rejection Ratio	≥ 80 dB	20 Hz - 20 kHz, typ.
Total Integrated Output Noise and Residual Mains Hum	2.5 µV RMS (11.6 dB) 1.5 µV RMS (0 dB)	A-weighted, 20 Hz - 20 kHz
Total Integrated Output Noise and Residual Mains Hum	3.1 µV RMS (11.6 dB) 1.9 µV RMS (0 dB)	Unweighted, 20 Hz - 20 kHz
Dynamic Range (AES17)	132 dB	1 kHz, V_{in} = 8 V RMS
Input Impedance	48 kΩ	
Module Dimensions and Weight	64×84×28 mm 45 g	(W × D × H)

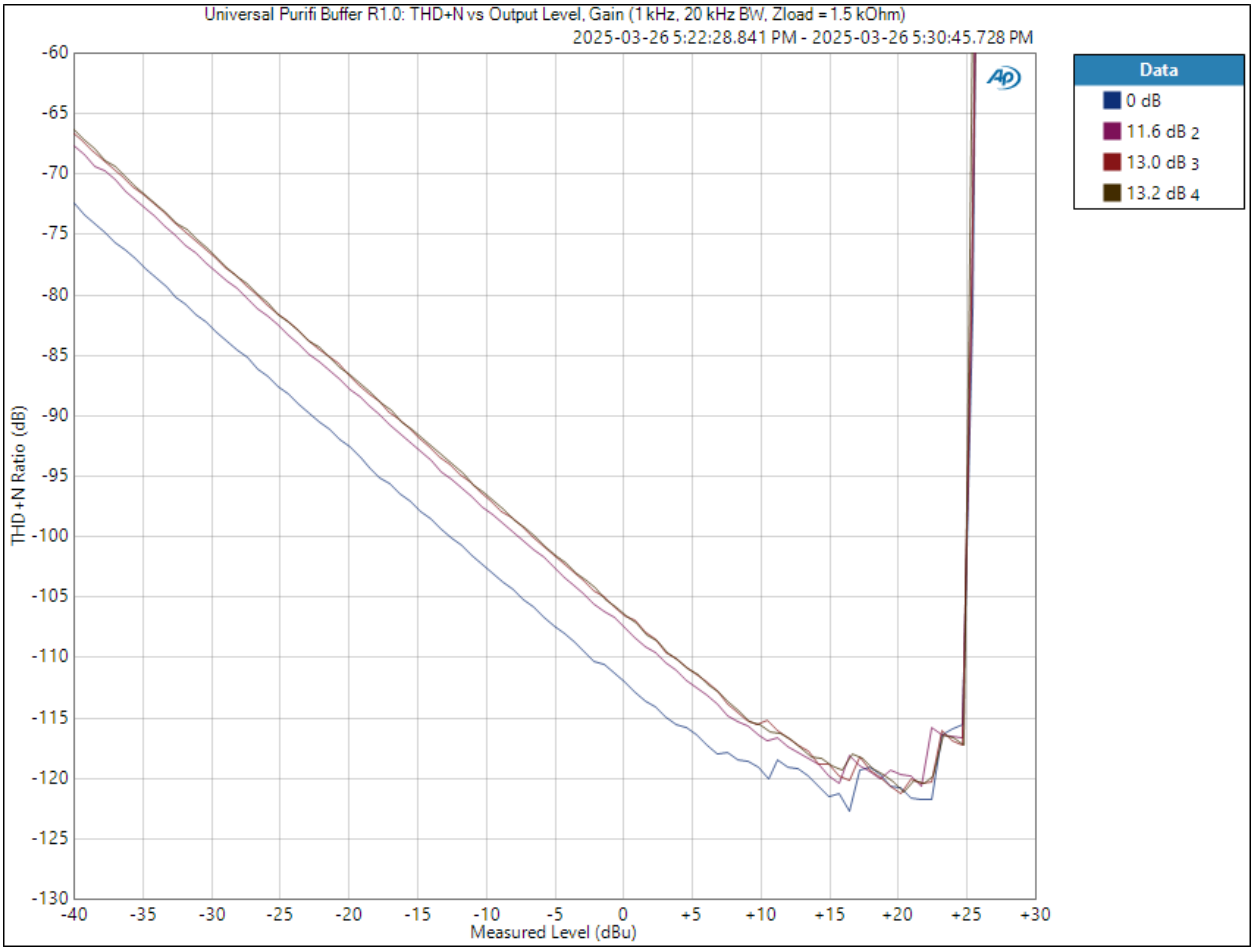
All parameters are measured at a supply voltage of ±20 V unless otherwise noted.

Harmonic Distortion

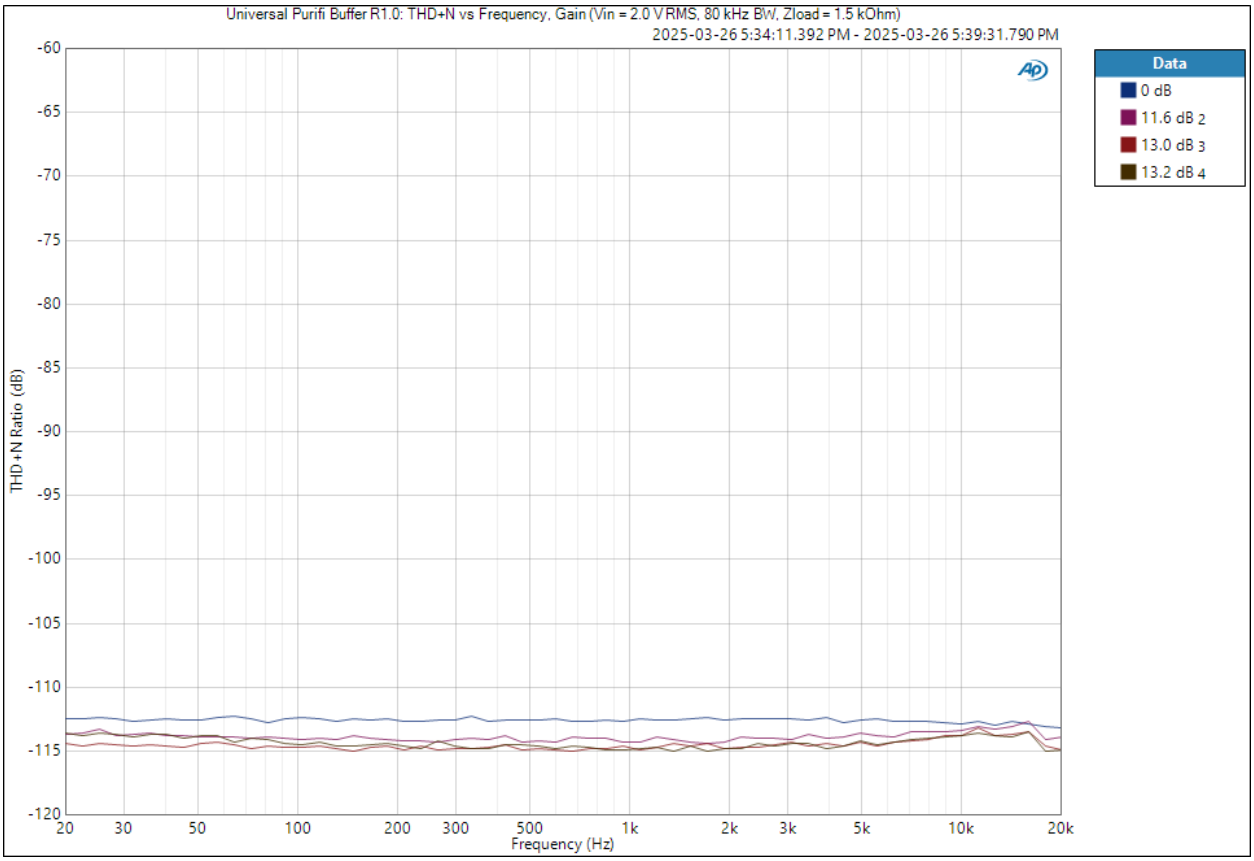
For the measurements below, the Universal Purifi Input Buffer was operating from a ±20 V power supply. The graph below shows the THD+N vs output power for the three load impedances representing the Purifi 1ET400A, 1ET7040SA, and 1ET9040BA, respectively. The performance of the Buffer does not depend on the load impedance.



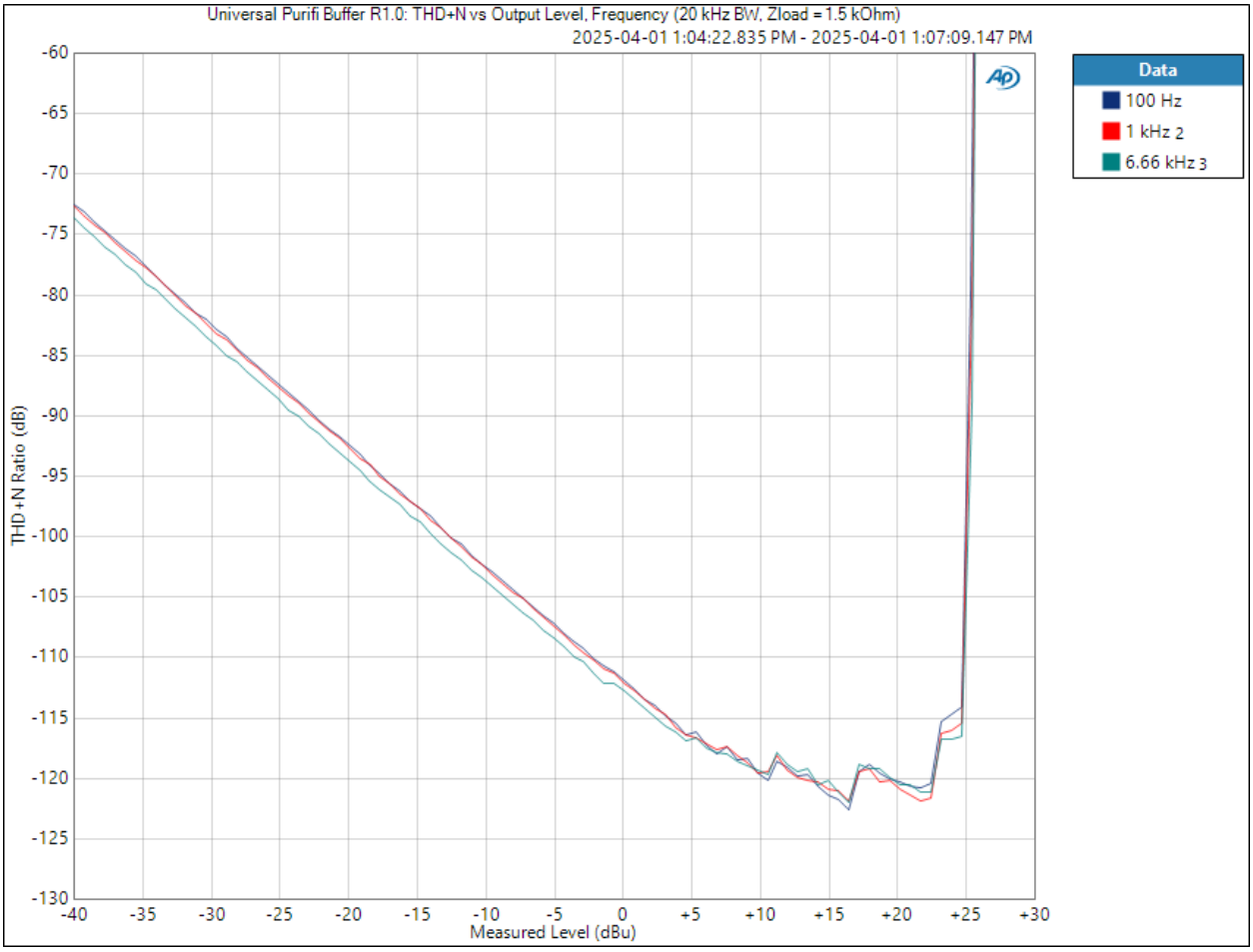
The graph below shows the THD+N vs output level for the four gain settings. The THD+N does increase as the gain is increase. This is due to the amplification of the generator noise.



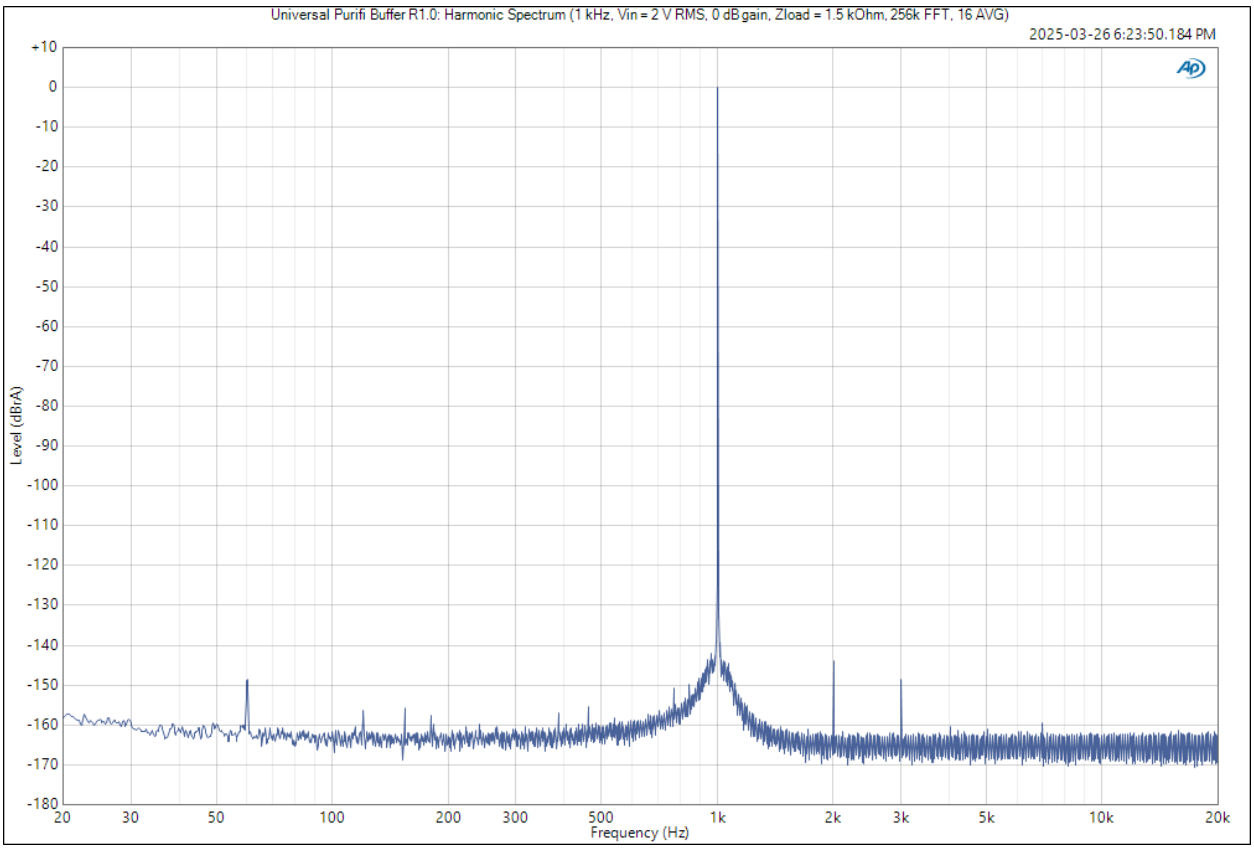
The THD+N vs frequency is shown below for an input voltage of 2.0 V RMS. Note that the measurement bandwidth is 80 kHz, so the THD+N is mostly dominated by noise.



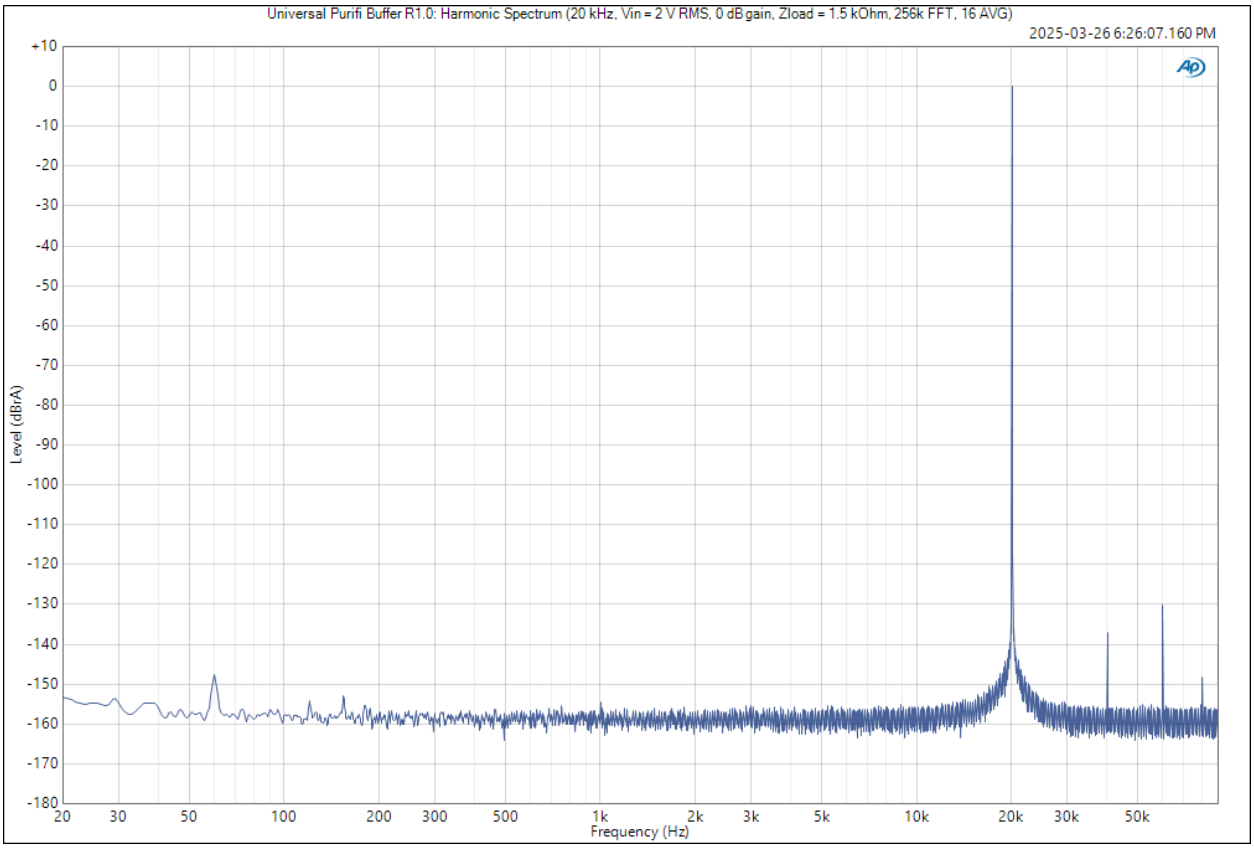
This was verified by measuring the THD+N vs output level at various frequencies with a 20 kHz measurement bandwidth. The result is shown below.



The spectrum below shows the harmonic distortion of the Universal Purifi Input Buffer with a 2.0 V RMS input. As seen in the graph, the THD measures well below -140 dBc at 1 kHz.

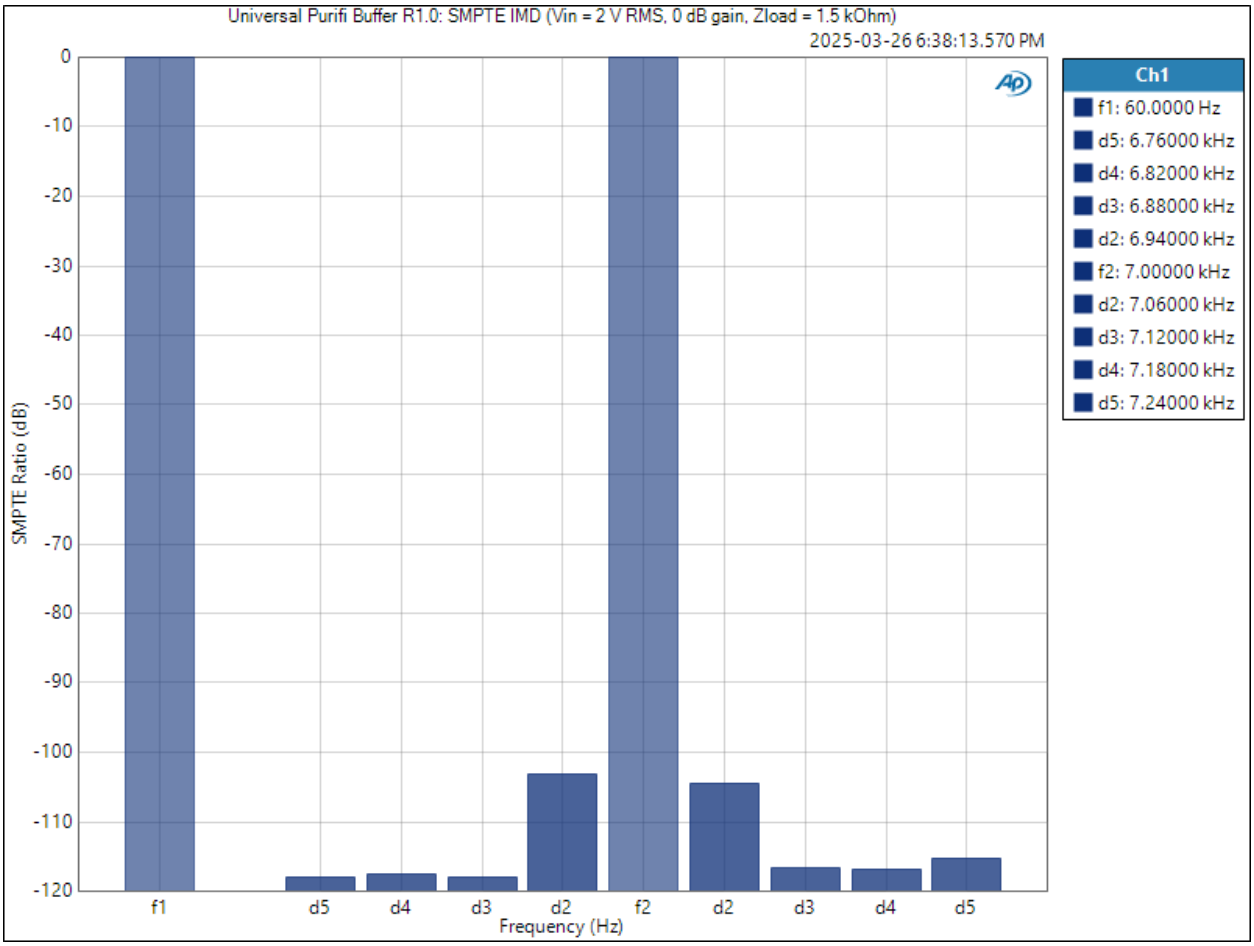


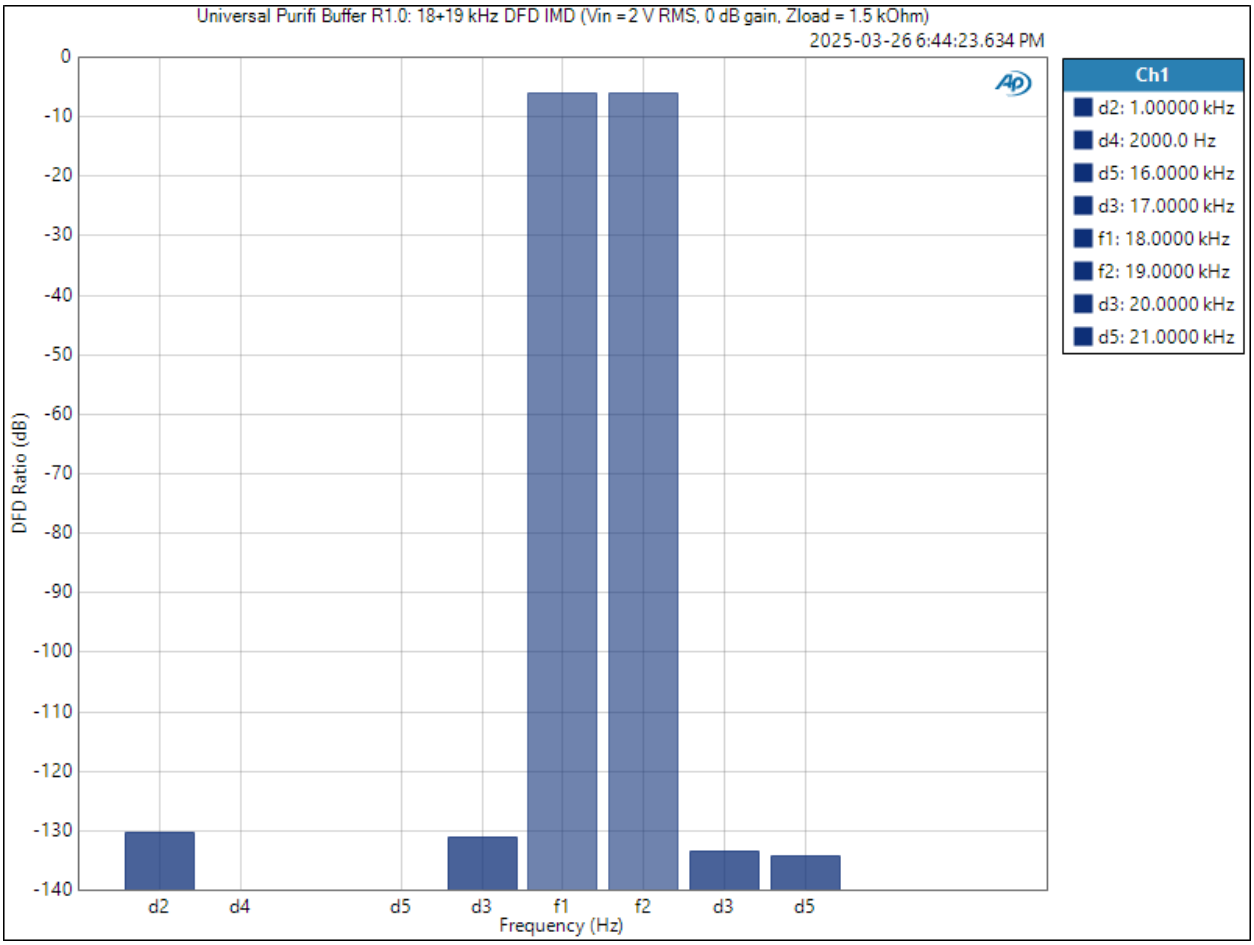
Repeating this measurement at 20 kHz shows excellent high-frequency THD as well.



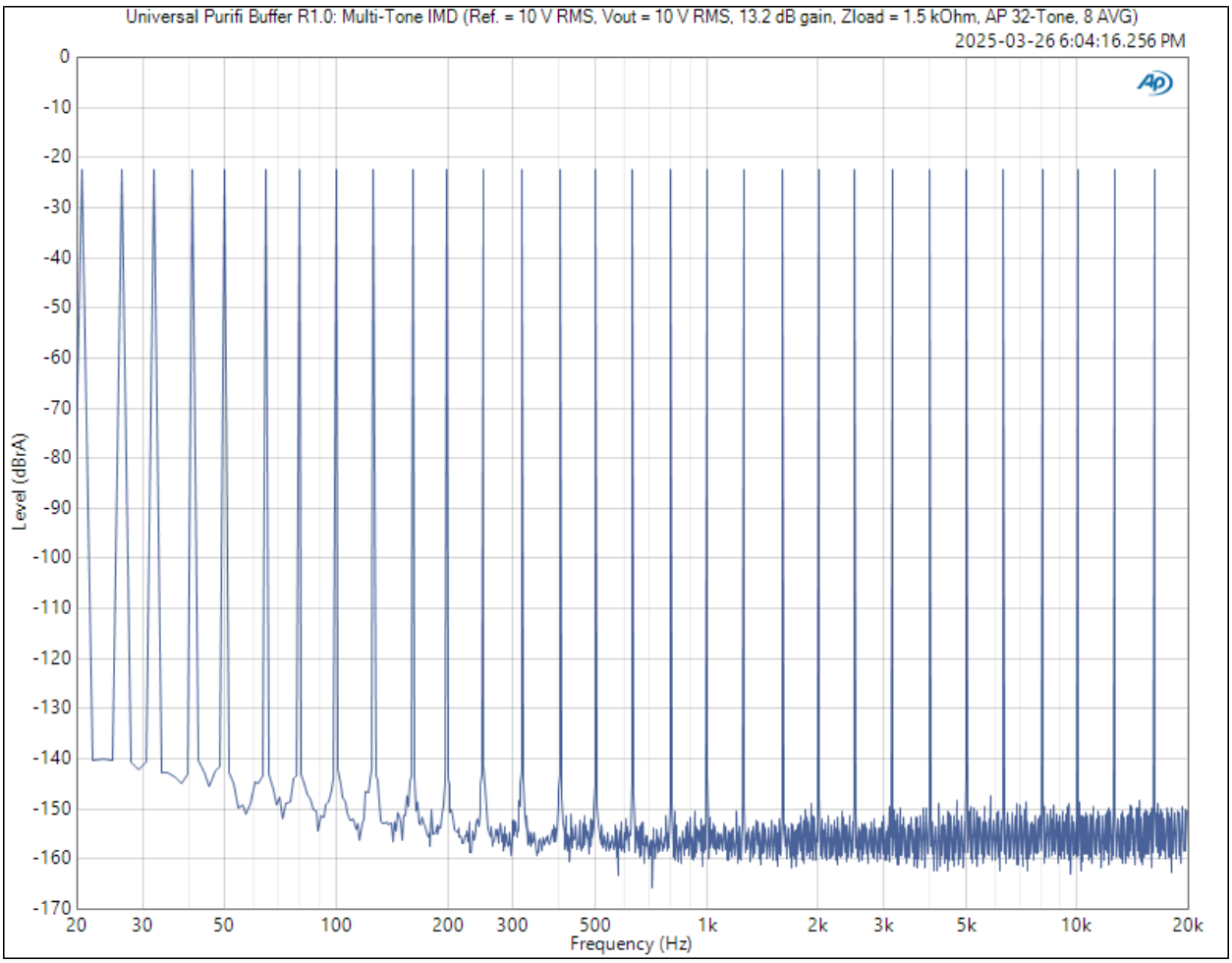
Intermodulation Distortion

The two plots below show the SMPTE (60 Hz + 7 kHz @ 4:1) IMD and DFD (18 kHz + 19 kHz @ 1:1) IMD, respectively.



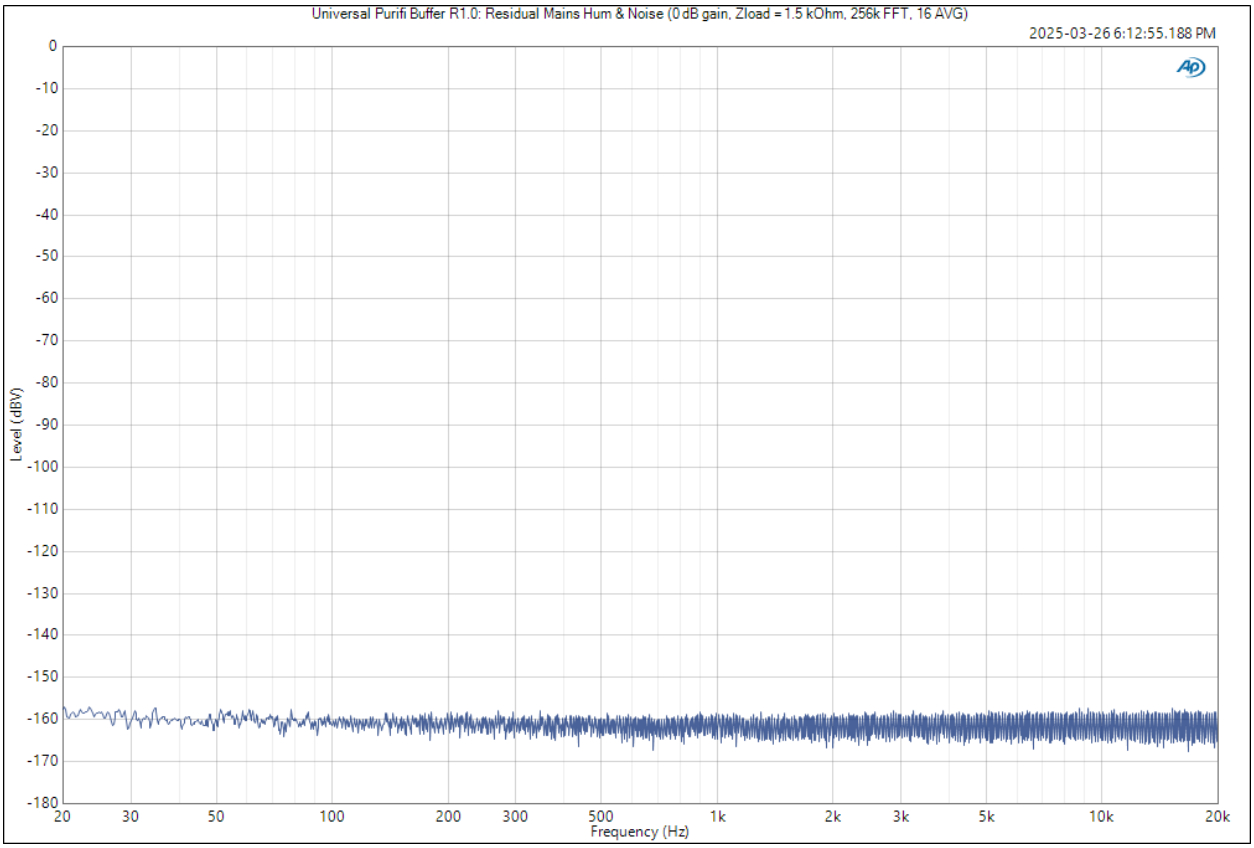


Audio Precision has developed a multi-tone test signal, which contains 32 tones from 15 Hz to 20 kHz, logarithmically spaced in frequency. This test signal sounds a bit like an out-of-tune pipe organ. It is the best approximation to music available in a deterministic test signal. Thus, this multi-tone signal should be used in an IMD test for the best correlation between measurements and perceived sound quality. This test is run just below clipping (V_{out} = 10 V RMS). The tallest IMD components are 148 dB below clipping level!



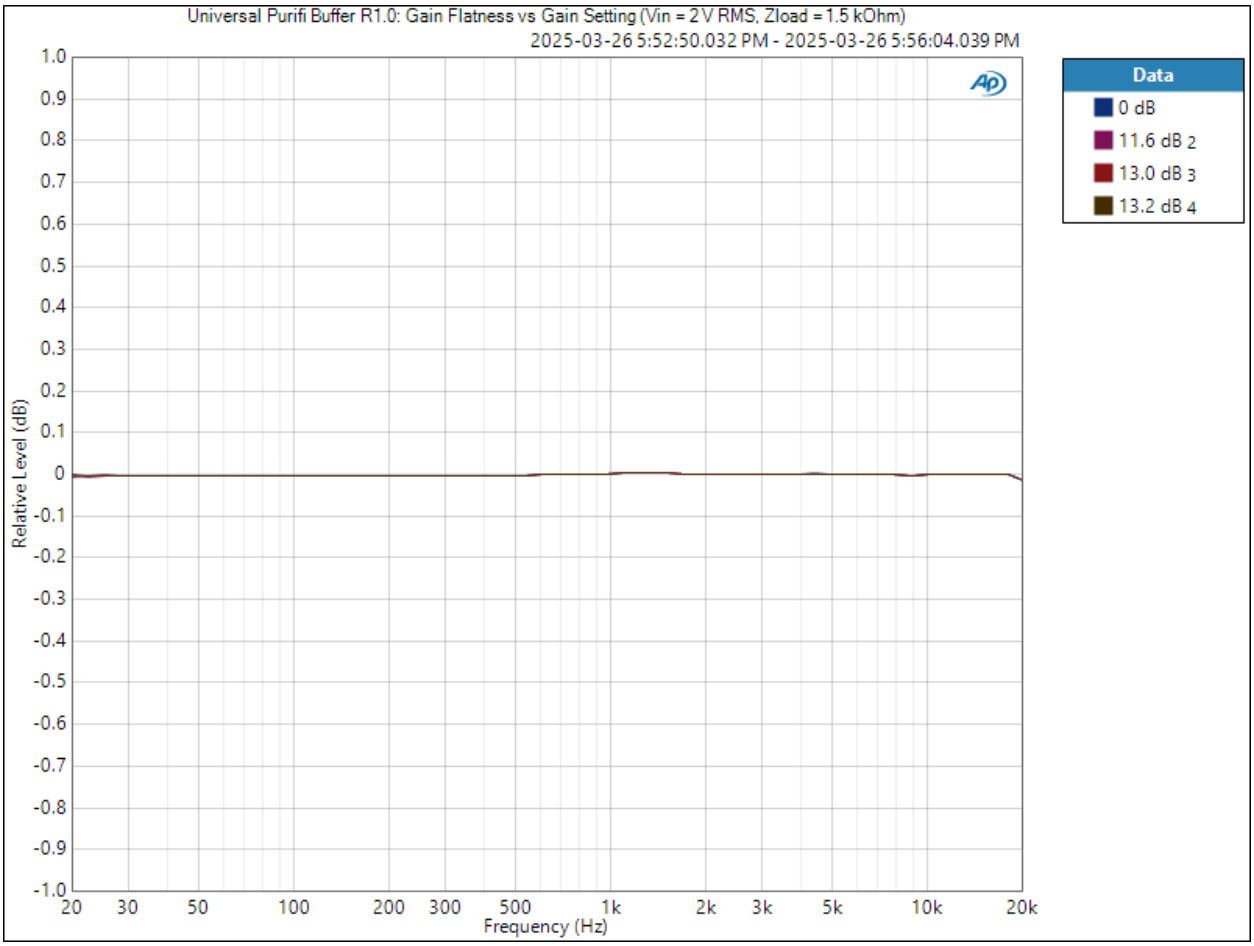
Residual Mains Hum and Noise

The Universal Purifi Input Buffer shows no residual mains hum. The plot below shows the noise floor of the amplifier when powered by a laboratory power supply (Keysight EDU36311A).

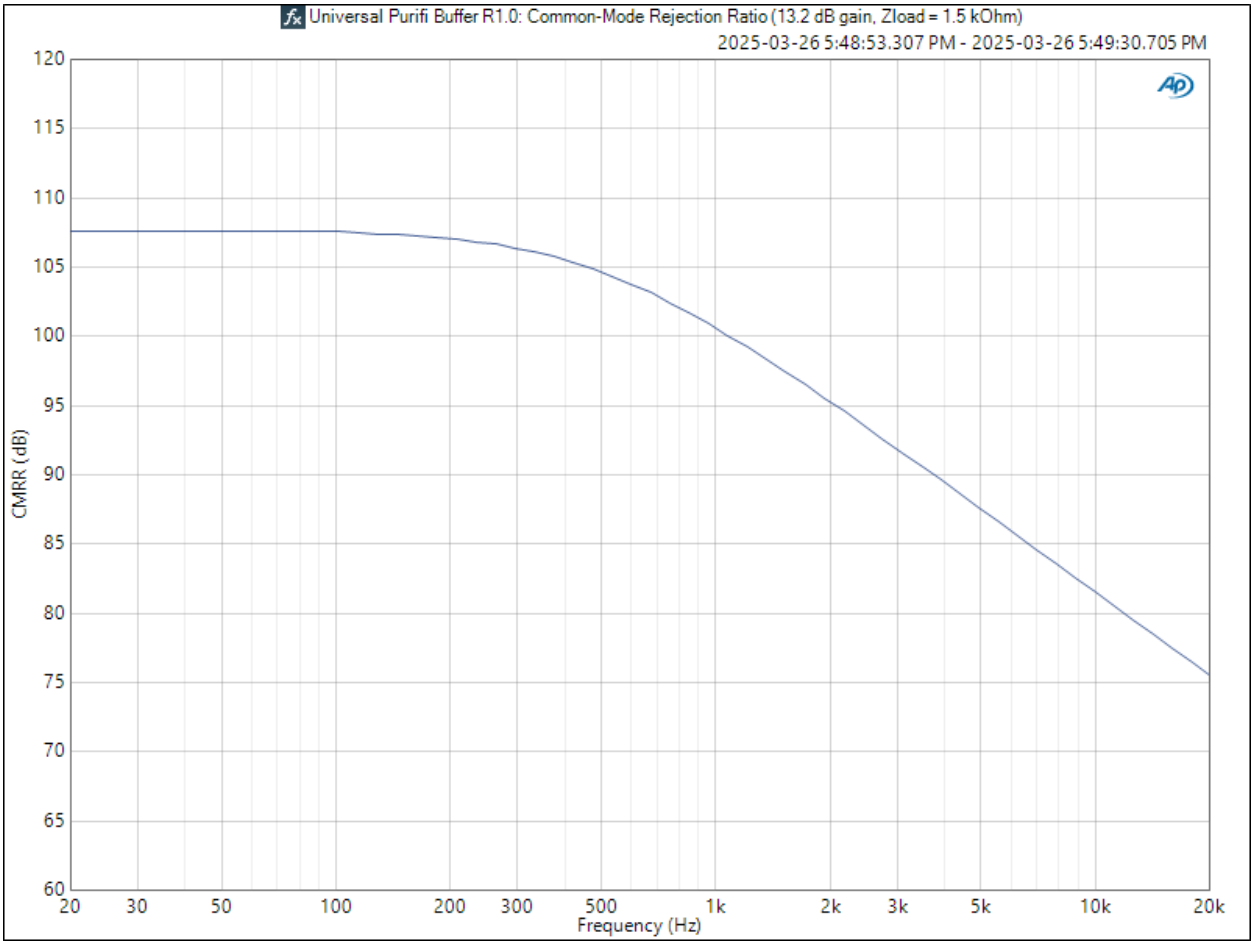


Gain Flatness, Amplitude Response, Common-Mode Rejection

The gain flatness and amplitude response of the Universal Purifi Input Buffer for the four different gain settings are shown below.



The common-mode rejection ratio (CMRR) vs frequency is shown below.



Transient Response

The transient response of the Universal Purifi Input Buffer is clean without any tendency to overshoot.